

A Rare Case of Periapical Healing in an Apically Extruding, Separated Instrument

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Abstract:- Endodontic file separation is a common mishap during cleaning and shaping procedures. Even though there have been many recent advances in the material science of endodontic files, instrument separation is sometimes inevitable. There are several treatment options available after instrument separation. In our case, a patient was referred to us with a separated instrument extending 4 mm beyond the apical foramen. Following the re-treatment, a guided periapical surgery was planned, and the patient was given long-term intracanal medication. At 3 months, the patient was symptom-free, and the lesion had reduced in size despite the fact that the endodontic file was extending apically. At 6 months follow-up, uneventful periapical healing occurred.

Keywords:- Apically extruded file, Periapical healing, Re-treatment, Separated instrument.

I. INTRODUCTION

In the event that an instrument becomes separated during root canal treatment, the best option is to retrieve it [1]. Clinicians should manage the case both clinically and legally. Separated instruments can be managed both conservatively by non-surgical treatment or by a surgical approach. This could include removing the fragment, bypassing it, or obturating at the level of the separated instrument [2]. Intracanal separations are managed more conservatively, whereas fragments beyond the curvature, at the apical third, or extending peri-apically are managed surgically.

There are many guidelines suggested for the prevention of instrument fracture, including examination of the instrument before use, avoiding use in a dry canal or overusing the instrument, and using files according to the manufacturer's instructions. The risk of instrument fracture is generally accepted to increase with the complexity of root canal anatomy. A higher prevalence of instrument separation has been seen in molars [5,6]. In addition to the intricacy of root canal configuration, a number of additional factors, such as excessive instrument use, incorrect file insertion, and a lack of practitioner competence, increase the likelihood of instrument separation [6]. It should be taken into consideration that, most of the time, the separated instrument does not have a significant impact on sealing the root canal. On the other hand, a tight coronal seal and the absence of irritants at the level of the separated instrument might boost the success rate [3].

An attempt to remove broken instruments could result in ledge formation, over-enlarging and transporting the prepared root canal, or perforation. As a result, the clinician must decide whether to try to remove the instrument, bypass it, or leave the broken instrument in the root canal. The pulpal condition, canal infection, canal anatomy, the location of the broken instrument, and the type of the fractured instrument should all be taken into account while making this choice [7].

II. CASE REPORT

A 25-year-old male patient was referred to the department of conservative dentistry and endodontics with the chief complaint of pain in the mandibular right posterior region. When the percussion test was applied to tooth No. 46, the patient experienced tenderness. A periapical radiograph revealed periapical radiolucency and separated instrument extending apically from the distal root (Figure 1). The patient reported that the tooth was tender on percussion and gave a history of prior root canal treatment. A diagnosis of symptomatic apical periodontitis in a previously treated tooth was given (Figure 1). Considering the fact that the endodontic instrument was 4 mm long and extended beyond the canal, guided periapical surgery after endodontic re-treatment was planned.

After local anesthesia with 2% lidocaine and epinephrine (1:10000), the crown was sectioned and removed. After rubber dam isolation, any old restorative material was removed, and gutta-percha cones were removed using Gates-Glidden drills (Dentsply Maillefer, Ballaigues, Switzerland). Working length was determined using an apex locator (Root ZX; J. Morita) and was confirmed radiographically (Figure 2). Cleaning and shaping were performed using the Protaper Gold rotary system and a 5.25% sodium hypochlorite solution. A long-term intracanal medicament was placed. In the meantime, the patient was referred to the department of oral radiology for CBCT, and a 3D printed surgical guide was planned for periapical surgery and instrument retrieval.

After three months, the patient was called back, the intracanal medication was removed, and the canals were dried with paper points. Continuous wave compaction (System B; SybronEndo, Orange, CA) and thermoplasticized gutta-percha backfill (Obtura II; SybronEndo) were used for obturation. AH Plus (Dentsply Maillefer) was used as the root canal sealer (Figure 4).

However, on the periapical radiograph, complete healing of the periapical tissue was noted. Additionally, the patient was negative for tenderness to percussion. Thus, after thorough discussion with the patient, it was decided not to go with peri-apical surgery as the periapical lesion had healed and the patient was free from any symptoms. Complete healing was noted at the 6-month follow-up (Figure 5).

III. DISCUSSION

Anatomical complexities such as thick buccal cortical plate increases the complexity of the peri apical surgery [8,9]. Also, the amount of bony defect impacts the healing potential after endodontic surgery. Excessive bone destruction causes delayed healing process or even unsuccessful healing and increases the risk of post-operative complications [10,11]. Post-operative trauma during surgery causes inflammation which leads to complications such as swelling and pain [12].

There are various techniques for managing instrument separations such as using ultrasonics, tube and hedstrom file technique, bypassing instrument, instrument pliers, Masserann etc., Additionally, operating microscope is considered very valuable for retrieval when the fractured fragment is visible [13]. However, a straight-line access is needed to view the coronal part of the fractured fragment in order it to remove it, which was not possible in this case.

An instrument fracture in itself could rarely be a direct cause of failure. However, it does limit access to the apical portion of the canal, compromising effective disinfection and obturation. The pre-existence of a periapical lesion, stage of cleaning and shaping, canal anatomy, fragment position, and type of instrument fracture can significantly influence the outcome and management of a particular case [14]. The apical portion is the site that most commonly encounters instrument separation. In this location, bypassing or retrieval should be initially considered. However, attempts at removing a fractured instrument can worsen the situation through ledge formation, over-enlargement, transportation, and perforation of the root canal space. Thus, the risk of removing a separating instrument should always be balanced against its possible benefit [15].

In this case, a guided endodontic surgery was planned from the beginning. However, after three months of recall and long-term intracanal medication, the periapical radiolucency was reduced, so the original plan was not followed and conventional re-treatment and periodic assessment were considered the choice of treatment.

IV. CONCLUSION

When considering the retrieval of a broken endodontic instrument, the potential risk should be balanced against the potential benefit. Endodontic instruments alone are rarely the sole cause of failure.



Fig. 1. Preoperative radiograph



Fig. 2. Working length radiograph



Fig. 3. Master cone radiograph



Fig. 4. Postobturation radiograph



Fig. 5. 6 months recall radiograph

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