



Management of separated instrument retrieval by using hyflex EDM & ultrasonics – A case series

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Abstract

Instrument separation affects the cleaning and shaping of root canal, thereby causing endodontic failure. There are many techniques for retrieval of separated instrument but none of these have been standardized. First attempt of retrieval is bypassing the fragment, when one cannot achieve it retrieval is too complicated. This case paper presents on how to create a space between separated instrument and when to use of ultrasonic's to facilitate retrieval.

Keywords: Instrument separation, Ultrasonic's, Instrument retrieval.

Introduction

Separated instrument in the root canal during root canal therapy is an unfortunate complication. The separated instrument may hamper the cleaning and shaping of the root canals, which has a potential impact on the outcome of the root canal.

Every clinician who performs the root canal has different emotional levels when they come across such potential accidents as instrument separation. This provokes a distress, anxiety, and then the hope that non-surgical intervention still exists to liberate the instrument from the canal.¹

There are many methods of retrieval of such instruments from root canals like Terauchi retrieval kit, Masserann kit, Zumax file retrieval kit, Hyflex EDM, Endo cowboy, and ultrasonic's. The major part is played by ultrasonic's as it transfers the ultrasonic energy to the separated file which helps to wiggle and remove coronal 1/3rd dentin around the instrument.

Most often retrieval of the instrument is a bit easier when one could bypass the broken segment. Not all times its possible to bypass, in cases of obliterated canals broken instrument itself occupies the whole canal space. In such cases Hyflex EDM and ultrasonic's play a major role in retrieval.

This case report illustrates the separated instrument retrieval using Hyflex EDM and ultrasonic's from obliterated canals where even all bypass attempts failed.

Case Report

A 65-year-old patient reported to our Simply Smilez Dental Clinic in Hyderabad, patient gives a history of continuous pain in the lower left mandibular first molar for 2 months. This is gradual onset continuous in nature and aggravates during the night and relieves on analgesics. The patient also gives a previous history of root canal therapy done for the same by another dentist.

On clinical examination, the tooth was already prepared for the prosthesis and showed tenderness on vertical and lateral percussions. On radiographic examination shows file separation of 6mm length in the middle 3rd of the distal lingual canal.

The tooth was diagnosed as Chronic Apical Periodontitis based on clinical and radiographic findings. On the radiograph, the canal appeared to be calcified and narrow as shown in **Figure 1**. The patient was informed about the separated instrument in the canal and removal of the fragment was chosen as the treatment plan.



Figure 1: preoperative view showing broken file in middle 3rd of distal canal

Biomechanical preparation was performed; the working length was determined by using the Propex Pixi apex locator (DENTSPLY). Root canal irrigation was done using 5.25% NaOCl solution and activated using PRO AGITATOR (INNOVATION ENDO) followed by 17% EDTA irrigation.

Bypass was attempted using M access file no 8(DENTSPLY) along with 17% EDTA solution, but eventually failed after several attempts. Then Hyflex EDM 10/.05 file was passed along with 17%EDTA in the canal at a speed of 500rpmClockwise along the inner wall beside the separated instrument to create a thin space.

As the inner space is created, Hyflex EDM ONE is introduced to increase the space created at a speed of 100 rpm CW in the presence of 17%EDTA solution. Then followed by a 40/.04 EDM file at a speed of 500 rpm to facilitate more space.

Once the bypass is successful then retrieval attempts are made using ET 25 titanium-Niobium tip. The tip is placed beside the fragment and activated for 10sec which tends in dancing of file in the canal. 17%EDTA solution is used to facilitate the retrieval and activated for 10sec results in popping out of fragment from the canal. **Figure 2**

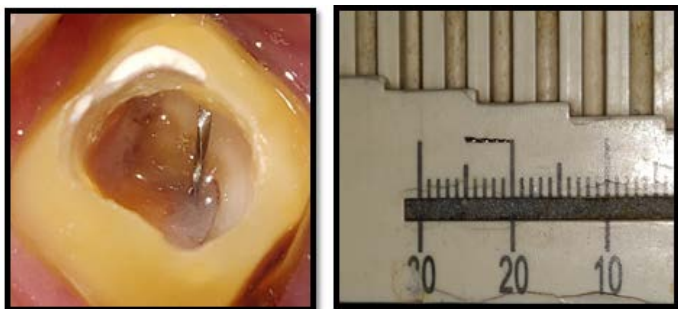


Figure 2: Retrieval of Separated segment

After successful retrieval of the file, the canals are biomechanically prepared again and irrigated with 40% citric acid and dried and obturated warm vertically.

