

Retrieval of File from Canal Apical Third: A Report of Two Cases

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ABSTRACT

Background: Procedural mishaps can occur during any step of root canal during cleaning and shaping, and might affect the prognosis of treatment. Among these separation of instruments in the canal is one of the most troublesome incidents in endodontic therapy especially if the fragments cannot be removed. Several techniques have been employed to facilitate the removal of the fragments; however, they are technique sensitive, expensive and require great expertise.

Aim: This paper aims to suggest combination of techniques for retrieval of file from apical or beyond the apical third of canal.

Materials and Methods: A 30year old patient presented with pain in upper anterior tooth. Clinical examination revealed a temporary restoration in 21 with no soft tissue abnormality. A radio-visio-graph indicated 22 associated with periapical radiolucency and a separated file extending 3mm beyond the radiographic apex in the periapical area. Retrieval of the separated instrument was planned using braiding technique followed by obturation and post endo restoration.

Second case report includes a female 43 years old with pain in upper lateral incisor. IOPA radiograph revealed a separated instrument in the apical third of root canal. Retreatment was planned by first bypassing the fractured file and then using ultrasonics to loosen the fragment followed by obturation and post endodontic restoration.

Conclusion: Combining different techniques during file retrieval can retrieve file with minimal dentinal destruction.

Key words: braiding, bypass, file retrieval, H file, K file, instrument separation, ultrasonics.

INTRODUCTION

File separation is an inevitable incident in the field of endodontics which can drastically decrease the prognosis of treatment. But as it is rightly said, with every problem comes a solution and with the problem of file separation comes the solution such as bypassing the file, sealing the fragment within the root canal or leaving the fragment in the canal and obturating it till the instrument or file retrieval etc.

The reason of file separation might be excessive torque for stainless steel instruments and cyclic loading for NiTi rotary files. Literature suggests that there are 2-6% chances of file separation during chemo mechanical preparation¹. Separated instrument itself may not cause treatment failure. However, the remaining fragment in the root canal can hinder proper preparation of root canal space. Various techniques have been proposed for retrieval of file which includes Masseran kit, IRS Kit, Endosicherheits system, braiding technique, ultrasonics, the combined technique, the wire loop technique and the endo-extractor technique. It is believed that not any single technique is effective but trying a combination of techniques might work best for retrieval.

Here, two case reports have been presented in which one discusses the

retrieval of an H-file, separated beyond the apical third of 22 extending 2mm beyond the apex by bypassing the fractured file first and then using the conventional braiding technique and in the second report the fractured instrument is retrieved using a combination of techniques like making a staging platform, by-passing and ultrasonics from the apical third region of 22.

CASE REPORT 1

A 30-year-old man reported to the Department of Conservative Dentistry and Endodontics, with a chief complaint of pain in the upper front teeth for which the patient had undergone previous dental treatment twice, but with no relief in pain. The patient gave a history of initiation of root canal treatment in the upper front tooth approximately 2 months back. On clinical examination, the tooth was restored with temporary restoration. The tooth was sensitive to percussion but showed normal mobility and probing depth. There were no signs of soft tissue injury or swelling in the affected area.

An intra-oral periapical radiograph showed a peri-apical radiolucency in 22 with file like fragment lodged in the apical third of the canal extended to approximately 3mm beyond the radiographic terminus (Fig 1A). The treatment plan aimed at retrieval of file fragment followed by root canal treatment.

Under rubber dam isolation, temporary restoration was removed. Then, A 15 K-File (Dentsply/Maillefer, Ballaigues, Switzerland) was introduced passively into the canal till it reached the cervical part of the fractured file. Subsequently, a chelating solution of 17% EDTA (Prevest DenPro Ltd., Jammu, Jammu and Kashmir, India) was applied to the canal and maintained there for about three minutes.

From this point on, a pre-curved 10 k-file instrument was passively introduced up to the cervical segment of the separated

file and introduced laterally by means of longitudinal and rotational movements. After the successful process of bypassing the separated instrument with 10,15 and 20 K-file the working length was determined with apex locator and confirmed radiographically. The biomechanical preparation (BMP) was done manually with K- files and the canal was enlarged up to ISO size 40 and irrigated with 2.5% sodium hypochlorite during instrumentation. The step back technique of BMP was performed till 55 K-file. Thereafter with the help of the file braiding technique, the separated instrument was engaged as deep as possible with the help of three new H-files of ISO sizes 15, 20, and 25 (Maillefer, Dentsply, USA) avoiding further extrusion of file periapically. The H-files were inserted, buccal and lingual to the separated fragment and then the files were braided in the clockwise direction, in order to engage the file segment inside the canal. After giving a clockwise turn, they were pulled out of the canal. This technique was done for several times till the instrument got disengaged from the apical foramen and moved into the coronal third of the canal.

