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## Case Report

# A novel approach for retrieval of separated endodontic instrument: Two case reports

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### ABSTRACT

The most common endodontic mishap that eventually occurs during any root canal therapy is the separation of instrument inside the canal. The separated instrument influences the final outcome and prognosis of the root canal therapy. The clinician is confronted with a few options when considering this situation. These options can include leaving the fragment or incorporating the fragment to form part of the final obturation or removal from the root canal. Once the decision is made to remove the separated instrument, the clinician must realize that the procedure can be one of the most difficult treatments to attempt. This case report describes retrieval of separated instrument in the middle to apical third area using ultrasonic tips and braiding technique.

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## 1. Introduction

Every clinician who has performed endodontics has experienced procedural accidents such as separation of an endodontic instrument. The frequency of separated endodontic instruments ranges between 2 to 6%.<sup>1</sup> The common causes for file separation are inadequate access, overuse of the instrument as happened in this case, continued use of large instrument in curved canal and absence of a glide path. Use of ultrasonics with dental operating microscope for improved magnification has also proven to be a useful adjunct.<sup>2</sup> However, ultrasonic techniques are time-consuming and have only moderate success.<sup>3</sup> In this report, ultrasonics and file braiding technique was used under magnification.

## 2. Case Report 1

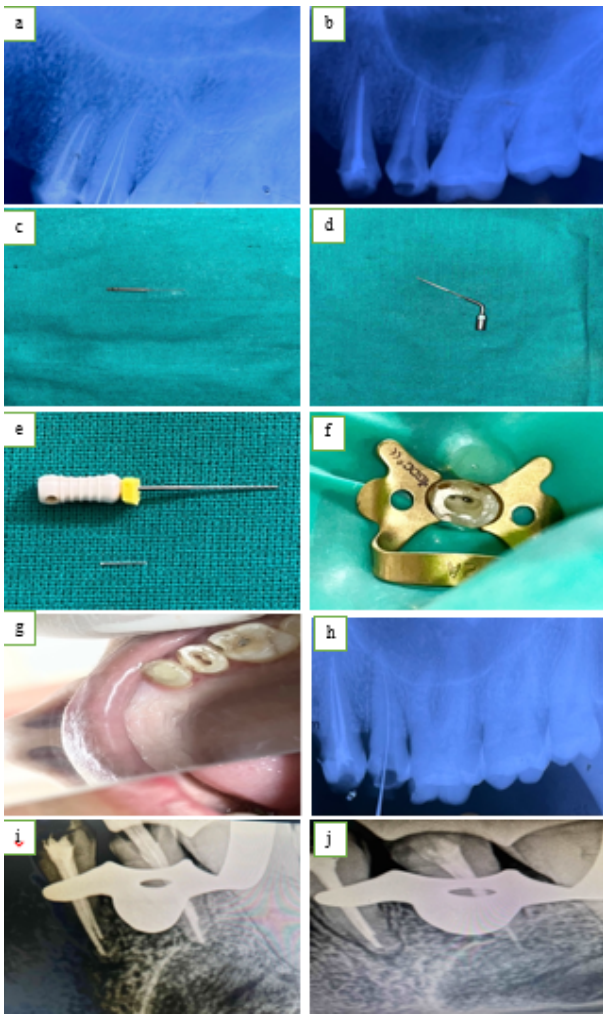
A 35 year old female came to the department of conservative dentistry and endodontics for intentional root canal therapy. After applying local anaesthesia, rubber dam isolation was placed around a single tooth #15. The access cavity was prepared and two canals were negotiated.

The working length of the canal was established and confirmed using K-file #8 as the canals were constricted. During pulp extirpation of the palatal canal with a stainless steel 15 H file, the instrument was separated. A radiographic examination showed that the instrument's location was extended from the apical third to the middle third of the palatal canal.

The patient was informed about the incident, and the treatment plan included the removal of the fragment. Coronal flaring was done by preparing the palatal canal to the length till the fragment could reach upto 55 stainless steel K file. The gates glidden was modified by cutting the tips perpendicular to the long axis of the bur's cross sectional. After that, staging platform was created with the

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**Fig. 1:** Sequence of fragment removal in case 1; **a:** Working length established; **b:** Radiograph showing the separated file in palatal canal; **c:** Modified Gates Glidden drill; **d:** Ultrasonic tip (ET 40); **e:** Separated file tip measuring around 5 mm retrieved from the palatal canal; **f-g:** File retrieved; **h:** Working length established again; **i:** Intraoral periapical showing obturated maxillary second premolar; **j:** Post obturation done

modified gates glidden drills size 1,2,3 (dentsply maillefer, Balaguer, Switzerland). The ultrasonic tip (ET40) was activated first at the inner dentinal wall of the canal. Ultrasonic vibration was applied and moved in push and pull motions between the fragment and inner wall of the canal and additional troughing was performed in the palatal aspect of the canal to free the instrument from dentin until the separated instrument vibrated and moved to the other position. The procedure was carried out under magnifying loupes (x2.5 magnification) (Heine, Germany).

