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**Shweta Santosh Lodha**  
Post Graduate Student,  
Conservative Dentistry &  
Endodontics, ACPM Dental  
College, Sakri Road, Dhule,  
Maharashtra, India

**Zinnie Nanda,**  
MDS Professor and Head of The  
Department, Conservative  
Dentistry & Endodontics, ACPM  
Dental College, Dhule,  
Maharashtra, India

**Rahul Deore,**  
MDS, Reader, Conservative  
Dentistry & Endodontics,  
ACPM Dental College, Dhule,  
Maharashtra, India

**Kranthikumar Reddy,**  
MDS, Reader, Conservative  
Dentistry & Endodontics,  
ACPM Dental College, Dhule,  
Maharashtra, India

**Srinidhi Surya Raghavendra,**  
MDS, Professor, Conservative  
Dentistry & Endodontics,  
ACPM Dental College, Dhule,  
Maharashtra, India

**Ankita Mundada,**  
Graduate Student,  
Conservative Dentistry &  
Endodontics, ACPM Dental  
College, Sakri Road, Dhule,  
Maharashtra, India

**Corresponding Author:**  
**Shweta Santosh Lodha**  
Post Graduate Student,  
Conservative Dentistry &  
Endodontics, ACPM Dental  
College, Sakri Road, Dhule,  
Maharashtra, India

## **An endodontic challenge managed by intentional replantation: A case report**

**Shweta Santosh Lodha, Zinnie Nanda, Rahul Deore, Kranthikumar Reddy, Srinidhi Surya Raghavendra and Ankita Mundada**

### **Abstract**

Over extruded root canal filling material or an endodontic instrument can act as a source of irritation and may lead to periapical inflammation and pain. Intentional replantation is considered as one of the treatment modalities with recent studies showing success rate as high as 95%. The present case report describes a case where extrusion of separated endodontic instrument beyond the root apex occurred during retreatment of right lower second molar with overextended root canal filling. Intentional replantation was done with atraumatic extraction of tooth, extraoral removal of over extended root canal filling material and endodontic instrument followed by obturation, reimplantation of tooth in the socket and splinting. At 8month follow up the tooth was firm in the socket with no clinical signs of pain and tenderness. Thus the success rate of intentional replantation is promising with proper case selection and procedural techniques.

**Keywords:** Intentional replantation, mandibular molar, separated instrument, splinting

### **1. Introduction**

The goal of endodontic treatment is to completely remove micro-organisms, tissues and debris allowing an impermeable seal with a filling material<sup>[1]</sup>. Endodontic therapy in various studies have been reported to have success rates of up to 91.54%<sup>[2]</sup>.

Causes of endodontic failure include inadequate obturation, perforations, anatomic features like impassable ledges or severe dilacerations, instrument separated or pushed beyond apex, overextended gutta-percha or root canal filling materials<sup>[3]</sup>. Despite the inert nature of gutta percha, extruded material can act as a source of foreign body irritation to the periapical tissue, promoting persistent chronic inflammation<sup>[4]</sup>.

Conventionally retreatment is performed using the orthograde approach, but retrieval of instrument and gutta-percha cone separated or pushed beyond apex by orthograde approach is difficult. In such cases, alternative methods which can be thought of include intentional replantation, peri radicular surgery or tooth extraction<sup>[5]</sup>.

Intentional replantation was preferred over other treatment modalities as it is quick, less invasive, show less chances of damaging surrounding structures and show faster healing.

The current case report describes the use of intentional replantation as a treatment modality in the management of symptomatic endodontically treated mandibular molar with overextended gutta percha and separated file fragment pushed beyond apex.

### **2. Case Report**

A 28 year old female patient presented to the Department of Conservative Dentistry and Endodontics with the chief complaint of throbbing pain in lower right back region. The medical history was non- contributory. On intra - oral examination, the mandibular right first molar #46 was missing and mandibular second molar #47 was tender on vertical percussion. Patient gave a history of endodontic treatment done on #47. There was no associated swelling, sinus tract or mobility and probing depths were within normal limits. Preoperative radiographs revealed well obturated #47 with 2mm of gutta percha extended beyond apex in relation with mesiobuccal canal of mesial root. Periapical radiolucency was seen with both mesial and distal root apices [figure 1a]. A diagnosis of symptomatic apical periodontitis secondary to failed endodontic treatment was made.

Conventional orthograde retreatment was performed for removal of gutta percha from the MB and ML canals and during the course of gutta percha removal, 25 size Hedstrom file (Mani Inc, Tochigi, Japan) got separated at the apical region of mesiobuccal root canal [figure1b]. The separated instrument was bypassed with 25 K file (Mani Inc, Tochigi, Japan) and orthograde retrieval of separated H file was attempted. During this, the separated instrument got pushed 3mm beyond apex [figure1c]. The patient was informed about the extruded gutta-percha and the separated instrument. The side effects of keeping it untouched since it was protruding beyond apex was explained. The patient was also explained about the different techniques with which attempts can be made to remove the instrument. The advantages and disadvantages of various techniques were explained in detail. The patient refused the surgical option and informed consent for intentional replantation was obtained.

