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Foreign Body in a Fractured Tooth: Successful Retrieval and Management by Intentional Reimplantation

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Abstract

The foreign body discovery in the teeth is a unique situation diagnosed often accidently. Moreover, chance of these foreign objects getting impacted into the tooth is more when the pulp chamber is open either because of traumatic injury or large carious exposure. The goal of conventional endodontic therapy is difficult to achieve in this situation and sometimes it is not possible to retrieve the object through nonsurgical or surgical procedure and the tooth has to be extracted as a last treatment option. This report describes a case of a thirteen year old young boy having metallic pins as foreign objects in his fractured mandibular left lateral incisor leading to periapical infection and its management by intentional reimplantation.

Keywords: Intentional reimplantaion (IR), Reimplntation of tooth Foreign body in a fractured tooth: Successful retrieval and management by intentional reimplantation

Introduction

A high incidence of traumatic injuries to anterior teeth is seen in pediatric population. In addition, children often have a tendency of habitual insertion of foreign objects in such fractured teeth with open pulp chambers. Intracanal foreign objects in pulp chambers and root canals of fractured teeth impede thorough cleaning and shaping of the root canal system and provide difficulty in achieving successful endodontic treatment. Retrieval of these intracanal obstructions is therefore essential for flourishing endodontic therapy. Sometimes, the retrieval procedures are extremely easy and can be performed in rather short time, but often they are tedious and time-

consuming, with a high number of failures where more invasive surgical procedures including periapical surgery have to be carried out. Pediatric patient are often apprehensive and refuses to undergo invasive surgical treatment. In such a situation intentional reimplantation can be considered as a viable treatment alternative. This case report describes the retrieval of foreign objects embedded into the root canal of a tooth by intentional reimplantation and successful management of the tooth thereafter.

Case Report

Thirteen year old, a male patient reported to the department of Pedodontic with Preventive dentistry, Faculty of Dental Sciences, CSM Medical University, Lucknow, with a chief complaint of pus discharge and pain in lower left anterior region since one month. Patient gave a history of trauma and fracture of a tooth six month back and repeated insertion of metallic pin into the tooth during pain and discomfort. Intraoral clinical examination revealed fractured incisal third of mandibular left lateral incisor with pus discharge from periapical area (Fig 1). The initial intra-oral periapical radiograph (IOPA) of the tooth showed presence of pulp exposure with periapical radiolucency, in addition to, two linear radio-opaque images in the pulp chamber extending into the root canal as a prominent finding (Fig 2). The presences of foreign objects were suspected. Same side Lingual and Opposite side Buccal (SLOB) rule was performed to confirm whether the foreign objects were lying in the tooth or adjacent soft tissues. The objects were confirmed to lie in the tooth itself. A tetanus vaccine booster dose was administered to the patient in the very first appointment.

Access cavity was prepared and the pulp chamber was cleared of debris by copious irrigation with a normal saline. A thin, Diamond tapered fissure bur was used to slightly widen the orifice of the canal to facilitate access for instrumentation and retrieval of the objects. The foreign objects were most likely metallic pins. An ultrasonic scaler was also used to clear the debris from the canal orifice and to facilitate loosening of the metallic pins. However, none of these techniques were successful in retrieval of the objects from the root canal. After detailed anamnesis, the treatment options of performing a periapical surgery or an intentional reimplantation were suggested to the patient and his parent. The option of periapical surgery was however excluded because of the clinical limitations of the procedure in this particular case. Performing a periapical surgery could not have allowed proper field of vision and access for retrieval of the objects from the root canals. Also, the patient was not willing for the procedure of periapical surgery. Finally, intentional reimplantation was planned for the management of the affected tooth.

The treatment procedure of intentional reimplantation was explained to the patient and parent, along with the risks and benefits involved and a written consent was obtained from the parent. One hour before the procedure, the patient was instructed to rinse the mouth with chlorhexidine gluconate 0.12%. The patient was prepared for surgery and inferior alveolar and lingual nerve anaesthesia was achieved. The tooth was carefully extracted with no intra-operative complications. The tooth was placed in a container with saline and was evaluated for any extraction fractures. The alveolus was carefully curettaged and irrigated with saline and filled with gauge embedded in this solution. The foreign objects were retrieved by cutting the root end and pushing the objects coronally which were confirmed as metallic pins (Fig 3). After retrieval of the objects, biomechanical preparation and orthograde obturation with gutta-percha was carried out. The root end cavity was prepared with the inverted cone bur and was filled with MTA. The tooth was rinsed

in sterile saline and was reimplanted back into its socket. And immobilized by wire composite splint[1](Fig 4a). A postoperative radiograph was taken (Fig 4b). The following postoperative instructions were given: putting a cotton swab with chlorhexidine gluconate 0.12% over the site three times per day for 7 days. Analgesics and antibiotics were prescribed. The patient was instructed to be on a soft diet for 2 weeks. The patient was recalled after 1 week for evaluation of the surgical site which appeared pink in color with minimal inflammation. The splinting was removed after 2 weeks. Prosthetic rehabilitation of the tooth was done (Fig 5) when the tooth became asymptomatic and thereafter patient was kept at regular follow up. (Fig 6a, 6b).

