

## Intracanal Foreign Object In An Open Apex: Considerations & Case Report

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**ABSTRACT:** The presence of foreign object in the root canal is uncommon & often diagnosed accidentally. Some people have a habit of placing foreign objects to remove food plugs from the teeth. However, occasionally, these objects may get lodged deeper within. Foreign objects may act as a potential source of infection & may later pose more serious clinical problems. A detailed examination and a meticulous approach is required to ascertain the location, size and type of separated instrument/ lodged fragment before attempting its successful retrieval.

In this article, we present a successful endodontic management of foreign object lodged in the apical portion of maxillary right central incisor root with an added challenge of open apical configuration using simple, inventive and economical H-file braided technique followed by apexification using biodentin using a custom made guttapercha based plugger.

**KEY WORDS:** Foreign object, Open apex, Braided technique, Apexification, Biodentin, Retrieval.

### INTRODUCTION

The primary aim of non-surgical root canal therapy is removal of bacteria laden biofilm from a seemingly accessible canal lumen as well as from an intricate maze aptly named "root canal system".<sup>1</sup> To achieve substantial success in this venture, biomechanical & chemical means are

employed. The fruition of such efforts is the prevention and management of periradicular pathosis, thereby enhancing one's quality of life.<sup>2</sup>

The onus of success in root canal treatment is dependent upon a few key precepts such as maintenance of proper isolation, consistent irrigation, judicious yet biologically driven instrumentation and an unyielding obturation culminating in creation of an environment in which the tooth/body can heal itself.<sup>3</sup>

Root canal treatment seems to be an easy affair at the outset but comes with its own share of imminent risks, which can hamper the end results. Such iatrogenic errors include missed canals, blockages, ledge formation, transportation & perforations to name a few.<sup>4</sup> Most perilous among such aberrations is the separation of a file/instrument within the canal space due to an unrestrained approach to instrumentation.

In truth, a procedural accident often impedes/makes it impossible to accomplish appropriate intracanal procedures. In such cases, next crucial step is resolution of those problems. It is of prime concern to make an earnest effort in disinfecting the canal in such special circumstances, more so when the tooth has an open apex. On the other hand, we can bypass the file/foreign object and make it a part of root canal filling depending upon the location, size and type of separated instrument & anatomy of the tooth.

There are a plenty of techniques available to retrieve such broken instrument/foreign objects. Systems like Endo-extractor, Masserann kit, Endo Extractor system, Ultrasonic devices, Caulfield elevator tip, Stainless steel tubing with H-files etc., have consistently found a place in the dental office. The fact remains however, that such techniques are rarely used by undergraduates /general practitioner. Lesser awareness of our budding practitioners about such methods and hesitancy in pursuit of such challenging scenarios are the probable reasons, not to mention that there are simpler techniques which can also be helpful in such cases, e.g., bypass followed by traction, adhesive traction or the braided file techniques to name a few.<sup>5</sup> This article attempts a foreign body retrieval in an open apex case using a H-file braided technique.

## CASE REPORT

A 14 year old male patient approached the Conservative dentistry and Endodontic clinic in the premises of SaraswatiDhanwantari Dental College, Parbhani in order to get his anterior tooth looked upon. He complained that the tooth had sustained a traumatic injury before 2 years for which he was treated at a local dentist. Upon apparent relief of symptoms, the treatment was discontinued by him. However, a change in color of the tooth in the last 1 year prompted a second visit by him to our clinic. An intraoral periapical radiograph of the region was taken in which the presence of a linear radiopaque object was seen having an approximate length of 5-6 mm, lodged at the junction of middle and apical third of the root (Fig-1). In addition, it was seen that the tooth had a blunderbuss apex. Upon a weighed assessment of subjective, objective and radiographic findings, it was decided that root canal treatment should be initiated with an attempt to retrieve the foreign object after which resumption of subsequent cleaning, selective shaping & apexification is to be performed.

To begin with, the previously prepared access was slightly modified in order to gain straight line access (Fig 2). Thereafter, the pulp chamber & canal lumen were flooded with copious amounts of normal saline to flush out food debris & blackish corrosive slurry. An effort was made to nudge the foreign object using #10 & #15 K files in simple filing motion before attempting its retrieval. This maneuver also facilitated purchase for bypass of the object before the introduction of H-files for reconnaissance. A radiograph was then exposed to confirm the exact location of foreign object & the bypassed H-file within the root canal (Fig 3-a, b). After the radiographic confirmation of a successful bypass, a decision was made to retrieve the foreign object using multiple #15 H-files using the braided technique.