The canal was then irrigated with saline in conjunction with sonic agitation using an endo-activator (Dentsply, Tulsa Dental Specialties, Tulsa, OK, USA) at a speed of 6,000 cycles per minute for 3 minutes. In this process, the separated instrument vibrated into the access cavity and was retrieved with a tweezer (Fig.1B,C). A calcium hydroxide dressing was packed in the canal and the patient was recalled after 1 week.

On recall after one week, patient was asymptomatic, hence obturation was performed by Cold Lateral Compaction technique using Gutta-percha and AH plus sealer (Dentsply Ballaigues, Switzerland) (Fig.1F) after confirming the working length and master cone radiograph (Fig.1D,E) and the access cavity was sealed by a composite restoration.

Photographs of case report 1

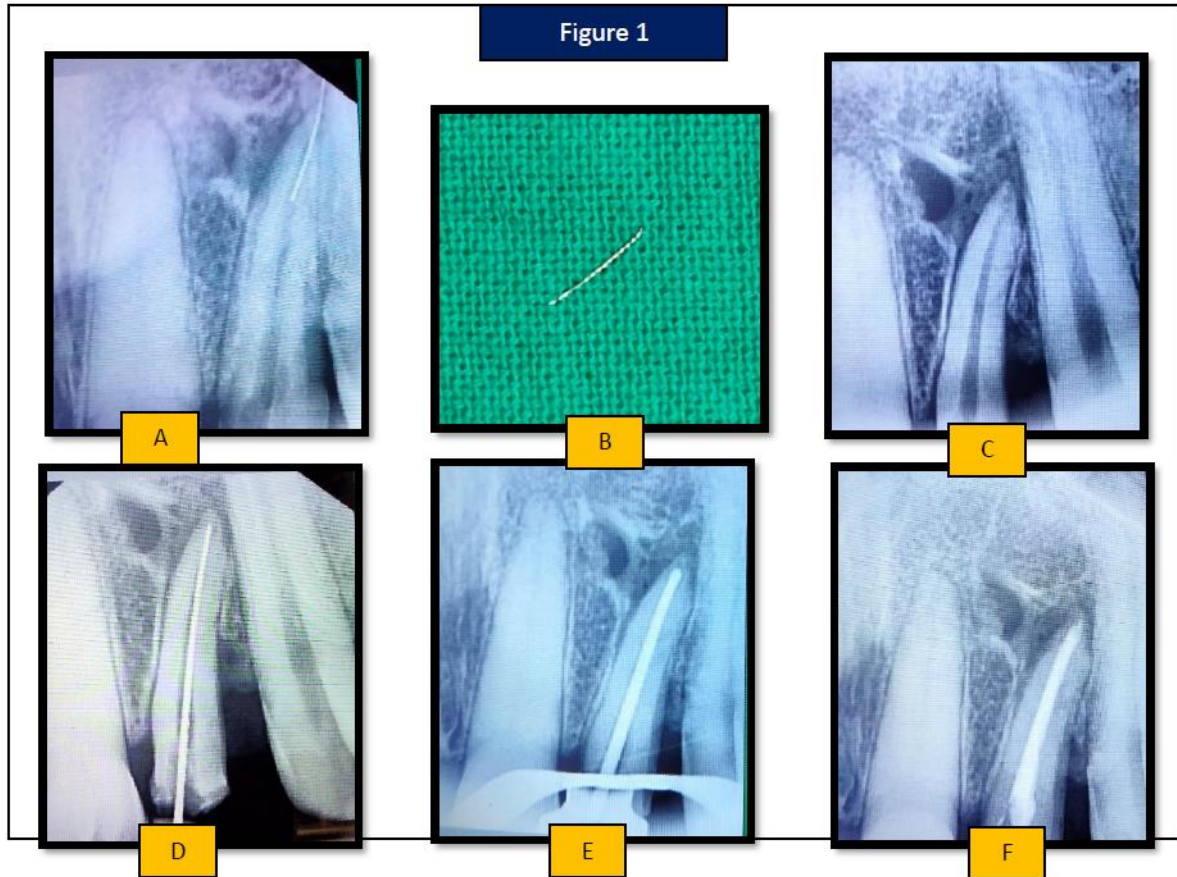


Figure1: A. Radiographic Picture of Fractured File B. File After Retrieval C. Radiograph After File Retrieval. Working Length E. Master Conef. Obturation

CASE REPORT 2

A female 43 years old reported to the Department of Conservative Dentistry and Endodontics, presented with pain in upper lateral incisor (22). Tender on percussion was present and radiograph revealed a separated instrument in the apical third region (Fig 2A).

