“Little Endodontists!!”
— A Clinical report

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Abstract: The discovery of a foreign object embedded in a tooth is relatively uncommon. People have a habit of placing foreign objects to remove food plugs from the teeth. Children often use materials such as bobby pins, safety pins, pencils & nails to probe their carious tooth to relieve pain & irritation. Often, these objects break and get lodged tightly in the root canals of the teeth. These foreign objects may act as The commonly involved teeth are the permanent incisors but cases have been reported in the molars and also the deciduous dentition. These foreign objects may act as a potential source of infection and may later lead to a painful condition. A detailed case history, clinical, and radiographic examination is required to ascertain the size, position, and likely composition of the object, and also difficulty involved in its retrieval. This article reports two clinical cases with foreign body in the root canals and the successful retrieval of objects by nonsurgical technique. A review of the various methods that can be employed for the removal of such objects has also been detailed.

Keywords: foreign body, nonsurgical technique, root canal.

Introduction

Presence of foreign objects in root canal is one of the troublesome incidents in endodontic therapy. Injury to both the hard and soft tissues may occur as a consequence of child's habit of putting various foreign objects into the mouth. Due to the pulpal irritation these objects are inserted into the tooth to probe and relieve pain and pressure symptoms. The chance of these foreign objects getting impacted into the tooth is more when pulp chamber is open either because of traumatic injury or large carious exposure. Foreign objects may become a potent source of pain and infection. Most often, these cases are diagnosed accidentally on radiographic examination of the tooth which may be associated with infection, pain, swelling and recurrent abscesses as a sequelae to the pulp exposure and lodgement of the foreign body. Clinical and radiographic examinations are necessary to confirm the presence, size, location and the type of the foreign object. This Deliberate self-harm is a traumatic experience with serious consequences at both individual and social levels.

Retrieval of foreign objects from the teeth in children is a challenging aspect of pediatric dental practice. These objects can be easily retrieved if they are located within the pulp chamber, but once the object has been pushed apically, their retrieval may be complicated. Apical surgical procedures may sometimes be necessary. The following case describes a foreign object impacted into the apical third of a maxillary central incisor, which was retrieved by simple nonsurgical intracanal means.

Case Reports

Case 1
An apparently healthy 13-year-old Female child was brought to to the Department of Pedodontics & Preventive Dentistry, with a chief complaint of pain...
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& pus discharge from the gum in relation to the Maxillary left central incisor (21) since one month.

A detailed history elicited from the patient showed that she had a sport injury during playtime. The tooth had an Ellis class III fracture (Fracture of crown involving the pulp)

A clinical examination showed the presence of fractured tooth with a large cavity and exposure of the pulp chamber. Tooth was discolored and non vital. The adjacent tooth (11) also showed an Ellis class II dentinal fracture.(Fig 1)

The parent was inquired once again, who reported that the patient used to intentionally injure the tooth with a metal piece, mostly a swing needle or a nail and a matchstick to relieve pressure in the tooth . An intraoral Radiographic examination showed the presence of a radiopaque foreign body present in the apical 2/3rd of the root canal. (Fig 2) The object appeared to be the broken part of a nail or a sewing needle. The tooth root showed completed root formation & no evident periapical pathology.

Finally, the root canal was irrigated copiously with saline, then with chlorhexidine and sodium hypochloride, and the tooth was placed under observation for a period of time. Absence of foreign body in the root canal was later confirmed with an intra-canal medicament containing calcium hydroxide (Metapex, Meta Biomed Co. Ltd., Korea) was administered after drying the canal with sterile paper point. The patient was advised routine endodontic procedure followed by dressing with calcium hydroxide. Obturation was advised on improvement of periapical symptoms.

Case 2

An otherwise healthy 14 year old male child reported to the department of Pedodontics & Preventive Dentistry, with a chief complaint of pain in relation to the maxillary right central incisor (11) since one month.