Local anesthesia was administered with 2% lignocaine hydrochloride in 1:80,000 adrenaline (Lignox 2% A Indoco remedies Ltd, Gujarat, India.). The crestal and crevicular incision which was given with 15 number BP blade (Lister, Magna Marketing Co, Kanpur, India) extending from distal surface of #45 to mesiobuccal line angle of #48 [figure2a]. Under aseptic conditions, atraumatic extraction was done [figure2b]. The tooth was rinsed gently with physiologic saline (0.9% NS Fresenius Kabi, Goa, India) and was held by the crown with forceps and the beak of the forceps was carefully placed only on the enamel throughout the procedure. The tooth was held with moist gauze during the procedure. The separated instrument which had extended beyond apex along with gutta-percha was retrieved, which measured 6mm and 4mm respectively [figure 2c,2d]. The mesiobuccal and mesiolingual canals were irrigated with 5.25% of sodium hypochlorite and EDTA (Avue prep, Prime dental products Pvt Ltd, Thane, India) followed by final irrigation with saline. Both mesiobuccal and mesiolingual canals were obturated with gutta-percha cones and AH plus sealer (AH plus, Dentsply, India). The socket was rinsed gently with saline and the tooth was replanted [figure 3a]. The entire extra oral procedure lasted for 10 mins. cross splinting was done with adjacent #44, #45 and #48 using ligature wire (0.25 mm, Dentomech, Karnataka, India) and flowable composite (Compo-Flo, D Tech Technologies, Pune, India) [figure3b]. Postoperative radiograph was taken to confirm the position of the tooth [figure 3c].

The patient was given oral hygiene instructions and asked to rinse with 0.12% of CHX solution (Hexidine, Icpa Health products Ltd, Mumbai, India) twice daily for one week, due to its antibacterial properties. Antibiotic coverage was given three times daily for 5 days (Novamox 500, Cipla Ltd, Mumbai, India) and patient was advised soft diet. Two weeks later, the splint was removed. The tooth was stable in its socket without any clinical sign of tenderness and pathologic mobility. Periodic evaluation was done after 1 month [figure4a] and 4 months [figure4b]. Followed by placement of prosthesis with 8 month follow up [figure4c,4d]

### 3. Discussion

Systematic review of the literature by Torabinejad *et al* found an overall 88% survival rate for intentionally replanted teeth,

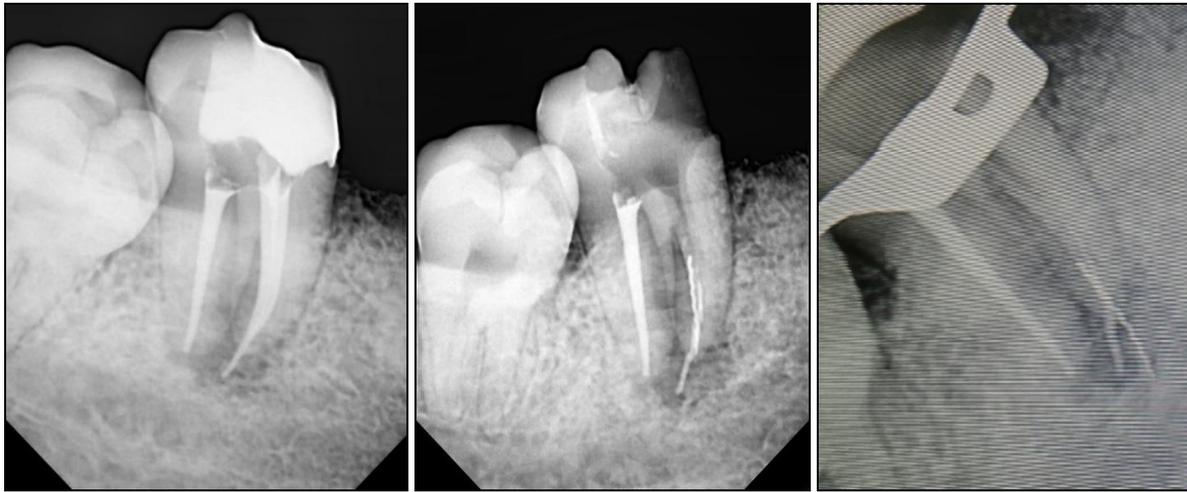
with more contemporary studies demonstrating success rates as high as 95% [6]. Intentional replantation can now be considered among more commonly accepted treatment options compared to other treatment modalities such as endodontic surgery. Surgical options in certain areas are filled with risks such as increased chances of damage to Inferior alveolar nerve due to the close proximity of root to the inferior alveolar canal in mandibular molar region and excessive removal of buccal cortical bone due to lingual inclination and external oblique ridge in mandibular second molars. There is an median average of 7.34 – 8.51mm of bone covering the roots in mandibular molar region [7]. This makes it a troublesome step if surgical treatment is considered.

