CASE REPORT

Thorn in Endodontics: Patient Induced Blockage of Root Canal by Unusual Foreign Objects

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ABSTRACT

Aim: To report and describe successful non-surgical retrival of tightly-bounded unusual foreign objects from pulp-space by a simple technique with a minimum damage to the tooth and surrounding tissues.

Summary: The discovery of foreign objects embedded in a tooth is an uncommon finding. Radiographs play an important role in the detection of foreign objects lodged by the patient in the pulp chamber or root canal because patients are often reluctant to reveal or even deny of putting any object in the tooth due to fear of scolding and punishment by the parents, like in the presented case. Sometime patients, themselves, try to remove the foreign object from the tooth resulting in another foreign body impaction. In this case report, patient accidentally broke a piece of metal wire and tried to retrieve it with a long pointed thorn, but that also got stuck in his tooth. This case report describes successful orthograde retrieval of tightly-bounded unusual foreign objects from the tooth by a simple technique with a minimum damage to the tooth and surrounding tissues.

Keywords: Foreign Bodies, Non-Surgical Technique, Orthograde Retrieval, Thorn.

INTRODUCTION

Children have a habit of placing foreign objects into the mouth leading to their accidental ingestion or aspiration. A foreign body in the tooth, however, is rare. This is more likely to occur when pulp chamber is in direct communication to the oral cavity as a result of trauma, large carious exposure, and during root canal treatment in which canals are left open for drainage. These foreign objects may become a nidus of infection and source of pain. Retrieval of these foreign intra-canal objects are usually a significant challenge to the practitioners but essential. Foreign objects impede thorough cleaning and shaping of root canal system and thus may compromise the outcome of endodontic treatment. Orthograde removal of foreign objects depends on the skill, patience and experience of the operator as well as the anatomic factors such as root canal curvature, diameter, and accessibility apart from shape, size and location of the foreign object. A number of cases have been cited in the literature describing various objects being lodged in the pulp chamber or root canal.[1-10]

There is no standardised procedure for foreign body retrieval, and numbers of different techniques have been reported.[11] Present paper is intended to report the effective removal of two tightly-bounded intracanal unusual foreign objects from the tooth.

CASE REPORT

A 14-year-old healthy male patient reported to the Department of Pedodontics and Preventive Dentistry, Saraswati Dental College and Hospital with chief complaint of recurrent pain and swelling in gum over the right upper front tooth for the past four months which subsided upon taking medication. Patient had suffered oro-facial trauma 4 years back by a hand pump. His medical and family history was non-contributory. Extra-oral findings were insignificant. Intra-oral examination revealed discoloured and fractured maxillary right lateral incisor (12) along with a wide opening into the pulp chamber and a sinus formation in relation to it (Fig. 1). The tooth was tender on percussion.

Figure 1: Photograph of the discoloured and broken down maxillary right lateral incisor.

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Intra oral periapical radiograph of 12 revealed periapical radiolucency (Fig. 2) surrounding an immature apex alongwith the presence of probably two linear radiopaque objects - a more radiopaque and coronally situated cylindrical object and a relatively less radiopaque as well as apically extended linear tapered object, which extend from the pulp chamber in to the cervical one-third of the root. The patient initially denied of putting any object in to the tooth but after careful anamnesis, finally reported an incident in which he accidentally broke a piece of metal wire in order to remove the food debris from the tooth 2 years back. The patient tried to remove the wire by a thorn of babool (*Acacia Arabica*) but it also got stuck in his tooth. The patient did not reveal the incident to his parents due to the fear of punishment. On the basis of history, clinical and radiographic findings, a diagnosis of pulp necrosis with periapical abscess along with foreign body impaction in the tooth were made. After taking the clinical and radiographic findings into consideration, root canal treatment was initiated with an attempt to retrieve the foreign object and subsequently complete the root canal treatment.

Figure 2: Radiograph of tooth showing radiopaque foreign objects in the pulp chamber extending in to cervical third of the root canal.

The access cavity was modified along with the removal of carious dentin and the debris was flushed out of the pulp chamber using isotonic solution. On initial exploration with #15 K-file, foreign objects were found to be very snugly bound to the dentinal wall and did not allow the file to bypass the foreign object (Fig. 3A). Thus, initial attempt to bypass the object with #15 K-file failed, and then #6 K-file was chosen to explore the gap between object and the canal wall. On exploration with #6 K-file a "catch" was felt on mesial aspect of the pulp chamber but still failed to bypass the object. EDTA (Glyde™ File Prep, Dentsply Maillefer) was applied thoroughly in the pulp chamber for 5 minutes in order to soften the dentin. Finally, through the careful exploration and negotiation of the "catch" point with #6 K-file, a passage was created alongside the object, to bypass it. The passage was subsequently enlarged to #15 K-file (Fig. 3B). Care was taken to avoid any apical displacement of the foreign object during the passage enlargement, and each step was accompanied with copious irrigation with normal saline. A #15 H-file was then introduced in to this passage. Patiently and unhurriedly space was created by removing the dentin circumferentially around the foreign body to loosen it from all sides. Again, precautionary measures were taken not to push the objects apically during circumferential removal of the dentin in order to create space around the object and this was achieved by cutting the dentin only during the pulling motion of #15 H-file. Ultimately an attempt was made to engage the foreign body between a #25 H-file and the canal wall and pulling it out coronally (Fig. 3C, 3D, 3E and 3F). Successful removal of foreign objects was achieved after few attempts and a post operative radiograph was taken to ensure the complete removal of the foreign objects (Fig. 4). The retrieved foreign bodies were a piece of metal wire and a thorn of babool approximately 4 and 7 mm in length respectively (Fig. 5). Canal was irrigated copiously with normal saline, hydrogen peroxide and sodium hypochlorite. Following the retrieval of the foreign body, calcium hydroxide (Prevest Denpro Ltd, Jammu, India)

