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Endodontic Management Of Curved Canals: Case Report

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Abstract

The curved roots in the posterior teeth often present the major challenge to the clinicians during the endodontic treatments. Dilaceration is a developmental anomaly in which there is an abrupt change in the axial inclination between the crown and the root of a tooth. It is more commonly found in posterior teeth. The efficient cleaning and shaping is affected by improper instrumentation in the curved or the constricted canals. The knowledge about root canal curvatures, periapical radiographs, instrumentation technique and root canal filling is very important to the success of the root canal treatment of dilacerated roots. This article presents case reports on endodontic management of curved canals.

Keywords: Curved canals, pre curving , balance force technique

Introduction

Successful endodontic treatment requires complete debridement , cleaning and shaping and 3 dimentional obturation of the root canals. Teeth with a straight root and a straight root canals are there but most teeth show some curvature of the canal. In addition, most of the canals have multiple planes of curvature throughout their length. Tomes, in 1848, called such curvatures as “dilacerations.[1]

It refers to the angulation or a sharp bend or a curve in the root or crown of a tooth or a deviation or bend in linear relationship of a crown of a tooth to its root.1,2 The widely accepted cause of dilacerations is the acute mechanical injury to the primary predecessor tooth which causes the dilaceration of the underlying developing permanent tooth.2 Mandibular second molar is the mostly affected tooth (1.6%) followed by maxillary first molar (1.3%) and then mandibular first molar (0.6%).[2]

In clinical situations with root canal curvatures, procedural errors like fractured instruments, ledges, zip and elbow formation, perforation may not allow for the complete disinfection leading to endodontic failure.[3,4]

So proper technique while cleaning and shaphing like using pre curve files, hand NITI files, coronal preflaring, use of balance force technique, recapitulation, glide path and newer rotary systems can be useful while managing cases of curved canals.

Case Report- 1

A 30 year old male patient with chief complaint of intermittent pain in lower right back tooth region of jaw reported to the Department of Conservative Dentistry and Endodontics. On clinical examination deep mesial caries were noted with 46. There was no pain on percussion with 46 .

Patient gave history of intermittent pain since 1 month. Intraoral radiograph showed carious exposure of pulp. Also apically curved roots were noted with 46.

So root canal treatment of 46 was decided as treatment plan. TREATMENT PLAN AND PROCEDURE -Before starting treatment Inferior alveolar nerve block was given (lignocaine with 2 % adrenaline). Isolation of tooth was done using rubber dam. Endo access bur was used for access opening of tooth. DG 16 was used to locate the orifices of root canal. Then pulp chamber modification was done using Endo Z bur . On close examination of floor of pulp chamber 4 orifices were located (MB,ML,DB,DL). straight-line access was gained in all the four canals. 8 number hand files were placed into these orifices and radiograph was taken. Then coronal pre flaring was done with orifice opener until coronal third of canals.

Then saline irrigation was done and 8 no hand K file was used to negotiate canals and curvatures apically.

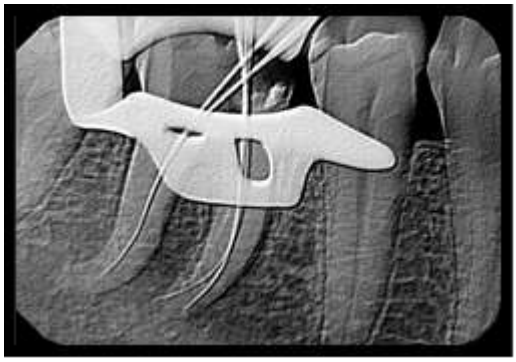
Once the canals negotiated working length was determined using apex locator. Pulp tissue was removed. Cleaning and shaping was done using hand K files, hand NiTi files and rotary files. Hand filing was done till 15 k files with continuous intermittent recapitulation with 10 k file.

Then canals were further enlarged with 15,20,25 no NiTi hand files. Balanced force technique was used for shaping of canals with hand files. After that rotary pathfinder 17 No 4% was used followed by preparation till 25 No 4% rotary file. The canals were irrigated in between with saline and 5.25% sodium hypochlorite solution. The canals were dried using paper points. The master cone gutta percha points(25 No 4%) were placed and confirmation was done using radiograph. The canals were obturated with gutta percha and sealmax as root sealing material. Excess gutta percha was removed and condensed. Then the temporary dressing was placed.

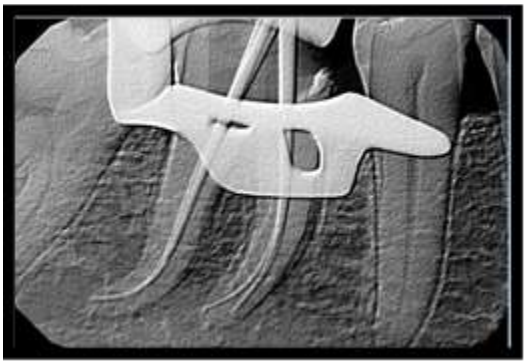
Patient was recalled after 7 days and final postobturation restoration was done.