Intentional replantation is indicated in cases such as failed root canal treatments, developmental anomalies, anatomic limitations, difficulties in access, accidental exarticulation, patients with objections to surgery and trismus. In the present case, intentional replantation was done with mandibular second molar because of the typically thick overlying buccal bone, shallow vestibular depth and proximity of the root apices to the mandibular canal. Also the tooth had convergent roots hence atraumatic extraction was able to be performed without causing too much damage to the roots [8].

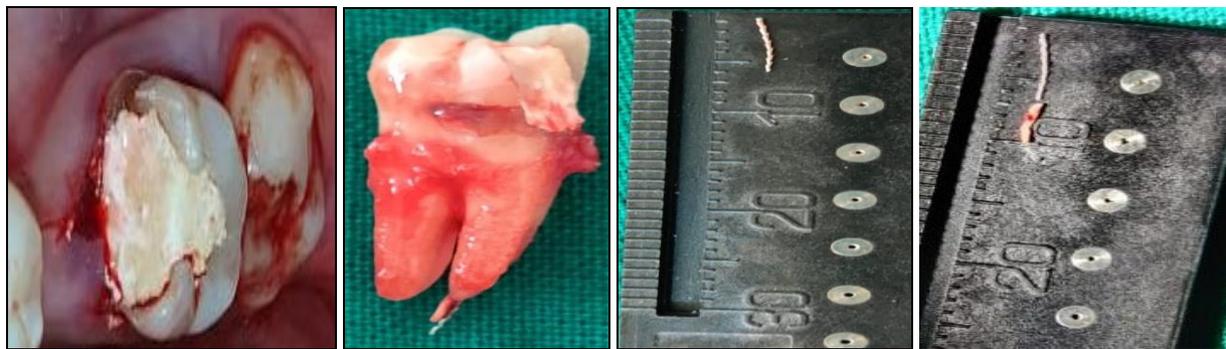
Traumatically extracted tooth are not good candidates for intentional replantation, teeth with flared or moderately curved roots, patient with poor oral hygiene, presence of periodontal diseases, immune compromised patient, tooth with vertical root fracture may have poor prognosis with intentional replantation [8].

The prognosis for successful healing after replantation is closely related to avoiding trauma to the PDL and cementum during extraction, to maintain the viability of the PDL cells and avoid resorption and ankylosis of the tooth. During extraction, use of elevators should be avoided and the beaks of the forceps should be placed coronal to cement-enamel junction. The extra oral time should be kept as minimum as possible as drying of PDL cells take place with delay of 8 minutes or more. The chances of bony ankylosis increases as the extra oral time increases. [9] Jang *et al* reported higher success rates for those teeth in which the extraoral time was 15 minutes or less compared with those kept out for more than 15 minutes [10].

