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Extraneous Foreign Bodies In An Immature Permanent Tooth: A Case Report

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Abstract:
Background: *The existence of extraneous materials in the root canal poses a significant challenge in endodontic treatment. The likelihood of foreign objects becoming embedded in the tooth increases when the pulp chamber is exposed owing to trauma, extensive carious lesions, or an open root canal for endodontic treatment.*
Case presentation: *This case involves an 8-year-old kid who arrived with many stapler pins and a wooden stick embedded within the root canal of an immature maxillary right permanent central incisor. The foreign items were extracted, and the case was well managed and is currently under follow-up.*
Conclusion: *A foreign body may serve as a focus for infection and recurrence of periapical pathosis if not removed. Identification of any extraneous object within the root canal necessitates immediate retrieval and following interventions to eradicate the infection.*
Key Words: *Foreign body, Child management, Stapler pin, Wooden stick, Immature permanent teeth.*

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I. Aim & Background:

The occurrence of foreign bodies embedded inside a tooth is somewhat rare. Children often insert unfamiliar objects into their mouths. The likelihood of foreign items impacting teeth increases when the pulp chamber is exposed due to severe traumatic dental injury, significant carious lesions, or during endodontic procedures. Multiple case reports documented the introduction of foreign objects by patients into the exposed pulp chambers and canals. The things comprise pencil lead,[1] darning needle,[2] metal screws,[3] beads,[4] paper clips,[5] staple pins, [6-9] minute hand of the watch,[10] a toothpick,[11,]. The failure to eliminate these poses a threat to endodontic success [12]. The existence of these objects undermines the prognosis of endodontic treatment and the overall prognosis of the tooth.

The case history and clinical examination is of paramount importance in diagnosing cases with foreign objects. The radiographic examination enables us to ascertain the dimensions, location, and anatomical characteristics of the object present in the root canal. An accurate diagnosis enables us to choose among the treatments available for the successful retrieval of foreign bodies from the tooth.

II. Case Description:

An 8-year-old male, accompanied by a guardian, presented to the Pediatric Dentistry Department with a chief complaint of pain in the upper front tooth region. The pain has been sporadic during the past year, accompanied by occasional inflammation in the same area. The dental history indicated that the patient experienced a fall two years prior, resulting in pain and swelling. The child underwent root canal therapy one week after the trauma at a local dental clinic; unfortunately, the procedure was not completed. The patient exhibited a recent episode of pain that continued despite ten days of prescription antibiotics and analgesics. The parents requested to get the tooth extracted.

Extraoral examination showed a bilaterally symmetrical face with no deviation and a clicking sound in the temporomandibular joint. Intraoral examination revealed a horizontally fractured 11 (FDI notation) involving the middle third of the tooth (figure 1A). The palatal access was seen open due to dislodged restoration which was placed during the prior endodontic intervention. The involved tooth had no intraoral or extraoral swelling or vestibular obliteration. However, the tooth was tender on percussion with grade II mobility. A sinus tract was present involving the attached gingiva of 11.

Provisional diagnosis: Complicated crown fracture with respect to 11

Investigation and treatment done:

An intraoral periapical radiograph revealed several radiopaque bodies within the root canal of a tooth exhibiting a blunderbuss apex and periapical radiolucency associated with tooth 11 (Figure 1C). Upon questioning, the patient confessed to utilizing a stapler pin to dislodge food particles from his tooth. The vitality test conducted on the adjacent teeth indicated that teeth 22 and 12 are vital. A diagnosis of chronic periapical abscess with an open apex was established for tooth 11 through clinical and radiographic evaluation. Based on the clinical and radiographic findings, apexification was scheduled, accompanied by an attempt to remove the foreign bodies, followed by the finalization of the root canal therapy.

Following the placement of the rubber dam, the access cavity was adjusted, and the pulp chamber was thoroughly cleansed of material through extensive irrigation with normal saline solution and 5.2% sodium hypochlorite solution. The objects were extracted utilizing a No. 35 H-file (Dentsply Maillefer, Ballaigues, Switzerland). The residual food particles were eliminated utilizing normal saline and a 5.2% sodium hypochlorite irrigation solution. Four stapler pins and one wooden stick (Figure 1B) were extirpated from the canal, and an intraoral periapical radiograph was taken to verify the full extraction of foreign embedded bodies (Figure 1D).

Non-setting calcium hydroxide (Neocal, Orikam Healthcare India Pvt Ltd) was used as intracanal medication, and a temporary restorative material (MD Temp. Meta Biomed™, Korea) was used to seal the tooth (Figure 1E), and the dressing was changed periodically twice a month and the case was followed up for 6 months to achieve apical closure. After six months, the root apex was closed, so gutta-percha obturation and composite resin restoration were performed (Figure 1F).

III. Discussion:

Endodontic failures and refractory periapical periodontitis arise from various factors, including insufficient endodontic access, inadequate canal debridement, resistant bacteria, compromised post-obturation restorations, and endodontic errors.[1,2] Inaccurate diagnosis of pulpal pathosis is a principal factor contributing to endodontic failures; the failure to identify foreign bodies can jeopardize the efficacy of endodontic therapy. The identification of foreign objects is typically coincidental.[3] The Foreign bodies are typically challenging to diagnose due to the following factors: The appearance of a foreign body in canals is atypical, and there is no documented history of foreign bodies being placed in the mouth. Furthermore, some foreign bodies lack radiopacity, making them undetectable in diagnostic imaging. X-rays. In this instance, we have only identified stapler pins on radiograph, but we also encountered a wooden stick during the operation.

