

## Retrieval of a Broken Instrument Fragment from an Aberrant Site – A Bizarre Case Report

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### **Abstract :**

**Aim:** Description of endodontic surgical procedure which was adopted to successfully retrieve the broken instrument from an aberrant site.

**Background:** Management of broken or separated endodontic instrument has always been considered to be a challenge, demanding expertise in the field of endodontics and has generated all time interest among endodontists. Separated instruments in root canal system leads to metallic obstruction and prevents thorough cleaning and shaping which may culminate into endodontic failure. Instrument separation outside the root canal system is still more embarrassing.

**Case description:** This is an unusual case of a broken file embedded in the apical half of periodontal ligament space of mandibular second molar, separated due to binding in the extraradicular space emerging out through a perforation in mesial wall of the pulp chamber during routine endodontic treatment.

**Conclusion:** This unique case report represents how an endodontic surgical procedure was adopted to successfully retrieve the broken instrument with a McPherson ophthalmic forceps along with sealing of the perforations and completion of the routine endodontic treatment.

**Keywords:** McPherson Forceps, Operating microscope, Retreatment, Retrieval, Separated instrument .

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### **I. Introduction**

Fractures of endodontic instruments within root canals is one of the most troublesome incidents [1]. Evaluations of endodontic recall radiographs indicate that the frequency of broken endodontic instruments ranges between 2% and 6% of the cases investigated [2]. Broken instruments usually prevent access to the apex, and the prognosis of teeth with broken instruments in the canals may be lower than for normal cases. The prognosis of these cases mainly depends on the preoperative condition of the periapical tissues [3]. For these reasons an attempt to remove broken instruments should be undertaken in every case [4]. The orthograde removal of broken instruments in most cases is very difficult and often hopeless. There have been many reports on methods of removing broken instruments in root canals. Methods using chemical agents such as iodine trichloride, mechanical methods such as hand instrumentation, ultrasonic devices, a canal finder system, and surgical methods have been used. The success rate for removal of fractured instruments has been reported as varying from 55 to 79%[5].

A suitable method for retrieving broken instruments from a root canal must be based on an armamentarium delicate enough to enter the roots of posterior teeth under full visual control and yet rigid enough to loosen and pull out the fragment [6]. No standardized procedure for the successful removal of broken instruments exists, although various techniques and devices have been described .

This paper describes an endodontic surgical procedure which was adopted to successfully retrieve the broken instrument with a McPherson ophthalmic forceps along with sealing of the perforations and completion of the routine endodontic treatment.

### **II. Clinical Case**

A 45 year male patient was referred to the Post Graduate Department of Conservative Dentistry & Endodontics, K.M.Shah Dental College & Hospital, Piparia with a chief complaint of pain in relation to lower left back teeth region since seven days. Medical history was insignificant. Past Dental History revealed patient was complaining initially of pain on mastication and sometimes spontaneous dull aching pain in relation to #37 since 1 month for which he took some medication by himself. But since the pain was not subsiding he reported to some local dentist by whom the patient was advised and was undergoing endodontic treatment for the same tooth.

Patient further revealed that the dentist informed him about the mishap of breaking the endodontic instrument in the root canal system, during the endodontic treatment and he also stated that the only way to get rid of the foreign body was extraction of the tooth followed by a surgical procedure.

Since the patient was apprehensive as well as desirous of conservation of the tooth also, he turned up to our department to seek an expert opinion regarding the entire situation.

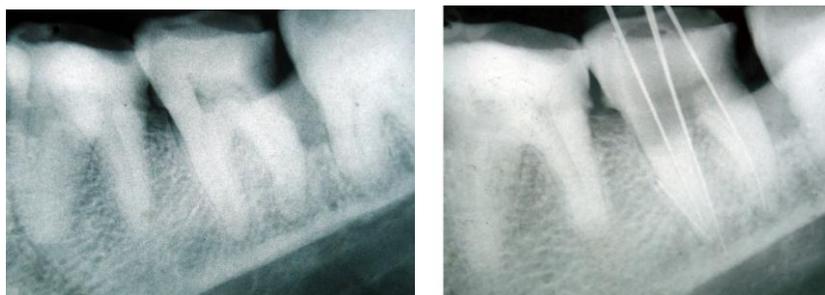
Past medical history was not significant. Extra oral examination revealed no significant findings. Intraoral examination revealed a temporary restoration done in #37 (Fig 1).



**Fig 1.** Initial pre operative photograph with a temporary restoration in relation to the offending #37

Tenderness on percussion and vestibular tenderness was present in relation to the same. Periodontal examination revealed mild bone loss in interproximal areas of all posterior teeth, with no significant mobility.