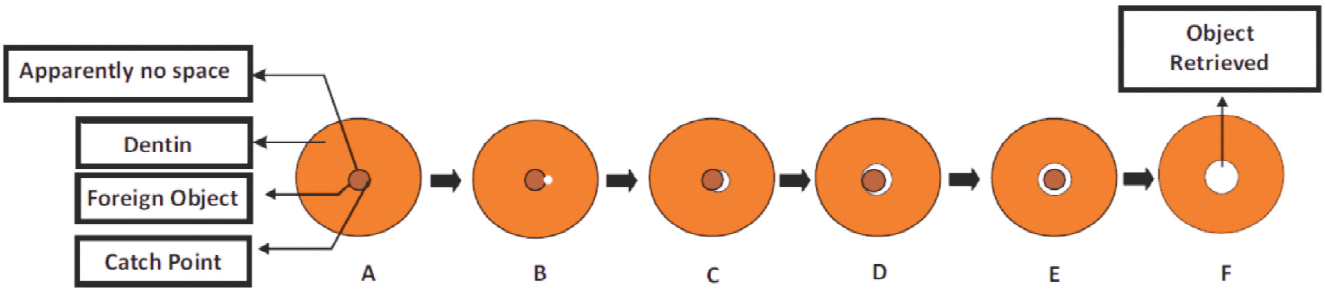

Figure 3 (A to F) Diagrammatic illustration of procedure employed for retrieval of foreign objects **(A)**: Apparently no space between the foreign body and dentinal wall, only a "catch" point on the mesial aspect of pulp chamber **(B):** Passage created alongside the foreign object by #6 K-file by careful exploration and negotiation of "catch" point and subsequently enlarged to #15 K-File. **(C to E)**: Circumferential removal of dentin by #15 H-file to create space around the foreign object to loosen it. **(F):** Successful retrieval of object (object removed)

Figure 4: Radiograph of the tooth after the retrieval of foreign bodies.

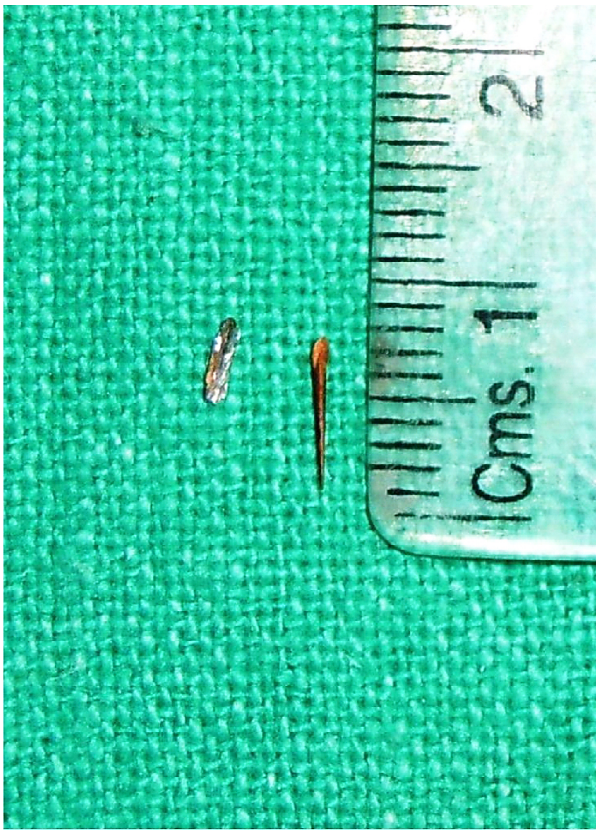

Figure 5: Photograph of retrieved foreign objects – a piece of metal wire and a thorn.

intracanal dressing was introduced and replaced every month to induce apical closure. After four months, the concerned tooth exhibited a sign of periapical healing and apical closure on radiograph (Fig. 6). The patient is still under active follow-up every month for complete apexification and periapical healing before going for final obturation.

Figure 6: Follow-up radiograph after 4 months showing reduction in periapical radiolucency and sign of apical closure which indicates periapical healing in progress.