Under rubber dam isolation, post endodontic restoration was removed. The orifice was enlarged with GG drills #1,2,3 subsequently and a staging platform was made with burrowing technique till the middle third region. Then, a 15 K-File was introduced passively into the canal till it reached the cervical part of the separated file. Subsequently, a chelating solution of 17% EDTA was applied to the canal and maintained there for about three minutes. From this point on, a pre-curved 10 k-file instrument was passively introduced up to the cervical segment of the separated file

and introduced laterally by means of longitudinal and rotational movements. The separated instrument was successfully bypassed with 10,15 and 20 K-file (Fig2B). The biomechanical preparation (BMP) was done manually with K- files and the canal was enlarged up to ISO size 40 and irrigated with 2.5% sodium hypochlorite during instrumentation. the. The step back technique of BMP was performed till 55 K-file.

Then with the help of ultrasonic like Ultra X(Orikam) and 17 % EDTA the file was loosened with the help of vibrations produced and was retrieved with the help of tweezers (Fig 2C). The working length was determined with apex locator and confirmed radiographically (Fig 2D).

The canal was then irrigated with saline in conjunction with sonic agitation using an endo-activator at a speed of 6,000 cycles per minute for 3 minutes. A calcium

hydroxide dressing was packed in the canal and the patient was recalled after 1 week.

Obturation was performed on recall visit with warm vertical obturation

technique using Gutta-percha and AH plus sealer and the access cavity was sealed by a composite restoration (Fig 2E).