An Attempt was made to engage the foreign object between the H-files by twisting them in clockwise direction with enormous control (Fig.3-c). When capture was achieved, files were collectively pulled out coronally (Fig3-d). The retrieved foreign object appeared greyish black in colour and measured approximately 5-6 mm in length (Fig-4). An IOPAR was taken to confirm the complete removal of foreign object which turned out to be a stapler pin. (fig-3-e) (fig-5).

After the retrieval of foreign object, copious irrigation was performed using 2.5% sodium hypochlorite, 17% EDTA & normal saline. Intracanal calcium hydroxide medication was placed, a closed dressing was given and the patient was recalled after 21 days.

Upon patient's return to the clinic after 3 weeks, it was noted that his symptoms had completely subsided. A review radiograph was then taken to reveal the condition inside root canal and periradicular area of the tooth, which showed a partial resolution of medicament as well as an apparent decrease in periapical radiolucency. As tooth had a blunderbuss apex, apexification was planned to treat the immature tooth after a lucid explanation of treatment plan to patient & his guardians.

**APEXIFICATION PROCEDURE:** Firstly, the tooth was isolated using cotton rolls. Thereafter, the temporary cement (ZOE) & intracanal medication (Calcium hydroxide) were removed. Irrigation was performed to further disinfect the canal followed by suction drying it by

use of a syringe and 25 gauge needle. To prepare a custom plugger for condensing biodentine, an ISO #40 guttapercha cone was checked for apical fit, both clinically and radiographically (Fig 6-a). Thereafter, the tip of guttapercha cone was cut by 4 mm with the help of sterile scissor. This trimmed cone was to serve as a guide to create an apical plug of biodentine, instead of hand/finger pluggers. (Fig 6-b,c).

The powder and liquid components of biodentine were proportioned as per manufacturer's instructions (Fig9-a) and mixed to form a dough of required consistency. The semisolid mix was introduced into the canal with amalgam carrier & subsequent increments were condensed with the blunt end of pre-fabricated custom plugger till the thickness of 4mm. An additional radiograph was taken to see the position and adaptation of biodentine within canal (Fig 7). Once the biomaterial was set, canal was coated with ZOE based sealer (Tubliseal) (Fig-9-b) & backfilled with thermoplasticized gutta percha obturation system (EndoPex) & sealed approximately 2 mm below the level of CEJ. Remaining canal space & access cavity was filled by coronal-radicular restoration technique using composite resin (Fig-8). Upon one month's follow up, the patient was completely symptom free. A radiographic review showed a decrease in periapical radiolucency,

suggestive of healing. The placement of a permanent full coverage crown was delayed for a period of 5 more years.<sup>7</sup> Further follow up appointments have been scheduled.

## DISCUSSION

In an elusive labyrinth of a structure named root canal system, being able to achieve absolute success is an overstatement. However, a handy formula for consistently good results is to neutralize as many microbes as practically possible. A foreign object, by virtue of blocking the very lumen of a root canal, stalls the elaborate biologically directed exercise of root canal therapy. Such error commands greater control in its correction process, especially when the canals exhibit a blunderbuss apex. The present case was an ode to such efforts which aim at harvesting the simplest of means to achieve endodontic success.<sup>4</sup>

Retrieval of foreign objects like separated files, reamers, lentulospirals & silver cones is a relatively easy affair when such objects assume a more coronal position in the canal. With the regular use of magnifying loupes and LED head lights giving the modern clinician a much needed clarity of vision, locating the exact position of intracanal foreign objects is nothing more than a routine in the parlance of today's times. On the retrieval front, ultrasonically guided loosening of separated file or foreign fragment and its subsequent withdrawal from the canal using a hemostat or Stieglitz forceps can predictably be carried out by a general dentist with a handsome amount of self-interest, training & experience.<sup>6</sup>