Figure 3



Figure 3: Post-operative view after retrieval

Case Report 2:

A 17-year-old boy was reported to the Department of Pedodontics and Preventive Dentistry with throbbing pain in the lower left mandibular molar for a month. On thorough examination, the patient gives a history of

throbbing pain which aggravates on cold and hot stimuli and relieves on medication.

On clinical examination, the tooth was covered by a zirconia premium crown and has tenderness on percussion. On radiographic examination 36 tooth shows Radix Endomolaris type of root morphology with failed root canal therapy and separated file of length 6mm in apical 3rd of mesiolingual canal along with periapical pathosis. **Figure 4**



Figure 4: Preoperative view showing separated instrument Crown was removed and the re-root canal was attempted except for the mesiolingual canal. Cone Beam Computer Tomography (CBCT) was taken to know the position of the separated file in the mesiolingual canal. CBCT examination shows the apical extrusion of broken file as shown in **figure 5**

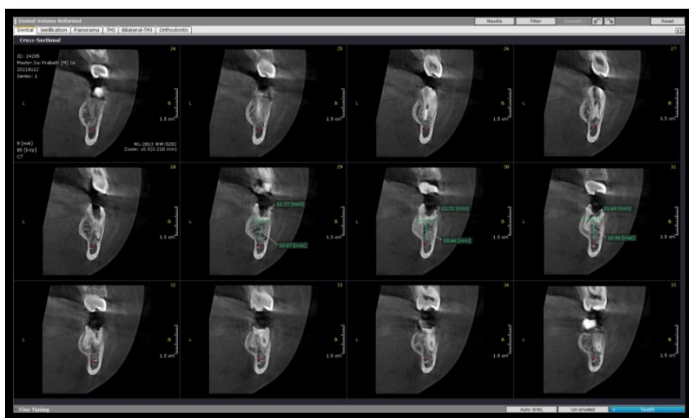


Figure 5: CBCT showing the exact position of separated instrument

On clinical and radiographic examination tooth was diagnosed as chronic apical periodontitis with a periapical abscess in all roots.

After Re-root canal was performed, the staging platform was attempted using modified GATES GLIDDEN drills no.3 till the broken file. Bypass was attempted using M access no.8 file which eventually failed as there was no space.

Hyflex EDM 10/.05 was introduced to create a thin space at a speed of 500rpm CW, which was followed by Hyflex EDM ONE file to enlarge the space then followed by 40/.04 EDM file to facilitate more space everything is done under 17% EDTA solution.

Once space was created, ultrasonic ULTRA X (ORIKAM) was introduced in the inner wall of the root canal and activated for 10sec in an anti-clockwise direction to facilitate unscrewing of broken file. After the removal of 1/3rd dentin from the coronal portion of the separated instrument, the file started wiggling.

Few drops of edible Soya bean oil are added to the root canal and activated using ULTRA X for 10sec the file started dancing and popped out of the canal. **Figure 6**



Figure 6: Retrieval of 6mm separated instrument

Biomechanical preparation was carried out and canals were prepared to size 25.06 taper and calcium hydroxide along with iodoform (METAPEX PLUS) was placed in the canals for 4 months, changing the dressing every 15 days.

