

Retrieval of a Moving Fractured File in the Root Canal: A Case Report

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Abstract:

Background: With an increasing demand of root canal treatment, iatrogenic mishaps do occur in daily practice. The separation of instruments during non-surgical endodontic treatment is a troublesome incident and the incidence ranges from 2 – 6 % of the cases. Instrument separation can occur at different levels along the length of the canal. The most common causes for file separation are improper use, limitations in physical properties, inadequate access, root canal anatomy and possibly manufacturing defects. The separated fragment blocks the access to thorough root canal cleaning and shaping procedure apical to the level of separation or irritates the periapex when it juts out of the root apex. Attempt to bypass or retrieve the instrument should be made before leaving it and obturating to the level separation. The present case reports a rare case of moving file in an upper lateral incisor.

Key Word: Separated instrument, moving file, periapex.

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I. Introduction

Unfortunate occurrences tend to happen during endodontic treatment some due to detailed inattention and some mostly unpredictable.^{1,2} Endodontic mishaps may be attributed as access, instrumentation and obturation related or miscellaneous. One such commonly occurring endodontic procedural accident is instrument separation.^{2,3} A retained metallic obstruction in the root canal is generally a consequence of instrument fracture or separation during the endodontic therapy. Considering stainless steel and nickel- titanium (NiTi) instruments, the prevalence of retained fractured endodontic instruments has been reported to a range from 0.4% to 7.4%.⁴ A separated instrument prevents thorough root canal cleaning and shaping apical to the level of separation and hinders the clinician from optimally preparing and obturating the entire root canal system. A broken instrument management is highly challenging to any experienced and competent clinician.⁵ Here we aim to discuss a peculiar case of management of moving separated file in an apical third curvature of an upper lateral incisor during interappointment period.

II. Case Report

This case report describes a rare case of migration of separated instrument which was bound at the apical thirds and not freely mobile. The file migrated back inside the canal to the middle third from its initial location in apical third between the two appointments time frame.

A 35-year-old male patient was referred to the Department of Conservative Dentistry & Endodontics, K M Shah Dental College and hospital for intentional endodontic treatment in upper left lateral incisor for prosthodontic rehabilitation in the partially edentulous region of upper left maxillary region. The patient had dental history of extraction of upper left central incisor 15 years back. During clinical examination the tooth was not sensitive to percussion and palpation. Intra oral periapical radiograph (IOPA) revealed a severe curvature in the apical thirds of the lateral incisor. Local anaesthesia was administered after rinsing the patient's mouth with 0.2% chlorhexidine and isolation was done with rubber dam. Access opening was done and the working length was established till the full working length using 20 K NiTi file. Crown down preparation was planned with hand instrumentation at apical thirds. Unfortunately, the 25 K hand file got separated at the apical thirds which was confirmed upon taking the IOPA. As the patient was asymptomatic at the time of fracture of fragment and the fractured fragment was in an inaccessible location the patient was kept on recall basis. The patient was asked to report to the department in case pain arises. Upon 2 weeks patient reported with tenderness to both percussion and palpation in 22 region. IOPA was taken to localise the fragment and check the periapical status and it was found that the fractured fragment had moved from the apical thirds and beyond the curvature to a much more accessible location (before the curvature and in coronal thirds). Hence it was decided to retrieve the fragment

under magnification and passive ultrasonics. Ultrasonic vibration using Ultra X (*Orikam, Eighteeth*) was applied and moved in “push and pull” motions between the fragment and the inner wall of the canal until the separated instrument jumped out of the canal. The fractured file fragment popped out on when the canal was irrigated again with saline. A radiograph was taken to confirm retrieval of the file fragment. The retrieved file fragment was approximately 4 mm long. After instrument retrieval, working length was determined using radiograph and electronic apex locator. 5.25% sodium hypochlorite and 2% chlorohexidine were used for irrigating the root canals and calcium hydroxide as an intracanal medicament was placed after completion of root canal preparation for 2 weeks. In the subsequent visit, obturation was carried out cold lateral compaction technique using gutta percha points and AH Plus sealer (*Dentsply Maillefer*). Post-endodontic restoration was done using flowable and packable composite (*Palfique, Tokuyama*). After removal of rubber dam, final occlusion was checked and adjusted. Finishing and polishing of restoration was done and the patient was suggested to undergo prosthetic rehabilitation of the missing tooth.