On the other hand, a foreign object positioned in the apical third poses a different set of challenges. Scanty access coupled with difficult reach of an ultrasonic tip necessitates a more ingenious approach in such cases. Irrespective of the scenario, a rule of thumb is to first consider modifications in the original access cavity in order to achieve a straight line access. This simple step must preclude any effort aimed towards retrieval or a bypass, as doing it greatly reduces the chances of reconnaissance files undergoing fracture. As for the retrieval of an apically lodged foreign object in a relatively straight canal like in our case, there is no dearth for innovative & easily practicable techniques. Such repertoire includes bypass followed by traction, traction using Masserann Kit, Canal Finder System, adhesive traction using hypodermic needle and cyanoacrylate combination to name a few.<sup>5</sup> File braiding technique is yet another inventive method

requiring a minimal learning curve to master, yet has a fair amount of success in retrieving foreign objects in relatively straight canals. The technique involves the use of several Hedstrom files inserted along a bypassed foreign object for them to be twisted in order to grasp the fragment and then withdrawn as one unit, altogether. In the present case, bypass of the foreign body was performed using a #15 H-file followed by braiding of multiple such files around it, before its retrieval.<sup>6</sup>

Apexification was the definitive treatment approach after retrieval of the foreign object as the tooth was devoid of pulp and exhibited an open apex. A chair side or custom plugger was prepared in order to create an apical biodentine barrier by merely trimming short a snugly fitting master guttapercha cone by 4 mm, the desired length of biomaterial plug that was needed. It is most opportune that such makeshift solutions be a regular affair among general dentists thereby removing the unreal hesitancy which many budding clinicians tend to have while using finger & hand pluggers in apexification cases. As the tradition goes, the dish of dentistry is best served when it is served simple, economical and with a pinch of possible. It is the belief of authors that such convictions, if carefully watered, can bring about a fragrant bloom of revival in a rather monotonous clinical routine as we know it. Lastly, it was agreed upon that the placement of permanent crown be deferred until five more years considering the tooth's potential for continued passive eruption. However, periodic visits & review of the resin composite access filling has been scheduled, to keep microleakage, if any, at bay.<sup>7</sup>

## CONCLUSION

Apart from the prevention & management of endodontic mishaps, modern clinicians should have a template ready for cases involving apically lodged foreign objects in root canals. Many a times, management of such cases only require simplest of approaches and commonly used instruments albeit in a slightly different manner. File braiding technique is a safe & practicable venture to retrieve an apically lodged foreign object in relatively straight canals. With a gradual but steady normalization by the dental community of working under a magnified & illuminated vision, successful expeditions in endodontically related retrievals appear possible like never before.

## ACKNOWLEDGEMENT

The authors would like to acknowledge Dr. Allen Ali Nasseh, DDS. MMSc. of Boston, for video demonstration of custom plugger technique for apexification via his YouTube channel “Real World Endo”.

## CONFLICT OF INTEREST

The authors deny any conflict of interest related to this study.

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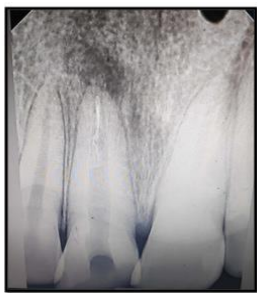


Figure 1: Preoperative periapical radiograph showing radiopaque foreign object.