DISCUSSION

Nothing is more annoying or disheartening to a dentist than the discovery of a broken or a separated instrument in the root canal whose removal at times is rather difficult and too time consuming, with a reported success rate ranging from 55% to 79%.[12] Similarly a number of cases have been cited in the literature describing various objects being lodged by the patient in the pulp chamber or the root canal. Toida *et al.*[1] reported plastic chopstick embedded in unerupted supernumerary teeth in the pre maxillary region of a 12 year old Japanese boy. Balto[2] mentioned the presence of a straight metallic pin in the periapical area of 12 year old female child, eventually removed by the braiding technique. Prabhakar *et al.*[3] cited a fractured piece of an ornament in the maxillary central incisor. Other objects that have been illustrated are pencil leads,[4] darning needles,[5] paper clips[6] to beads,[7] metal screws,[8] and stapler pins.[9,10] The present case report describes presence of a piece of metal wire and, probably, for the first time, a thorn in a tooth and their successful retrieval by simple endodontic instruments.

A radiograph is of diagnostic importance for localisation of foreign object when it is radiopaque. Different radiographic methods have been proposed to locate the exact position of the objects in the root canal such as Parallax views (either horizontal or vertical), Vertex occlusal views, Triangulation techniques, Stereo radiography and Tomography.[10] Radiographs also help to determine the size and likely composition of foreign object as well as the degree of difficulty that will be encountered during its removal.

Foreign bodies in the root canal not only act as obstructions for the smooth passage of endodontic instruments but also act as foci of infection and source of pain. They should be removed as complications can arise if they are not eliminated. Goldstein[13] reported Actinomycosis following impaction of jewellery chain in the maxillary central incisor, while Costa[14] quoted the development of chronic maxillary sinusitis of dental origin when foreign object was pushed through the root canal in to the sinus area. Hence, prompt and cautious attempts for retrieval should be initiated firstly by non-surgical means, but if fails, then surgical method should be employed.

Various techniques have been documented in the literature for the successful intra-canal (non-surgical) retrieval of the foreign object lying in the pulp chamber or the canal such as the Masseranan Kit,[15] the modified Castroviejo needle holders[16] and ultrasonic instruments.[17] Steglitz forceps[18] have also been known for the removal of silver points. Nehme[19] recommended the use of operating microscope along with ultrasonic filing to eliminate metallic obstruction. The operating microscope provides proper illumination and visibility of canal and locates proper position of the object in relation to the adjoining dentinal wall. But, when the object is lodged close to the apex or periapically, intra-canal retrieval of object become progressively more difficult or sometime impossible. Srivastava and Vineeta[20] suggested periapical surgery or intentional reimplantation for the removal of objects lodged in periapical region; they reported retrieval of a straight pin lodged in the periapical area of maxillary central incisor by periapical surgery.

In all cases, a careful exploration with a fine endodontic instrument should be the first step. A gap between object and the canal wall, which will exist in most cases, should be explored. If it can be detected, then fine endodontic instruments are gently worked alongside the foreign body to create enough space to bypass object. But if the object is snugly bound to the canal, gently working a fine file alongside the foreign object using ethylene diamine tetra-acetic acid (EDTA) to soften dentine may create enough space to bypass object. After bypassing, the object may have to be loosened and then removed with minimal damage to the internal root structure to prevent perforation of root canal. Care should be taken to avoid apical displacement of foreign body during its removal because it will result in more snugly fitting of the foreign object to the root canal wall, as the canal become progressively narrow apically, resulting in greater degree of difficulty encounterd during its retrieval.

In the present case, the foreign objects were found to be snugly bound to the dentinal wall and were retrieved successfully by a simple and minimally invasive and nonsurgical technique using endodontic instruments such as K-files and H-files. No specialised instruments or commercially available kit beside clinician skill was used. The basic principal that was applied in this case report of foreign body retrieval is that, if the foreign object is snugly bound to the dentinal wall, the object may have to be bypassed and then loosened before attempting its retrieval.[21] The finest K-file was used to bypass the obstruction and H-files were used to create space around the object and to loosen the foreign objects. The Masseran kit,[15] consisting of a series trepan burs which cut a space around the obstructing object and tubular extractors which are inserted in to the created space and mechanically grip the object, could also have been used but leads greater loss of root canal dentin and subsequently perforation or fracture of narrow roots.[11] Braiding technique, which involves insertion of multiple files lateral to the object in the canal space and then twisted to engage the foreign object and then withdrawn, could not be applied as the object was snugly bound to the dentinal wall and lack of space around the object did not permit access of multiple files.

A common practice employed during root canal treatment in abscessed tooth involves access cavity preparation and then leaving the pulp chamber open for pus drainage. This procedure may put the patient at peril of foreign body lodgement in the canal. But if clinician makes a decision to leave the pulp chamber open, the patient and parents should be cautioned about risk of impaction of foreign object in the pulp chamber or canal. The pulp chamber should not be left open for prolonged period of time and access cavity should be sealed as soon as acute symptoms subside. Above case report describes the successful retrieval of metallic object and a thorn from the canal space non-surgically and necessitates the need of a proper treatment outline plan for such cases.

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