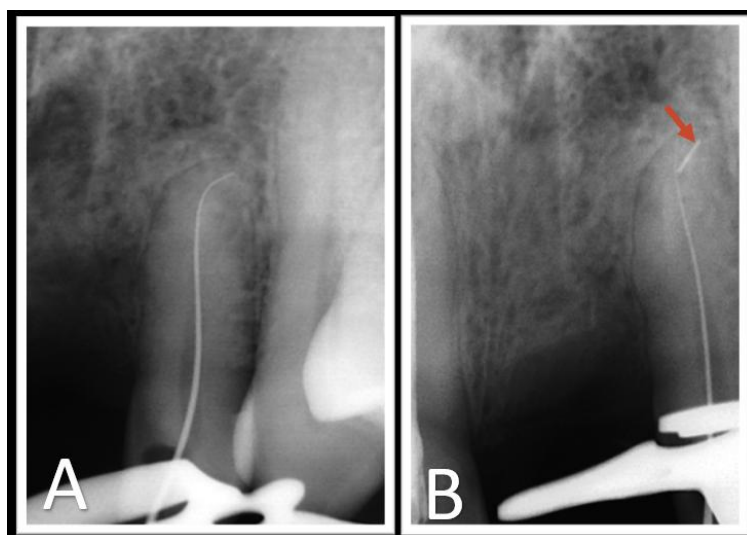


Fig 1: a) Initial working length b) Fractured file at the apical third of 22

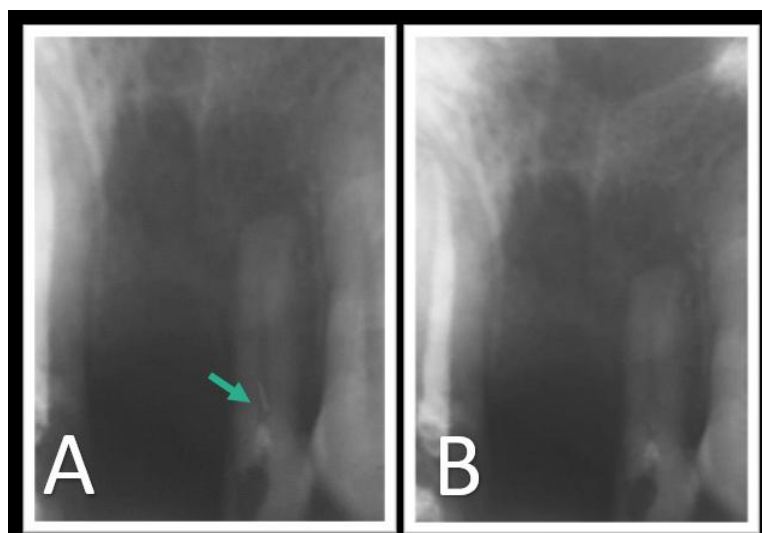


Fig 2: a) Moving file in the coronal thirds in the next visit b) After fractured file retrieval

