

Managing the Risky Curve – A Case Report

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Abstract

Multirrooted 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 the endodontic management of 'S' shaped root canal in maxillary first premolar.

Key words: *Bayonet shaped canal , NiTi Files, Maxillary First Premolar*

Introduction

Root anatomy is highly complex and unpredictable. The knowledge of the normal and its frequent variations can greatly enhance the success rate of endodontic practice. Variations in the number and the configuration of the root canals is not uncommon [1].

Routine periapical radiographs helps us to assess the number, length, curvature and aberration of the canal system of the tooth. Root canal curvatures can be apical curve, gradual curve, sickle-shape curve, severe-moderate-straight curve, bayonet curve, dilacerated curve [2,3].

Curved root canals exhibit great difficulty in cleaning, shaping & obturation of the root canal system, therefore determining the degree of curvature of root canal before starting the endodontic treatment is mandatory.

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 [4,5]. S- Shaped canals are also found in maxillary lateral incisors, maxillary canines, mandibular molars. S-Shaped or Bayonet shaped canals can be troublesome and challenging since they involve atleast two curves, with the apical curve being the most vulnerable to deviations in anatomy and loss of working length.

CASE REPORT

A 28 year-old male patient, reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of pain in upper left tooth region since 15 days.

On clinical examination, left maxillary first premolar had a deep carious lesion on the disto-proximal aspect. The tooth was tender on percussion. Radiographic examination of the tooth revealed radiolucency in the disto-proximal aspect, with pulp exposure. The roots of the tooth were 'S' shaped. (Fig.no.1)



Fig.no.1 Pre-operative IOPAR

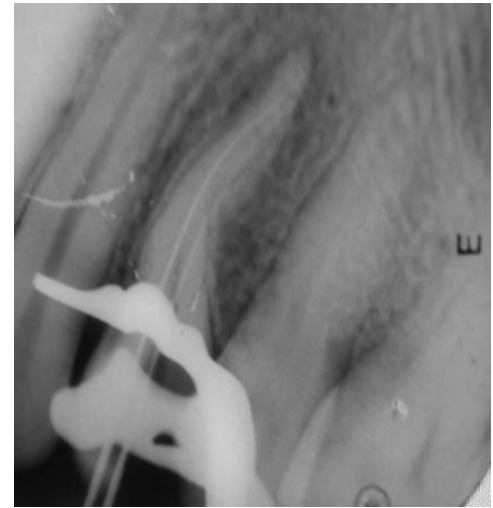


Fig.no.2 Working length determination

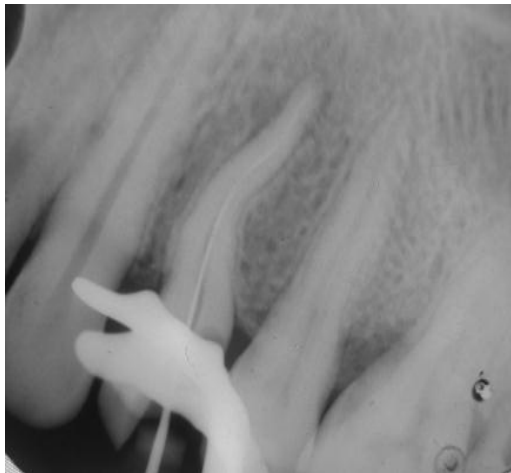


Fig.no.3 Master cone selection

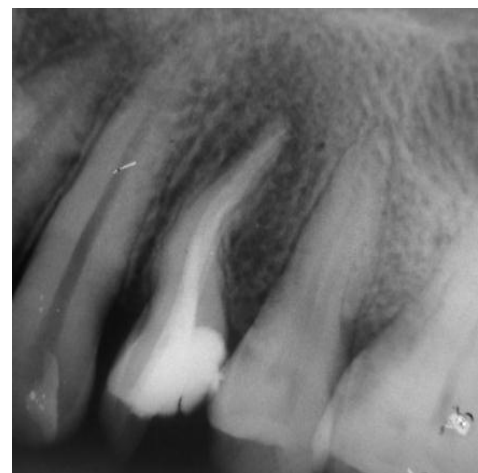


Fig.no.4 Obturation



Fig no. 5 K flex files

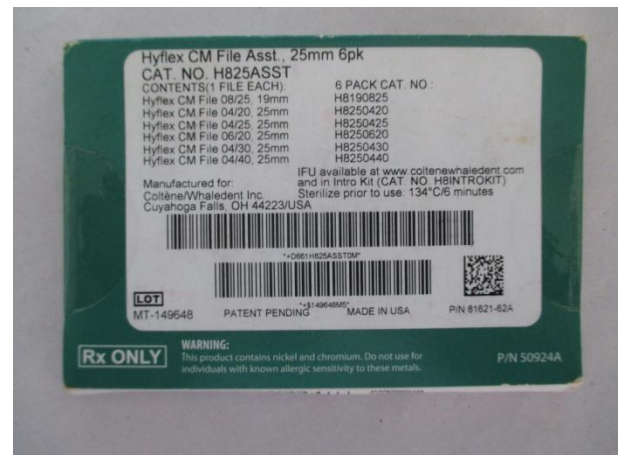


Fig no. 6 Hyflex CM Files

On the basis of clinical and radiographic findings, a diagnosis of pulp necrosis was made and endodontic treatment was initiated.

Clinical Procedure

After administration of anesthesia, the operating field was isolated with rubber dam and access opening was done. The access cavity preparation was oval in outline, in the bucco-palatal direction. The working length (Fig no. 2) radiograph was taken with K Flex Files (FKG DENTAIRE, LOT: 1358) (Fig.no.5)

The patency of the root canals was determined with help of ISO 10 size nickel-titanium K-files. The chemico-mechanical preparation was done using HYFLEX CM file system (Coltene/Whaledent, LOT: MT-149648) (Fig no 6).

Canal irrigation was done using normal saline, 2.5 % Sodium hypochlorite, and EDTA Liquid (SMEAR CLEAR, Sybron Endo), alternately with side vented irrigation probe (CANAL CLEAN, BIODENT, KOREA LOT: 30C101202). 2% Chlorohexidine was used as final rinse. After proper cleaning and shaping of the root canals, master cone was inserted.(Fig.no.3)Root canals were obturated using Roekoseal resin sealer (Coltene/Whaledent),

Discussion

The variability of the root canal system of multirouted 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.

Several studies have suggested methods to determine root canal curvature using periapical radiographs. Schneider proposed a method to determine curvature based on the angle that is obtained by two straight lines. The first is parallel to the long axis of the root canal, and the second passes through the apical foramen until intersecting with the first line at the point where the curvature starts. The formed angle (α) was named according to the degree of root canal curvature: straight: 5°, moderate, 10-20° and severe: 25-70°.

Determining the curvature of the root will permit the maintenance of the curves associated with continuously tapered shapes and prevents structural deformations of the endodontic instruments. In this way, disastrous consequences to root canal preparation can be avoided, such as loss of working length, apical transportation, creation of ledges, elbows, zips and perforations, and fracture of instruments[6].

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.

Guttman [7] suggested preflaring the coronal one-third 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 this 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 [8]. 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

With improvement in technology of file systems for example CONTROLLED MEMORY(CM), challenges like bayonet canals can be dealt more effectively. Knowledge and recognition of canal configuration can facilitate more effective canal identification and unnecessary removal of healthy tooth structure. To address challenging mid root curvatures, understanding of the complex root canal morphology and choosing a canal preparation technique, thorough irrigation, debridement and disinfection will ensure successful endodontic treatment in complex situations.

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