A detailed history elicited from the patient showed that he had a incident of fall during running down a staircase & sustained an injury. The tooth had an (root canal). A tetanus vaccine booster dose was administered prior to initiating dental treatment. The primary aim of the treatment plan was to obtain a proper case history of the patient to ascertain about the SIB (self injurious behaviour) pattern and to provide counseling for the patient and parent. Secondly, conservative management of the central incisor was considered under antibiotic cover and removal of the foreign objects was done by tactile sensation using K-Files of size 10-25 with irrigation alternating between sodium hypochloride and hydrogen peroxide and the evacuation done using high vacuum suction. The irrigants passed out of the canal with a blackish color revealing that the metallic object was corroding. A few pieces of wood-based substance along with the metallic object ( head of sewing needle) were obtained, which was not surprising as these are not radio-opaque (fig 3).

Fig.1 Figure showing Ellis class III fracture wrt 21.

The patient confirmed the probable history that she used to forcefully injure himself and had placed a straightened sewing needle into the hole in the tooth.

Fig 2. Radiograph showing presence of foreign object.

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Ellis class III fracture (Fracture of crown involving the pulp).

On further questioning Patient admitted to ‘chewing staples’ inside the root canal to remove food plugs from the teeth. However, the stapler pin got lodged accidentally in the root canal of central incisor. Patient tried to remove the stapler pin with a needle and was unsuccessful. On examination, the pulp chamber was found to be open to oral cavity but was occluded with food plugs. Radiographic examination revealed periapical radiolucency the presence of a radio-opaque object in the root canal extending from middle third to the coronal one. (fig 4) It was decided to retrieve the stapler pin by nonsurgical technique, and thereafter, complete the routine endodontic treatment in tooth.

Fig.4 Radiograph showing presence of radiopaque object. Conventional access cavity was refined to facilitate access for instrumentation. An ISO no. 20 K-file (DENTSPLY Maillefer, Ballaigues, Switzerland) was used to bypass the stapler pin. Retrieval was done by attempting to engage the stapler pin between ISO no. 20 H-file (DENTSPLY Maillefer) and canal wall then pulling it out coronally, which was then grasped with tweezers and was retrieved. The retrieved stapler pin was nine millimeters in length (fig5).

Fig.5 Figure showing retrieved staple pin. The root canals were cleaned and shaped using protaper rotary instruments in a crown down motion.

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Three percent sodium hypochlorite, ethylenediamine tetra acetic acid (EDTA), and isotonic saline were used as irrigants. An intracanal calcium hydroxide medicament was placed. Obturation was performed using protaper Guttapercha and AH plus sealer (De Trey DENTSPLY, Konstanz, Germany). On a follow-up examination after three months, the teeth were asymptomatic. (fig 6)

Fig.6 Follow up radiograph.

DISCUSSION

As children often tend to have the habit of inserting foreign objects in the oral cavity, there are more chances of finding foreign objects in their teeth. Sometimes, children do not reveal to their parents due to fear. In such cases, the presence of foreign body is detected on routine radiographs. These foreign objects may act as a potent source of infection and painful condition. The teeth commonly involved are the permanent central or lateral incisors but instances of foreign bodies in root canals of molars are also available in the literature(1). William Gelman (2) has reported a case with primary dentition.

A number of foreign objects were reported to be lodged in the pulp chamber or root canals of the tooth, which ranged from stapler pin(3), pencil leads(4), darning needles(5), metal screws(6), beads(7), plastic chop stick(8), hat pins(9), dress maker pins(10), two straws(11), conical metallic object(12). Grossman(13) reported retrieval of indelible ink pencil tips, brads, a tooth pick, adsorbent points and even a tomato seed from the root canals of anterior teeth left open for drainage. Toida8 have reported a plastic chopstick embedded in an unerupted supernumerary tooth in the premaxillary region of a 12-year-old Japanese boy. Zillich and Pickens(9) and Turner(10) cited cases wherein hat pins and dressmaker pins that were used to remove the food plugs from the root canals of maxillary and mandibular incisors undergoing
endodontic treatment had eventually fractured inside the root canals of these teeth. Gelfman(11) and colleagues reported a case where in a 3-year-old child had inserted two straws into the root canal of a primary central incisor, which was later extracted.

Harris(14) reported the placement of varied objects within the root canals of maxillary anterior teeth. These included pins, wooden toothpick, a pencil tip, plastic objects, toothbrush bristles and crayons. The patients had inserted these objects in the root canal to remove food plugs from the teeth. Placements of beads, a paper clip and a stapler pin in the root canals of maxillary incisors were reported. Lamster and Barenie(15) reported insertion of a conical metallic object in the distal root of the primary left first molar.