An individual typically engages in the act of inserting foreign items to extract food residues and other substances trapped in the pulp chamber or canals. Children often exhibit the masochistic tendency to place foreign objects in their mouths; therefore, this potential should be considered, particularly in instances of open pulp chambers to mitigate discomfort.[12] Upon diagnosing the foreign objects, various aspects influence the comprehensive retrieval, including the object's type, position, canal morphology, canal curvature, wedging action, size of the foreign body, solubility to endodontic irrigants, and radio-opacity.[13]

The interappointment medicament-calcium hydroxide was used to allow better healing of periapical pathology.[14]

Retrieving the foreign object can be challenging if it is located in the periapical region. In these instances, apicoectomy is the preferred treatment, as indicated by Zillich and Pickens.[15]Srivastava N et al. have proposed purposeful reimplantation for the extraction of foreign items in some instances. The prognosis is favorable following the successful extraction of the foreign items (Table 1).[1] A retained foreign body might serve as a focus for infection and recurrence of periapical pathosis.

In the present case, we used H-files to retrieve foreign objects and copious irrigation with saline and 5.2% Sodium hypochlorite followed by non-setting calcium hydroxide dressing for six months. The case was kept under strict follow-up, and bimonthly periodic replacement of dressing material was done. After six months, root end closure was noticed on the radiograph and confirmed by gutta-percha points. Finally, obturation was done followed by composite resin restoration.

The patient expressed satisfaction with the post-treatment aesthetic restoration. He was recalled for standard follow-ups to monitor for any failures. The tooth in question was asymptomatic, indicating the efficacy of the endodontic operation.

IV. Conclusion:

This paper presents the diagnosis, treatment, and assessment of a case involving foreign body entrapment in the tooth's root canal. The paper also reviews the retrieval procedure and emphasizes the practical application of intracanal calcium hydroxide paste to ward off microbial infection. Knowledge of these procedures and infection management can assist the practitioner in effectively treating the patient and restoring the tooth's structure and function.

Clinical Significance:

Foreign objects discovered in root canal of permanent teeth are rare. The diagnosis of such situations should rely on comprehensive history taking, meticulous clinical examination, and appropriate imaging of the suspicious region.

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Figures And Figure Legends:

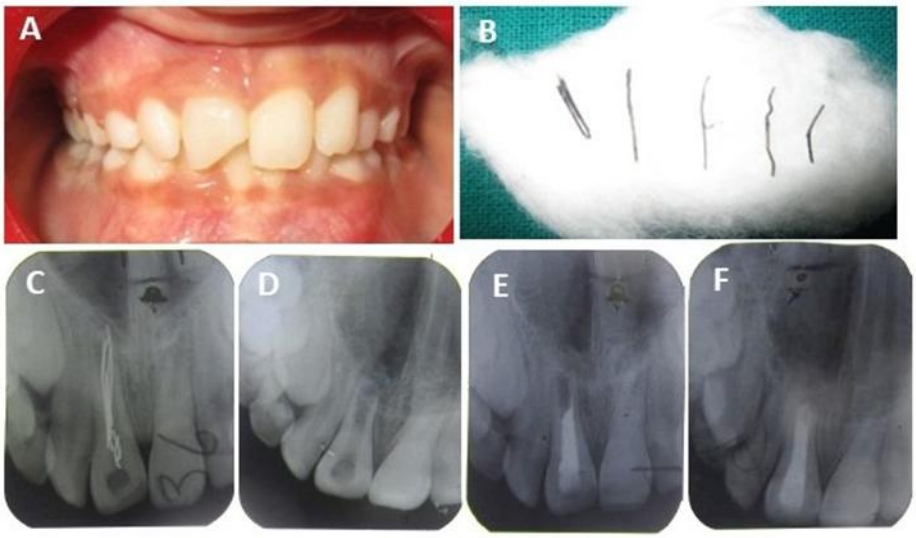

Figure 1A to 1F: **1A)** 11 with a fracture in the middle third **1B)** Stapler pins and a wooden stick after retrieval **1C)** Preoperative IOPAR of 11 showing open apex and foreign objects in canal space **1D)** IOPAR of 11 after retrieval of foreign objects **1E)** IOPAR of 11 showing calcium hydroxide dressing **1F)** IOPAR of 11 showing root end closure and obturation.

Table 1: Key points to be considered during the management of embedded foreign object's teeth

Aspect	Details
Challenges in Diagnosis	Foreign objects in root canals are rare, often undetected due to lack of history, radiolucency, or unusual presentation.
Causes of Foreign Objects	Children habitually place objects in open pulp chambers of teeth to alleviate pain or while cleaning lodged food.
Factors Influencing Retrieval	Retrieval depends on object type, location, canal morphology, and radiopacity.
Management Techniques	- Use of H-files, copious irrigation, and calcium hydroxide or triple antibiotic paste dressing to eliminate infection. - Periodic dressing changes and strict follow-up ensured healing.
Alternative Treatments	Periapical surgery or intentional reimplantation may be required for deeply lodged foreign objects.
Prognosis	Successful retrieval and treatment result in good outcomes; untreated foreign objects act as infection niduses.