Figure 2: Modified access cavity

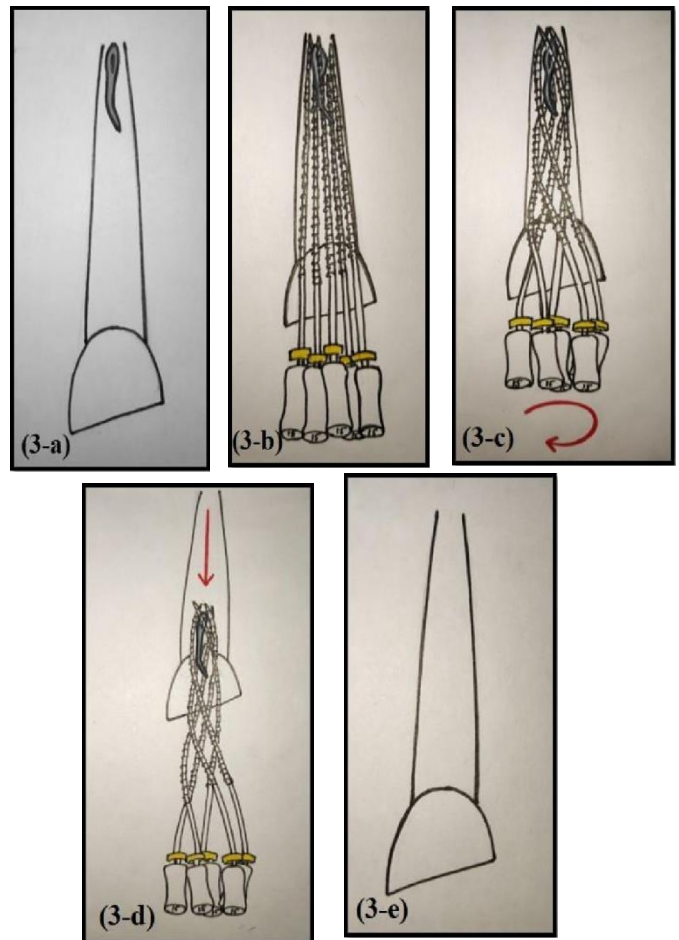


Figure 3-a: Illustration of preoperative condition showing foreign object in the apical third of root canal

Figure 3-b: Capture of foreign object by H-files.

Figure 3-c: Twisting the H-files in clockwise direction around the foreign object.

Figure 3-d: Foreign object braided with files were pulled out coronally.

Figure 3-e: Root canal showing complete removal of foreign object.



Figure 4: Foreign Object.



Figure 5: Postoperative X-ray after removal of Foreign object.

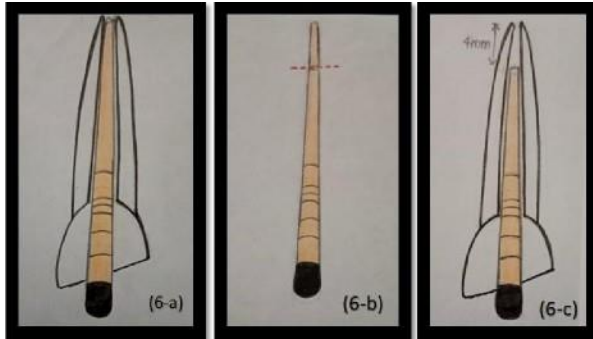


- i. Capsule containing biodontine powder & single dose container of liquid.
- ii. ZOE-based sealer (TubliSeal).
- iii. Paper pad & mixing spatula.
- iv. Obturation pen.
- v. Gutta percha pellets.
- vi. Obturation gun.

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**How to cite this Article:**

Shiraguppi VL, Deosarkar BA, Rajput SR, Shah YR, Syed MT, Gitte SB. Intracanal foreign object in an open apex: considerations & case report. Journal of Interdisciplinary Dental Sciences, July-Dec 2021;10(2):36-40



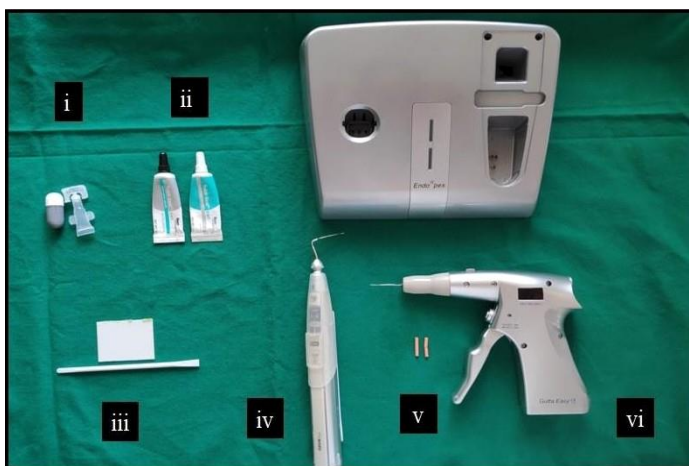
**Figure 6-a:** Checking of guttapercha for tug-back  
**Figure 6-b:** Trimming of guttapercha from its tip by 4mm.  
**Figure 6-c:** Custom guttapercha cone in place.



**Figure 7:** Apical biodontine plug (Apexification).



**Figure 8:** Obturation plug (Apexification).



**Figure 9:** Armamentarium