Photographs of Case Report 2

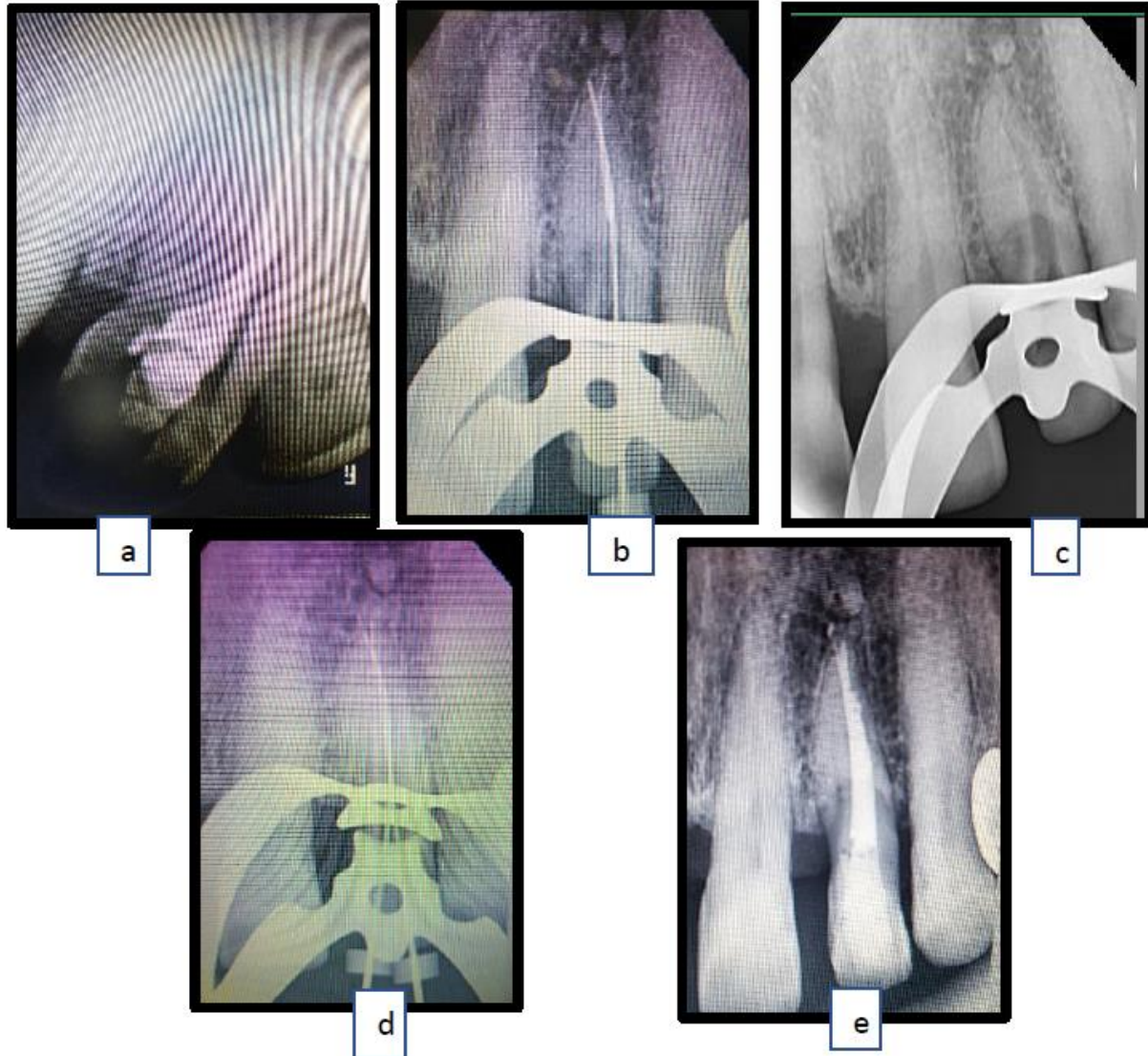


Figure 2: a. preoperative radiograph b. File bypassed c. File retrieved d. Working length e. obturation

DISCUSSION

Unwanted procedural mishaps can occur at any stage during root canal treatment amongst which instrument separation is a common one. Of all, instrument separation within the root canal system especially in the apical third region and more rarely separated piece protruding beyond the apex are among the most troublesome and frustrating errors. Separated instrument extending beyond the

apex causes a great concern for both the patient and dentist.²

Several methods and instrument retrieval systems have been proposed for retrieval of broken instruments from the root canals. Though, 100% guaranteed success no particular method can provide or can be considered the gold standard for instrument retrieval. Orthograde and surgical approaches are the two methods recommended for managing cases with broken instruments. Bypassing the

instrument, removing the instrument or preparation of the canal and obturation to the level of the separated instrument are phases of an orthograde approach. In the present case report, patient was referred by some other dentist. Thus, the actual extent of canal disinfection when the instrument broke was not known. Hence, bypassing or retrieving the separated instrument deemed necessary. Considering the non-surgical endodontics being the more conservative approach, the retrieval of instrument was attempted.³

In the Case report 1, conventional braiding technique was used because it was possible to obtain a straight line access to the coronal end of the separated instrument without creating any staging platform, and the separated fragment was also bypassed. This technique consists of inserting multiple H-files and twisting them around the foreign body is reported in endodontic literature. Since their flute design is suitable for engaging the foreign body, they would exert a gripping force which would ultimately aid in the removal of the fractured instrument.

Due to various advantages advocated in literature studies of ultrasonics in instrument retrieval such as minimal dentin damage and compatible tip designs, which can reach the apical third of the canal,⁴ ultrasonic retrieval was attempted in our case report 2.

But ultrasonics have certain disadvantages. First, ultrasonics sometimes causes secondary fracture of separated files. Ward et al.⁵ mentioned in his study that these smaller fragments are more difficult to remove than larger fragments, and the removal rates are low for fragments that are located apical to the canal curvature. Secondly, ultrasonic vibration sometimes pushes the separated file out of the canal. Thirdly, aggressive use of ultrasonics sometimes results in perforating a canal. Fourthly, the prolonged use of ultrasonics can result in a temperature rise on the root surface.⁶

A novel burrowing technique was applied in the case report 2 where a partial

platform of about 180° around the instrument fragment, oriented toward the inner wall of the curvature was made.⁷ Ultrasonic vibration should be applied intermittently to the separated file in the space created between the fragment and the inner curve of the canal, and move in "push and pull" motions until it is removed.⁶ Thus, a careful selection of instrument retrieval criteria and a proper treatment planning must be done by the clinicians before adopting any treatment procedure for instrument retrieval.

CONCLUSION

A proper treatment planning is a must for any instrument retrieval from root canal before initiation of the treatment. Though, literature offers a number of procedures that can assist instrument retrieval, choosing a protocol beneficial for that particular case is important. Thus, this case report uses a combination of techniques for instrument retrieval.

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