

Instrument Retrieval from Central Incisor – A Case Report

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Abstract

Instrument separation is a very common mishap in routine endodontic practice. Although fractured fragment does not affect the prognosis of the case, it may affect the subsequent steps in endodontic therapy, such as chemomechanical preparation, obturating root canals. In case of separated instrument, attempts should be made to retrieve the instrument where possible or one should try to bypass the fragment. This case report describes the retrieval of a separated instrument from central incisor of 18-year-old boy.

Key words: Instrument retrieval, Instrument separation, Retrieval methods

INTRODUCTION

A clinician can face a variety of procedural problems during endodontic treatments. These include formation of ledges, strip perforations, or separation of instruments in the canals.^[1] The introduction of nickel–titanium (NiTi) instruments has revolutionized the way we shape the canal system. Despite the various advantages and increased use of NiTi instruments, the chances of procedural mishaps are much greater (1.3% and 10.0%, respectively) than that those of stainless steel instruments (0.25% and 6%, respectively).^[2] Improper use, inadequately extended access cavities, unpredictable root canal anatomy, and very rarely manufacturing defects are the most common causes of instrument separation.^[3] The separated fragment hinders through cleaning and shaping of canals beyond the separated fragment. If the separation has occurred at the apex and a part of it protrudes out, it can cause tissue irritation and adversely affect the prognosis of the case.

Over the past decade, there has been a significant rise in the use of rotary endodontic files and with this the

incidence of separated instruments. Many factors can be attributed to the fracture of these instruments, which include operator experience, speed of rotation, degree of canal curvature, instrument design and technique, torque, manufacturing process, and most importantly absence of a well-established glide path.^[4] Instrument breakage during treatment may also lead to considerable anxiety to the clinician. The success rate for retrieval of separated instruments has been found to be between 55% and 79%.^[5] Various devices and techniques have been used for retrieving instruments. The use of ultrasonics and dental operating microscope improves the chances of successful retrievals. This article reports a case of instrument retrieval of a long fragment with the help of ultrasonics, and finally, two files twist technique.

CASE REPORT

An 18-year-old male patient was referred to our clinic with pain and swelling with maxillary left central incisor. Mild swelling and pus discharge were seen with respect to 21 and 22. The patient was referred for the management of separated endodontic file. The referring dentist gave a history of separation of Proglider file in the central incisor 2 days ago. He also sent the pre-operative intraoral periapical (IOPA) [Figure 1].

IOPA radiographs were taken to confirm the fractured fragment in the canal [Figure 2]. Periapical radiolucency

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was seen with respect to 21 and 22. The patient was informed about the separated instrument and the prognosis of the tooth and consent was taken. Routine endodontic treatment with instrument retrieval was planned for the patient. After complete history taking, local anesthesia was administered to the patient. The concerned teeth (21 and 22) were isolated using rubber dam. The temporary filling material was removed. Starting with an ISO # 6 K-file, an attempt was made to bypass the instrument at working length. Progressively, ISO # 8, 10, and 15 K-files were used. The files were used along with ethylenediaminetetraacetic acid (EDTA) gel and copious irrigation of 3% sodium hypochlorite. At every step, apex locator (i-Root) was used to check if the file had been bypassed and if the apex was reached. Once the file had been bypassed and apex was reached, a confirmatory radiograph was taken. Working length was measured to be 20 mm. Subsequent biomechanical preparation was done using progressive files along with EDTA and sodium hypochlorite for irrigation. Calcium hydroxide dressing

was placed for 7 days (Iodotin, Techno Dent) in both 21 and 22.

After 7 days, the patient was recalled. No swelling was observed. After removing the temporary filling, the calcium hydroxide dressing was removed from the canals of both the teeth and the canals were thoroughly irrigated.

After biomechanical preparation up to F2, the separated fragment became little loose in the canal. Ultrasonic tips (Cric Dental) were used to loosen it further. Two K-files No. 15 and No. 20 were inserted simultaneously to engage the fractured fragment. Once the fragment was engaged, the files were used to retrieve the fragment [Figure 3]. IOPA was taken to confirm the complete retrieval [Figures 4 and 5].

After the retrieval, through irrigation with 3% sodium hypochlorite was done. Master cone selection was done [Figure 6]. Canals were dried with paper points and obturated using cold lateral condensation technique [Figure 7]. The patient was then kept under recall.



Figure 1: Intra-oral periapical radiograph



Figure 3: Engaging the fractured fragment in two files



Figure 2: Intra-oral periapical radiograph to confirm the separated instrument in canal



Figure 4: Intra-oral periapical radiograph to confirm retrieval of file

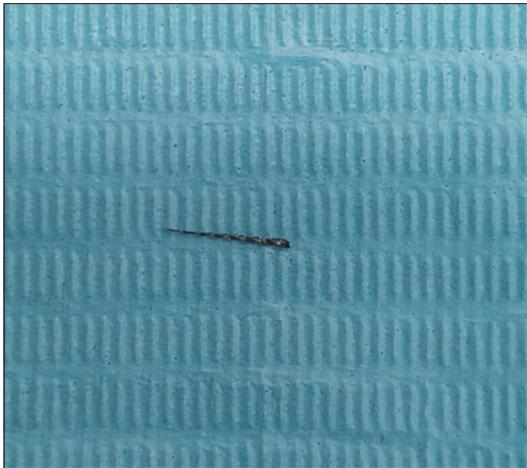


Figure 5: Retrieved fragment



Figure 6: Master cone selection



Figure 7: Post obturation intra-oral periapical radiograph

DISCUSSION

Fracture of an endodontic instrument is one of the most common procedural errors. There are various factors that

contribute to fracture of endodontic files, of which a few are listed below:^[6]

1. Operators skill – inadequate access cavity preparation, failure to achieve glide path, and improper instrumentation technique
2. Dynamics of instrument use – torque, rotational speed, engine driven or hand driven
3. Root canal anatomy or morphology
4. Fatigue of instrument and overuse.

Every case of endodontic instrument fracture creates dilemma for the operator, whether to bypass or remove the fragment. Furthermore, it is important to stress the need for additional armamentarium that is required for instrument retrieval which includes microscope, ultrasonic endodontic tips, and special endodontic instrument retrieval kits. All the devices, techniques, and methods vary in their effectiveness, cost, and mechanism of action. Hence, before a final treatment plan is designed, it is advisable to weigh the advantages and disadvantages for the success of the treatment.

Sometimes, the clinician may have to consider other factors such as periodontal status of the tooth, periapical lesion, additional financial expense, patient's anxiety related to a broken instrument in the tooth, and a potential medicolegal scenario. A few factors that should be considered in management of fracture endodontic instrument; (1) length of the fragment, (2) location of fractured fragment - beyond the apex, near apex, mid root (3) Root curvature, length, thickness.

The fracture of endodontic instrument is unpredictable but few precautions that one should take to reduce the risk of fracture,^[7]

1. Access cavity preparation should be adequate for visual access
2. Choosing the right armamentarium based on the instrumentation technique
3. Establish a glide path and a straight-line access to reduce flexion of files and resistance at multiple points
4. Follow the recommended torque values for rotary instruments.

CONCLUSION

Prevention is the best solution to avoid fracture of instruments. However, if such a situation arises, its best to weigh the advantages and disadvantages of bypassing, retrieving, or leaving the instrument *in situ*.

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