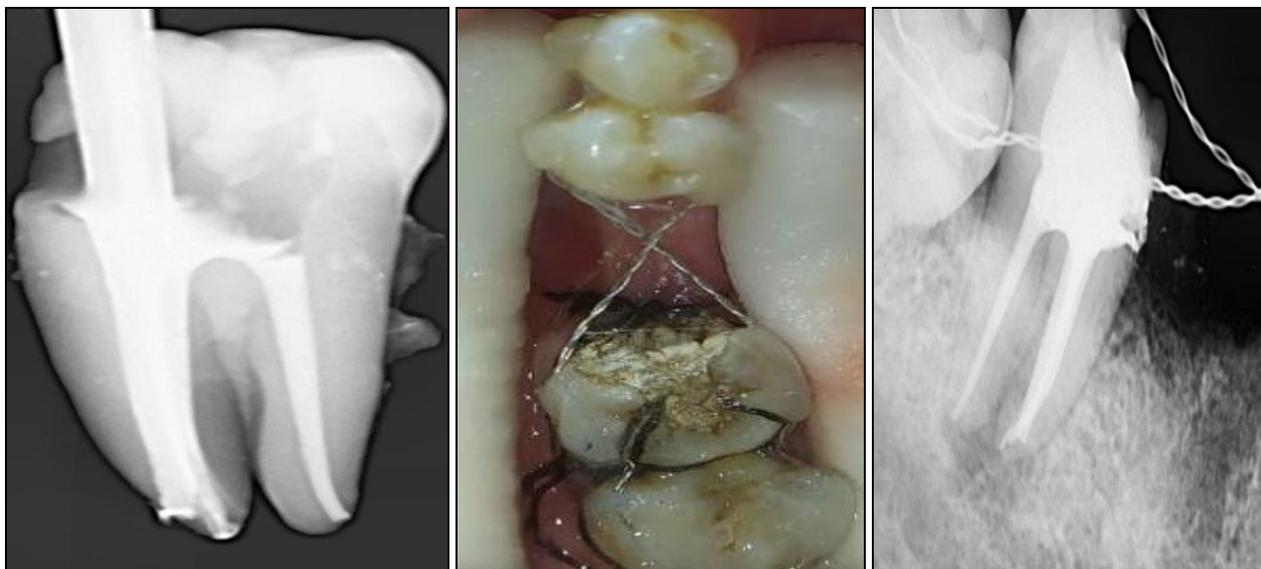
There are three types of splints, rigid, semi-rigid or flexible. The rigid splints include Arch bar splint, Arch bar splint with acrylic, Rigid wire composite or Composite splint. The flexible splints include suture splint, Flexible wire splint, Protemp, Orthodontic splint. In this case, we have used the semirigid splint namely the ligature wire and composite for two weeks. The composite wire splint used in this case is flexible, allowing for the physiologic movement during the splinting period which promotes healing with less chances of ankylosis. The composite wire splint is proven to be well accepted, not cause damage to oral mucosa and allows the patient to maintain good oral hygiene [9]. The true indicator of success is to return the tooth back to its function with absence of associated signs and symptoms. In this case, patient was able to masticate by the treated tooth with no discomfort. After the initial observation period, the treated tooth functioned as an bridge abutment for first molar defect [11, 12, 13].



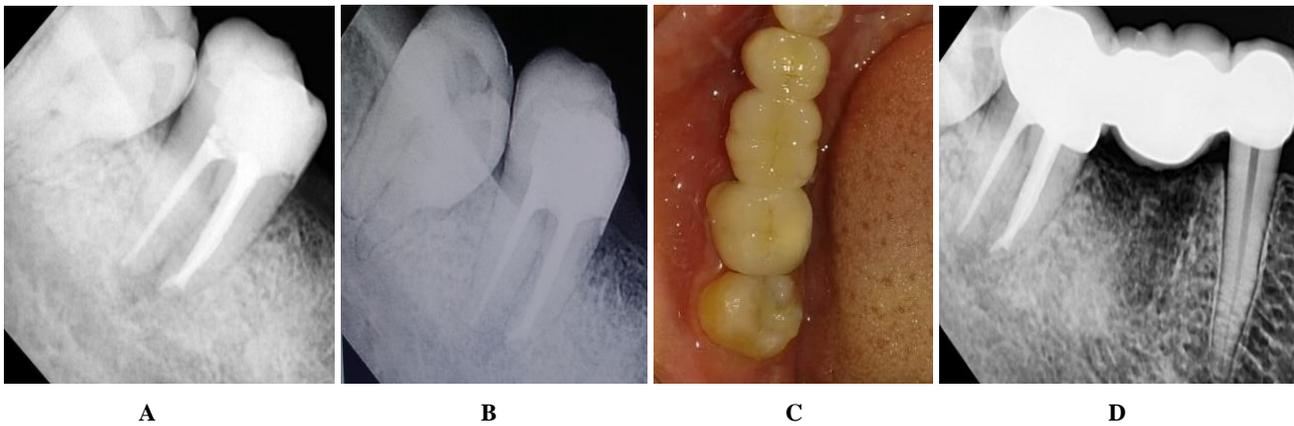
**Fig 1(a):** Preoperative radiograph; **(b)** separated endodontic instrument; **(c)** instrument extruded beyond apex.



**Fig 2(a):** Crestal and crevicular incision; **(b)** Atraumatic extraction of tooth; **(c)** and **(d)** retrieval of separated instrument and gutta-percha.



**Fig 3(a):** Obturation done extra orally; **(b)** cross splinting; **(c)** postoperative radiograph



**Fig 4(a):** Follow up of 1 month; **(b)** follow up after 4 months; **(c)** prosthesis placement **(d)** follow up of 8 month.

#### 4. Conclusion

Various treatment modalities which can be used in case of extruded instrument or root canal filling material include conventional endodontic surgery, intentional replantation or extraction of the tooth. Based on various criteria and indications either the surgical option or intentional replantation can be thought of. In present case, due to favourable root morphology and systemic condition of the patient, intentional replantation was considered. Patients acceptance to intentional replantation when indicated is favourable, due to less invasive nature of the treatment and lesser time needed for the procedure as well as healing.

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