PREOPERATIVE RADIOGRAPH 46

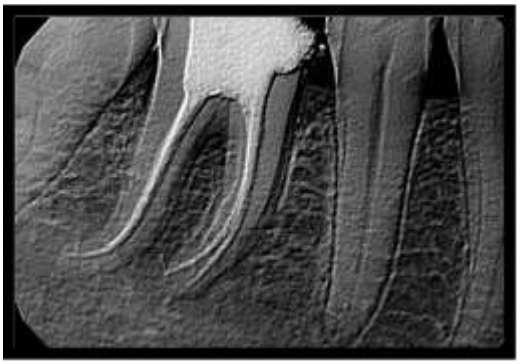
WORKING LENGTH RADIOGRAPH 46



MASTER CONE RADIOGRAPH 46



POSTOPERATIVE RADIOGRAPH 46



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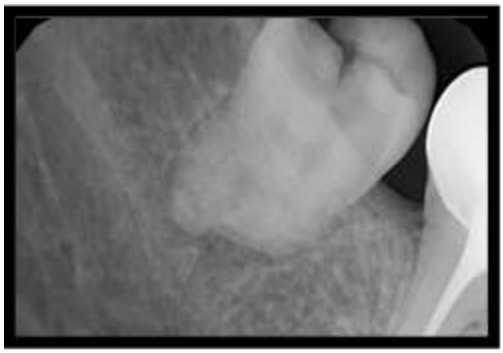
Case Report- 2

A 27year old male patient with chief complaint of intermittent pain in lower right back tooth region of jaw reported to the Department of Conservative Dentistry and Endodontics. On clinical examination deep occlusal caries were noted with 48. There was no pain on percussion with 48 . Patient gave history of intermittent pain. Intraoral radiograph showed caries exposing till pulp.

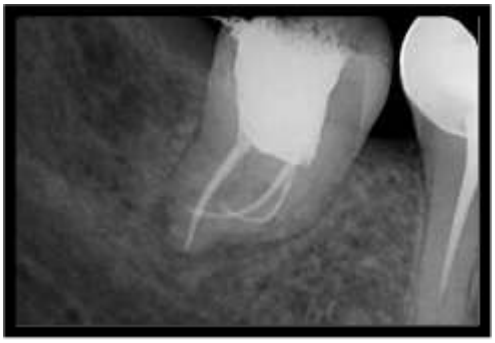
Also fused and curved roots were noted with 48. The patient had adequate mouth opening enabling root canal instrumentation.

So root canal treatment of 48 was decided as treatment plan. In similar manner, root canal treatment with balance force technique was performed with 48.

PREOPERATIVE RADIOGRAPH 48



POSTOPERATIVE RADIOGRAPH 48



Discussion-

Successful endodontic treatment involves thorough cleaning and shaping of the canals, most of the canals have multiple curvatures along their length, which pose difficulty in root canal instrumentation. Schneider in 1971 has proposed a method to determine the root canal curvatures based on the preoperative radiographs. Accordingly, the root canal curvatures are differentiated based on the angle of the curvatures such as straight (5° or less), moderate (10°–20°),and severe (25°–70°). 5It was a challenging to maintain the original shape of the canal while shaping curved canals. Majority of mishaps happen at junction of straight and curved canal. Hand preflaring with K-hand file made the coronal and apical curves more easy to negotiate. Use of NiTi files is advantageous as it is claimed that the nickel-titanium device is more effective than stainlees steel device to shape the root canal. It is because they have 2 or 3 times more flexibility.4

Various techniques used for management 0f curved canals-

1. Precurving the file- precurved file traverses the curve better than a straight file. Precurving is done by the two ways:• Placing a gradual curve for the entire length of the file
   a. Placing a sharp curve of nearly 45° near the apical end of the instrument.1
2. Precurving of all the hand instruments and use of smaller files (No. 6 or 8) facilitates easy negotiation of curved canal and reduce the amount of transportation to danger areas.2,6 Use of small no files as they are flexible enough(6,8,10 K files).1 3.Use of flexible NiTi hand files in curved canals.1
3. Use of Balance force technique while preparing canals.1The balanced force technique is less likely to cause iatrogenic damage, decreases the extrusion of debris apically and maintains the instruments centrality within the root canal.2,7,8
4. According to Gutmann coronal preflaring helps in providing a glide path before rotary NiTi files are introduced for biomechanical preparation and also the tactile control of the entire curved root canal.2,9
5. The crown-down technique of instrumentation has largely overcome the conventional step-back method.1 Special emphasis should be there on frequent irrigation of the root canal to avoid blockage by the dentinal debris and also to remove the necrotic tissue.1

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6. Various newly available NiTi rotary files are there for shaping of curved root canals such as Hyflex CM , Protaper NEXT, Flexendo files etc.

Pathfinder files or glide path are unique alternative to small size K files .2,4 Ni-Ti alloys are comparatively softer than the stainless steel, they have a lower modulus of elasticity and are more resilient and show Shape memory and Super elasticity (SE). The rotary files are helpful in flaring of coronal third and has advantages such as reduced coronal binding of the instruments, less apical extrusion of debris, and also effective irrigation of apical third of the canal.2,10

Conclusion-

The endodontic management of severely curved root canals are challenging cases. Understanding the complex root canal morphology, its curved anatomy and negotiating it with proper procedure is necessory. Choosing a proper and suitable canal preparation technique and instruments that are more helpful in such curvatures will contribute to successful root canal treatment.

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