Discussion

A number of foreign objects embedded in the root canals and pulp chambers of the teeth have been reported in the literature. These objects ranged from metal screws[2], pencil needles[3], beads[4], stapler pins[5], paper clips[6], and to leads darning[7]. Grossman[8] reported the retrieval of indelible ink pencil tips, brads, a tooth pick, adsorbent points and tomato seeds from the root canals of anterior teeth which were left open for drainage. Toida et al[9] have reported a plastic chopstick which was embedded in an unerupted supernumerary tooth in the pre-maxillary region of a 12-year-old Japanese boy. Gelfman[10] and colleagues reported two straws into the root canal of primary central incisor in a 3 year old child while Zellich and Pickens[11] had reported hat pins and dressmaker pins during endodontic therapy of incisors. In the same way Harris[12] reported pins, plastic objects, toothbrush bristles, and crayons from maxillary anterior teeth. Such foreign objects are potential sources of pain and foci of infection for the patient.

A detailed patient's history, together with clinical and radiographical examination is necessary to determine the nature, size, location of the foreign body and the possible difficulty involved in its retrieval. A radiograph can be of diagnostic significance especially if the foreign object is radiopaque. McAuliffe[7] summarized various radiographic methods to be followed to localize radiopaque foreign objects as Parallax Views, Vertex occlusal views, Triangulation technique, Stereo Radiography and Tomography. After localization however, orthograde removal of the object are usually a significant challenge to the practitioners. There is no standardized procedure. A number of different removal techniques and devices have been described in literature such as ultrasonic instruments[13], the Masserann kit[14], and modified Castroveijo needle holders[15]. In the literature there is description of an assembly of a disposable injection needle and thin steel wire loop formed by passing the wire through the needle being used. This assembly was used along with a mosquito hemostat to tighten the loop around the object[16.] Ethlenediaminetetraacetic acid has also been suggested as a useful aid in lubricating the canal when attempting to remove the foreign objects. Nehme[17] had recommended the use of operating microscope along with ultrasonic filing to eliminate intracanal metallic obstructions. Moreover, Srivastav[18] and Weine[19] have suggested periapical surgery or intentional reimplantation to remove such objects.

In the present case success could not be achieved with any possible noninvasive retrieval therapy. Amongst the invasive alternative, intentional reimplantation was preferred, due to the limitation of the periapical surgery as well as patient refusal. There has been a rising interest in intentional replantation with root-end biomaterials.[32]With good case selection, intentional replantation can be reliable and predictable procedure.[33]

Though, intentional reimplantation is considered as an audacious procedure by various authors due to the risk involved of root fracture during extraction and also, its

disadvantage of likely hood of replacement resorption or ankylosis, recent long-term studies have shown that the success rates for intentional reimplantation are similar to those for apical surgery[20-22]. Advantages of intentional reimplantation include reduction in clinical time, complications and expense[23]. Indications for intentional reimplantation include limited access, anatomical limitations, failed apical surgery & persistent chronic pain, difficult patient management, accidental iatrogenic avulsion, involuntary orthodontic extrusion.[24,28,35,36] Contraindications include pre-existent moderate to severe periodontal disease, curved or flared roots, non restorable tooth and missing interseptal bone.[24] Historically, amalgam was the material of choice for root-end filling; however, newer materials, such as Super ethoxybenzoic acid (SuperEBA), mineral trioxide aggregate (MTA), and calcium silicate cements, have shown superior ability to seal the root canal with calcium silicate cements demonstrating bioactivity with precipitation of apatite crystals on dentinal tubules.[25,20,30,37-41] One of the important factor in intentional replantation is proper handling of tooth during endodontic manipulation. Choi et al [26] and Cho et al[27] reported holding the tooth in saline-soaked gauze during manipulation of tooth and socket as dry gauze or sterile water may desiccate root surfaces and compromise the vitality of PDL cells. With good case selection, intentional reimplantation can provide long-term results which are as good as those of apical surgery and so, it should more often be considered as a viable treatment option to preserve the natural dentition in situations where other procedures are likely to fail. When modern microsurgical techniques for root-end surgery were used, superior and more predictable success rates were achieved.[31] Therefore, reimplantation can be considered as a predictable and an acceptable method of treatment when the patients present with foreign objects in root canals of traumatized teeth with open pulp chambers where conventional retrieval therapies are unsuccessful.