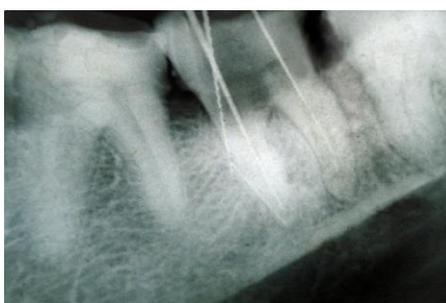
The patient also presented two radiographs which were taken by the previous dentist while performing the endodontic treatment for #37. (Fig 2,3).



**Fig 2.** Preoperative radiograph taken prior to endodontic treatment undertaken by previous dentist

**Fig 3 .** Intra operative radiograph taken by the during the endodontic treatment by the previous dentist

Immediately the broken instrument was identified as seen in fig 3 and a RVG was taken of the same region to calibrate the fragment. (Fig 4)



**Fig 4.** Calibration and negotiation of the broken instrument fragment on RVG which turned out to be 8.14mm approx

The broken instrument fragment was approximately 8.14 mm in length unusually located in the apical half of the mesial periodontal ligament space of mesial root of #37. Also in addition to the above finding, two distinct perforations-one in the region of Mesio Buccal canal along the mesial wall and another in furcation region were visualized.

**The treatment was planned accordingly and divided into three phases:**

1. Completion of the routine endodontic treatment
2. Sealing of both the perforations
3. Retrieval of the broken instrument fragment surgically

The routine endodontic treatment was completed initially by negotiating all the three orifices of the root canals meticulously. Also a no.15 stainless steel K file was used to locate the fragment from within the chamber. The chemomechanical preparation was completed in all the three canals with conventional step back technique with intermittent irrigation with 2.5% sodium hypochlorite and normal saline. The canals were completely dried with paper points and obturation of the root canals were carried out with cold lateral condensation technique with gutta percha cones and AH Plus sealer (Dentsply, DeTrey, Germany).

The perforations which were visualized radiographically and which were confirmed through the clinical findings were sealed off carefully with MTA (ProRoot MTA, Dentsply, DeTrey, Germany) (Fig 5). Cavit was then placed inside the pulp chamber and the final procedure to retrieve the broken instrument was followed subsequently.



**Fig 5.** Final post obturation radiograph with the sealed perforations with MTA.

A surgical procedure was planned and electively adapted to retrieve the broken fragment of instrument. After administering local anesthesia a L- shaped incision extending from mesial of #36 intrasulcularly upto distal of #38 with the relieving incision at the mesial line angle of #36 was given. A full mucoperiosteal flap was reflected carefully in #37 region (Fig 6).



**Fig 6.** L shaped incision with reflection of a full muco perisoteal flap.

An access to the surgical site was obtained with the help of an initial ditch cut with a long shank no. 2 surgical round carbide bur (S.S White, Germany) on a slow speed under constant flow of irrigation with normal saline solution. Further careful removal of bone was performed with a surgical carbide straight fissure bur (S.S White, Germany) on slow speed under constant flow of irrigation (Fig 7).



**Fig 7.** Access to the surgical site

Upon accessing the file, an Angled McPherson ophthalmic forcep was used to grasp it. The broken fragment was gently grasped with a fine Ophthalmic Angled McPherson Forcep and removed carefully . It took many painstaking attempts of sleeving and gripping the fragment and in one such attempt, when the tightest grip was felt by the tactile sense, the entire assembly was grasped to unscrew the fragment from the site and withdrawn to see the fragment retrieved. (Fig 8)



**Fig 8.** Retrieval of the fragment with the angled Mcpherson Ophthalmic Forcep

This was obviously impossible without the digital operating microscope which was significantly helpful in locating the broken fragment and grasping it. Bone grafting material Bio glass was placed into the surgical site to hasten the bone regeneration at the surgical site and flap was carefully closed. Three silk sutures were carefully taken to close the surgical site and a post surgical radiograph was taken (Fig 9).



**Fig 9.** Immediate post surgical photograph and radiograph

The patient was observed and a radiograph of the patient after an year is as shown (Fig 10).



**Fig 10.** Follow up after one year

### **III. Discussion**

No standardized procedure for the successful removal of broken instruments the canal exists, although various techniques and devices have been described. In root canals with broken instruments the success of the removal depends on several factors. Among them are the length and location of the fragment, the diameter and the shape of the root canal, and the tightness of the fragment and its impaction in debris or sealer. This is an unusual case report of a broken fragment of instrument in the extraradicular space. The method adapted for retrieval of this fragment is also affected by the same factors like the length and location of the fragment, the accessibility and visibility of the fragment, its impaction within the extraradicular region, proximity to the surrounding structures.

### **IV. Conclusion**

Prevention of the instrument separation is the best strategy to avoid any stress and anxiety associated with it. A separated instrument does not necessarily mean separation of the tooth from the socket. The best remedy for the separated instrument is not to separate

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