Before final obturation canals were cleaned with 40% citric acid, dried properly, and obturated using cold vertical condensation. **Figure 7**

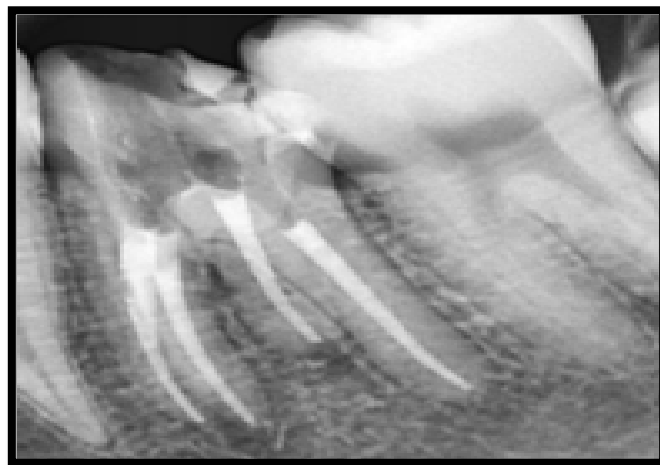


Figure 7: Post-operative view after retrieval

Discussion

Procedural mishaps in Endodontics can occur during the process of root canal therapy that can impact the success of root canals. Most often these can be a result of factors where the clinician may or may not have control of torque levels, no proper straight-line access, excessive cyclic fatigue of NiTi instruments, the radius of curvature, and torsional stress.

An instrument fracture happens in root canals if it exceeds the operating load. The fractured instrument can cause the failure of the root canal by being a stock it prevents disinfection of canal and incomplete preparation which has a negative impact.² Attempt to retrieve fractured instruments can lead to transportation of canal, ledge formation, over enlargement of canal, and perforation. Hence the clinician has to evaluate the status of pulp, canal infection, canal anatomy, the position of the instrument, and the type of instrument fractured.³

There are a lot of devices used in the retrieval process and all devices don't work in all situations and have no standardized technique. We have to choose which device is more applicable in retrieval, most often it depends on the position of the instrument and length of the fragment. If the fragment is in coronal and middle 3rd of canals easily removed through ultrasonic's, but if it's in apical 3rd and its length is more than 4mm then we require special ultrasonic tips (ET 20 & 25), modified lasso and an operating microscope to visualize, locate and remove the fragment.

The first step in any retrieval process clinician should follow some recommended guidelines

1. Obtain visual access to the coronal end of the fragment as shown in **Figure 8**.

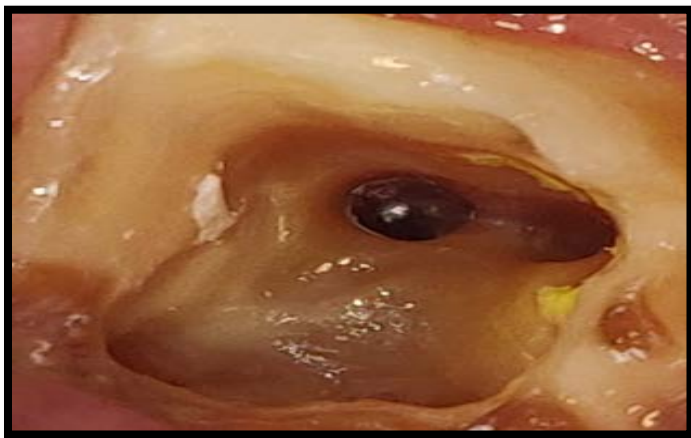


Figure 8: Visualization of separated instrument

2. Good knowledge about root canal anatomy;
3. Attempt to bypass the fragment in the first stage, if unsuccessful what to do the next;
4. Opting the right armamentarium.⁴

Following such guidelines prevent unpleasant mishaps to occur proper measures have to be taken before retrieval of any fragment.

A study by Fox et al. concluded that failure cases were associated with the separated instrument.⁵ Separated instrument can produce corrosion products in the canal which may lead to endodontic failure.⁶

Conclusion

This case report has illustrated the successful retrieval of separated fragments by use of Hyflex EDM and ultrasonic's, where even bypass attempts have failed. One should have a piece of proper knowledge and clinical skill when we come across such cases.

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