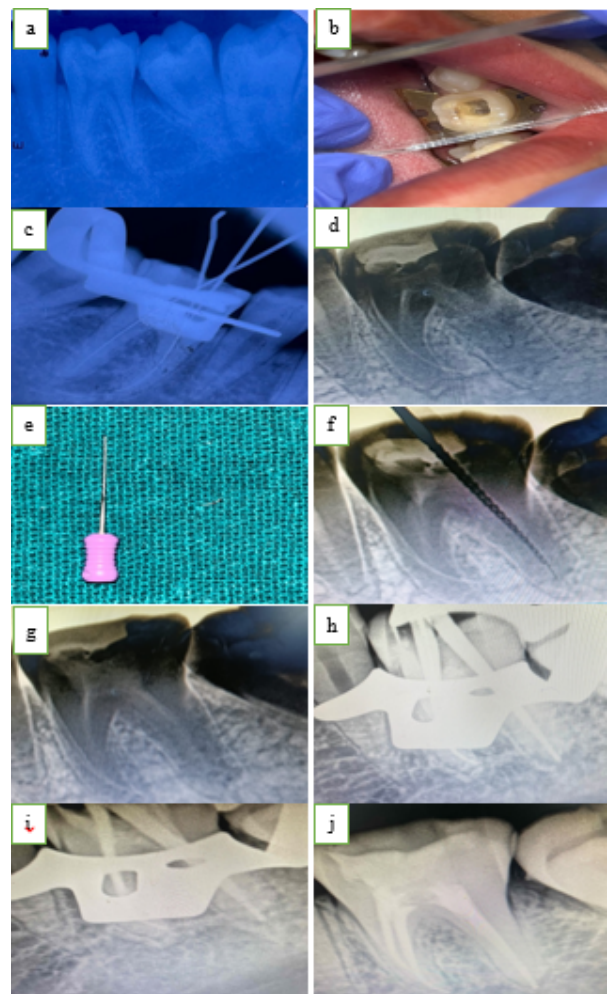
Copious irrigation was done with saline and 5.25% sodium hypochlorite. Then the file jumped out of the canal. A radiograph was taken to confirm the retrieval of the file fragment. The retrieved file fragment was 5 mm long.

After instrument retrieval, working length was determined with IOPA radiograph and electronic apex locator (Coltene Canal Pro).

Biomechanical preparation was done using rotary file (NeoEndo, Orikam Healthcare, India) upto 25/4. After 5 days, tooth was obturated with gutta-percha and calcium hydroxide based sealer (Sealapex; kerr CA, USA).

### 3. Case Report 2

A 28 year old female patient came to department of conservative dentistry and endodontics with a chief complaint of pain in lower left back tooth region since 20 days. The preoperative radiograph showed mesial proximal carious involving the pulp chamber.



**Fig. 2:** **a:** pre-op radiograph of mandibular first molar; **b:** Intraoral view of negotiated canals in mandibular first molar; **c:** Working length established; **d:** Radiograph showing the separated file in distal canal; **e:** Separated file tip measuring around 3 mm retrieved from the distal canal; **f:** Engaging the separated fragment in two files (20 H, 25 H files); **g:** File retrieved; **h:** Master cone placement; **i:** Obturation; **j:** Post obturation done.

Root canal treatment was initiated and while negotiating distal canal with 10 K stainless steel file, the file got separated.

The patient was informed about the incident, and the treatment plan included the removal of the fragment. Coronal flaring was done by preparing the distal canal to the length till the fragment could reach upto 45 stainless steel K file. After that, staging platform was created with the help of modified gates glidden drills size 1, 2 and the dentin was cut circumferentially around the file. Then the file was visible and with the help of braiding technique, the two new H files were used (20 and 25 H file) to engage the separated instrument as deep as possible. The files were rotated anti-clockwise with a short outward pull which resulted in the removal of instrument from the canal.

A calcium hydroxide dressing was given as an inter-appointment dressing. The patient was recalled after 10 days and obturation was completed.

#### 4. Discussion

Instrument retrieval from root canal depends on the experience, skill of the operator and the anatomical factors of the root canals as success rate for these tooth reported being 55–79%.<sup>4</sup> When the endodontic instrument gets separated during root canal treatment, it hinders further cleaning and shaping of the root canal system. Such inability to further clean and shape the root canal system can compromise the outcome of the treatment. The prognosis of these teeth is lower than that of a tooth with normal endodontic treatment. Hence every attempt should be made to retrieve the separated instrument from the canal for a successful root canal therapy.

The use of an ultrasonic instrument assisted by a microscope is a conservative method of handling a broken file compared to other alternatives. It can erode the structure of the dentine conservatively and is less likely to damage the root structure and periodontal tissue.<sup>5</sup>

It is generally believed that H- files, NiTi rotary instruments, and shorter fragments are more difficult to remove compared with K-file, SS rotary instrument and longer fragments respectively. The file separated in this case was an H-file which according to Himel VT, Levitan ME is more challenging to retrieve as they have larger helix angle, deeper flutes and greater positive rake angle resulting in greater engagement with root canal.<sup>6</sup>

#### 5. Conclusion

The corrective measure for separated instrument is prevention. However, in case of separation, it is preferable to remove the fragment and pursue treatment. The use of ultrasonics along with magnification is one of the most

effective method as well as use of file braiding technique is simple, conservative and easily available strategy for retrieval of separated instruments.

#### 6. Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

#### 7. Source of Funding

None.

#### 8. Conflicts of interest

There are no conflicts of interest.

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