Foreign objects in root canals can act as focus of infection. Complications can follow if these impacted foci of infection are not eliminated at the right time. Actinomycosis following placement of piece of jewellery chain into a maxillary central incisor(16) and chronic maxillary sinusitis of dental origin developed due to pushing of foreign bodies into the maxillary sinus has been reported(17). Hence, prompt attempts at retrieval should be initiated. During emergency root canal treatment the patient remains in the office with a draining tooth for an hour or even more and finally ending the appointment by sealing the access cavity(18). With the access cavity closed, new strains of microorganism systems and foreign bodies can be prevented from entering the root canal(19). Patient should be well educated regarding the phases of root canal treatment and the importance of completion of treatment, to avoid undue consequence. A radiograph can be of diagnostic significance especially if the foreign body is radiopaque. McAuliffe(3) summarized various radiographic methods to be followed to localize a radiopaque foreign object as Parallax views, Vertex occlusal views, Triangulation techniques, Stereo Radiography and Tomography. Vertex occlusal view is no longer favored because of relatively high radiation exposure to the lens of the eye and because the primary beam is aimed towards the abdomen. Triangulation is by the use of two views right angle to one another. Interpretation is difficult because of the superimposition of the other incisor teeth over the root. Stereographic views and tomography were not considered since the availability of the facilities in a dental operatory is very minimal. Specialized radiographic techniques such as radiovisography, 3D CAT scans can play a pivotal role in localization of these foreign objects inside the root canal. Parallax views were used in these cases to determine that the metallic objects was in the root canal, since there had been no displacement of the metallic objects to the root canal when the x-ray tube shifted. Radiographs also allows an assessment of how difficult it is likely to be remove the foreign objects. The technique of using files to retrieve foreign bodies is the gold standard and has been quoted many times in literature. K.V. Krell (20) has demonstrated the conservative retrieval of silver cones by the use of Haldstroem files, ultrasonic scaler, trephan bur, Gates glidden Drills. He has concluded that the use of ultrasonic scaler offers the maximum advantages. Some other approaches have also been advocated by various authors for retrieval of foreign objects lying in the pulp chamber or canal using ultrasonic instruments (21), the Masserann kit(22), modified Castroveijo needle holders(23) have been used. Ethylenediaminetetraacetic acid(EDTA) has been suggested as a useful aid in lubricating the canal when attempting to remove the foreign object. Meindinger(21) has used the ultrasonic scaler for the removal of a broken instrument in the root canal. He advocates the use of a H files for bypassing the broken instrument & the application of vibrations with the use of ultrasonic scaler. The Ultrasound instrument creates waves that can be used to loosen the broken instrument & dislodge it in the root canal. Williamson Bjorndal (22) has suggested the use of Masserann technique for removal of mechanical obstructions in the root canal. The instrument involves gripping the object through a tube or trephine which acts as a tube vice. This method is relatively harmless to the tooth & the periodontium. The Steglitz forceps have also been described for use of removal of silver points from the root canal. There is a 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(24).Nehme(25) had recommended the use of operating microscope along with ultrasonic filing to eliminate intra-canal metallic obstructions. However, if objects are found close to the apex , it may remove the foreign objects, and apicectomy should be considered in these cases. Srivastava and Vineeta(26) have suggested periapical surgery or intentional reimplantation to remove such objects. McCullock(27) suggested that access to the foreign object is improved by removal of small amount of tooth structure. According to Walvekar et al(28), if
the foreign object is snugly bound in the canal, the object may have to be loosened first; it should then be removed with minimal damage to internal tooth structure to prevent perforation of the root.

CONCLUSION

Foreign bodies in the root canal are commonly noted in pediatric patients. The removal of such foreign bodies is technique sensitive and need proper force application. Improper force or technique cause damage to the tooth or periodontium & also might lead to instrument breakage. In the above case reports the management of retrieval of foreign objects from the central incisor. Different armamentariums are available for their removal. Copious irrigation is advised whatever the method being used. There is a definite need for a proper classification of foreign bodies in and around the teeth and a treatment algorithm to be followed in such clinical situations. Timely diagnosis and management of foreign object embedded in the tooth should be done to avoid further complication.

REFERENCES