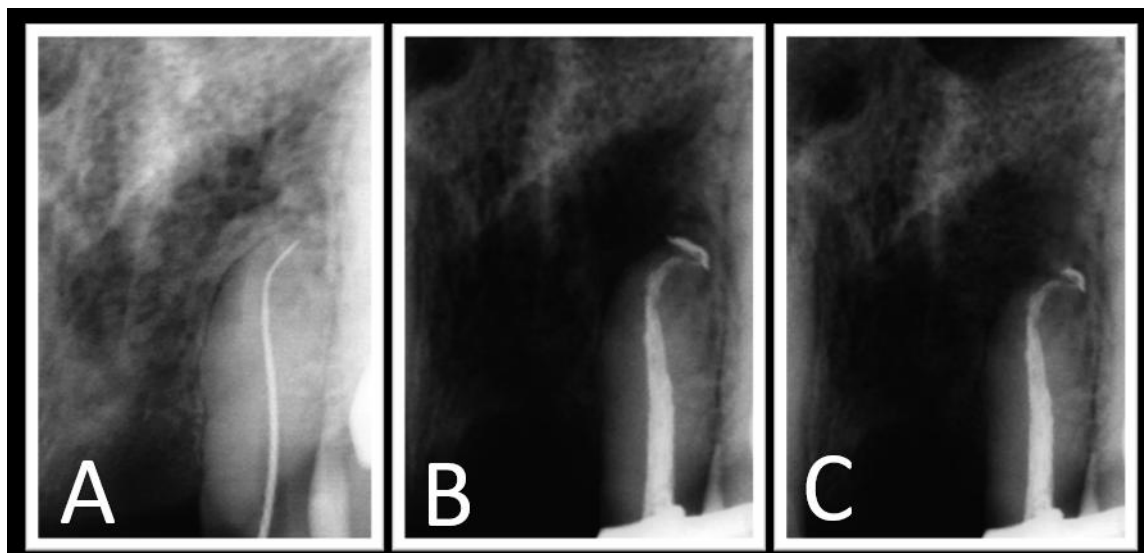


Fig 3: a) After cleaning and shaping with master apical file b) Post obturation c) Recall after 3 months

III. Discussion

The decision for management of separated instrument is governed by multiple factors such as the strategic importance of tooth, location of separated segment in the canal, cleanliness of the root canal system, risk of complications, armamentaria available and presence of pre-existing periapical pathology.^{6,7} If the clinician is well experienced and competent enough retrieval depends upon the accessibility of the fragment. If the fragment is accessible (coronal or middle thirds or before the curvature) an attempt to retrieve the fragment can be done. In case retrieval fails bypassing the fractured fragment or obturating coronal to separated segment is advised. If the fragment is inaccessible (apical thirds or beyond the curvature) and there is pre-existing periapical pathology non-surgical endodontic treatment is not advocated. Endodontic surgery and extraction of the involved teeth is the last option in management of separated instrument.⁸

The most common location of instrument fracture is in the apical third of the root canal. The probability of file separation in the apical area was estimated to be 33 times greater compared to the coronal third of the canal and almost six times greater when compared to the middle third of the root canal.⁹⁻¹² In this present case, the separated instrument initially was in the apical thirds of the canal and beyond the curvature which made it difficult to retrieve.

However, as the file moved up the coronal thirds and before the steep curvature it was much easier to retrieve. The file movement can be attributed to gravity as the tooth is in maxillary arch. Yet another reason of significance is inflammation in the periapex. Movement during inter-appointment can be due to pressure created by inflamed periapical tissues as a result of irritation from the foreign body in the root canal leading to increased vascularity and the inflammatory transudate leading to pressure build up. This transudate from the periapical area could have caused the file to move up in the canal. Other alternatives for movement of file were copious irrigation, negative aspiration after irrigation and placement of intra canal medicament. But since the patient with tenderness and severe pain in the next visit the most probable reason for this rare occurrence of movement of the fractured file was inflammation at the periapex and pressure from the inflammatory transudate.

There are a variety of instrument retrieval devices, but the third eye of operating microscope and the passive ultrasonic tips have paved way into the practice of endodontists.¹³ The passive non cutting nature of the ultrasonic tips and the magnification with aided illumination provided a greater advantage for retrieval of the separated instrument.^{8,14}

IV. Conclusion

Based on the case reported, it can be assumed that there are many assumptions for the movement of the separated fragment in the canal and the inflammatory transudate and gravity can be cited as the most possible reasons. The movement of the file is yet to be fully understood. The various complications associated with instrument retrieval was also avoided in this case.

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