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Legends Figure

Figure 1: Preoperative photograph.

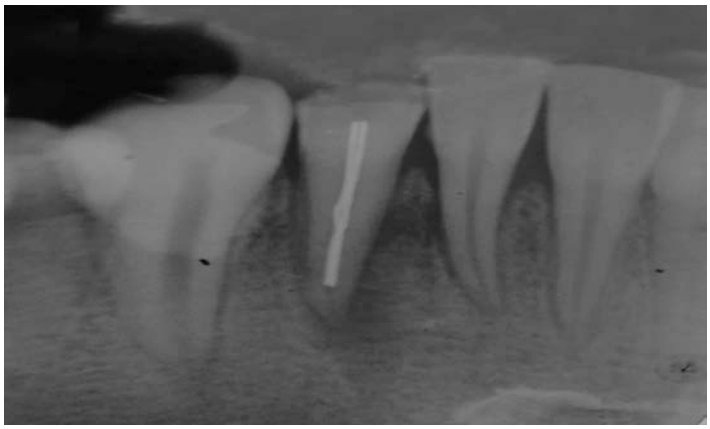

Figure 2: Diagnostic radiograph

Figure 3: Retrieved foreign objects (Metallic Pins).

Figure 4a – Mandibular left lateral incisor immediately after intentional reimplantation and semi rigid splinting (Intraoral Photograph).

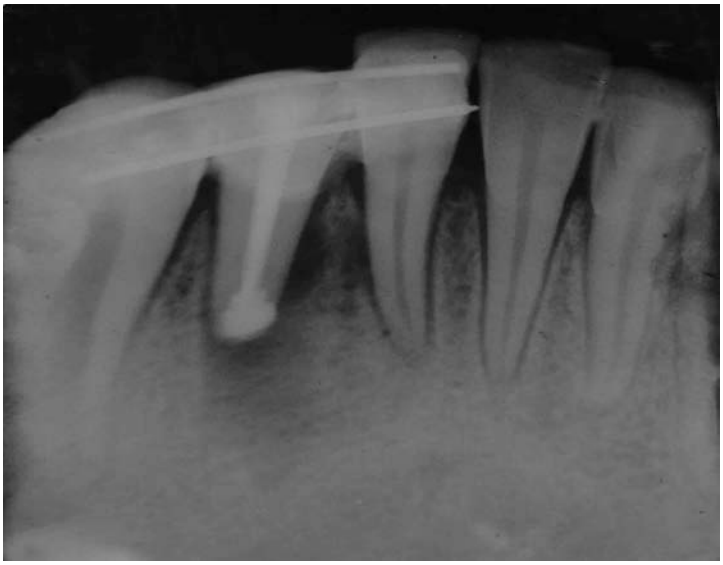

Figure 4b - Mandibular left lateral incisor immediately after intentional reimplantation and semi rigisplinting (Intraoral periapical radiograph).

Figure 5 – Intraoral photograph after prosthetic rehabilitation mandibular left lateral incisor.

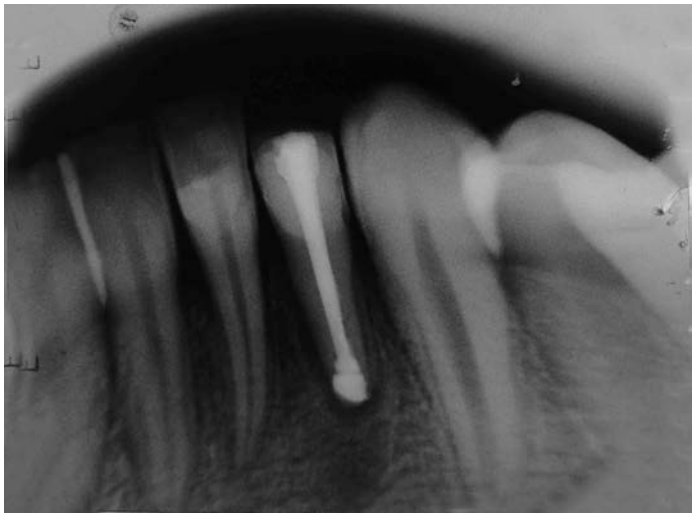

Figure 6a – Six months radiographic follow up.

Figure 6b- Reimplanted tooth 1 year after intentional reimplantation. The tooth exhibits normal periradicular appearance, intact root surface, absence of root resorption and normal periodontal ligament.