Accidental ingestion of a hypodermic needle during root canal treatment: a case report

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This atypical case report describes the accidental swallowing of a hypodermic needle by a patient during root canal treatment. The needle was safely removed by gastrointestinal endoscopy after 24 hours, but the incident emphasizes the need for rubber dam placement and proper vigilance during all endodontic and restorative procedures to prevent such events, which can be life-threatening or fatal. This case report also guides clinicians in the steps that must be followed if such an accident occurs.

Despite the best efforts of dentists as they perform procedures, certain materials may fall into the oropharynx of the patient, creating the risk of swallowing or aspiration. Today many dentists prefer sit-down dentistry, in which the patient is in a supine or semi-supine position during treatment; this positioning has increased the possibility of such occurrences.\(^1\)

Any foreign body can be aspirated or ingested. Aspirated foreign bodies can cause serious complications, such as sudden choking and asphyxia, whereas ingested foreign bodies generally pass spontaneously through the gastrointestinal (GI) tract and do not result in any complications. However, very sharp or pointed objects may cause perforations along the gastrointestinal tract. According to Ozkan et al, foreign body ingestion has a complication rate of less than 1% but may lead to perforation associated with peritonitis.\(^2\)

These cases mostly require surgical intervention. Ingested foreign bodies also can migrate from the esophagus to the thorax and mediastinal space and may lead to life-threatening complications such as pneumothorax, mediastinitis, pericarditis, pulmonary complications, and vascular injuries.\(^2,6\)
This case report describes the ingestion of a hypodermic needle used for irrigation of root canals and its retrieval from the stomach using flexible fiber-optic GI endoscopy after 24 hours. This article also emphasizes the use of proper preventive measures, such as rubber dam placement, and provides the protocol for treatment that should be followed if an incident of foreign body aspiration or swallowing occurs.

Case report
A 26-year-old man was referred to the Department of Oral and Maxillofacial Surgery of KVG Dental College & Hospital, Sullia, India, with the complaint of accidental swallowing of the 23-gauge hypodermic needle during a root canal treatment procedure. The patient allegedly swallowed the needle, which had detached from the syringe during irrigation of the root. The general condition of the patient was good; he was conscious, cooperative, and alert. He did not present any signs of choking or difficulty in breathing. No bleeding was reported from the throat or in the saliva, ruling out the possibility of immediate trauma caused by the needle.

The patient was advised to obtain a digital lateral cervical radiograph and an anteroposterior chest radiograph to locate the needle. He was then referred to the ear, nose, and throat department of the college for further intervention. The chest radiograph and lateral cervical spine radiograph did not show any evidence of the needle in the oropharynx, larynx, esophagus, trachea, bronchi, or lungs (Fig. 1). The absence of the needle in both radiographs suggested that the needle had moved down the esophagus, so an anteroposterior abdominal radiograph was advised. However, even an abdominal radiograph failed to show any evidence of the needle, which can be explained by the superimposition of high-density vertebrae (Fig. 2).

Because the radiographs failed to locate the position of the needle, direct exploration of the oropharynx and esophagus with rigid esophagoscopy was planned. The patient was administered general anesthesia for the procedure, which was inconclusive—the needle still could not be located. The dead spaces such as the piriform fossae were also explored to rule out any likelihood that the needle was hidden there.

Finally, it was decided to use flexible fiber-optic GI endoscopy to examine the upper GI tract. This flexible endoscope is usually used for locating lesions, tumor masses, obstructions, or foreign bodies in the upper GI tract. The patient was stable throughout the procedure and did not develop any complications. The GI endoscopy showed no evidence of the needle in the oropharynx, supraglottic area, or esophagus (Fig. 3A). A small ulceration, 1.0 × 1.3 cm, was noted near the upper esophageal sphincter; this lesion might have been caused by the rigid esophagoscopy used earlier (Fig. 3B).

The endoscope was advanced into the stomach, and the needle was discovered embedded in the thick wall of the stomach (Fig. 3C). The needle was covered with food particles. It was retrieved with the help of an endoscopy-assisted tissue punch, usually used for obtaining a biopsy specimen. The needle was bent at about 80 degrees, which is usually done to facilitate irrigation of root canals (Fig. 3D). No bleeding from the tissue-punched site was observed.
The patient was comfortable and was discharged after being kept under observation for 24 hours.

Discussion
This case report serves as a reminder to all dental staff and emphasizes the need to take proper precautions and pay close attention during any procedure. Momentary carelessness can result in serious complications for both the patient and dentist. Any foreign body that goes missing from the oral cavity can follow 1 of 3 paths: expulsion, aspiration, or ingestion. The Chart explains the protocol that must be followed if such an accident occurs. To avoid medicolegal complications, it is important to document every step taken to retrieve the foreign body in a systematic manner.

According to the reported literature, the majority of foreign bodies pass harmlessly through the GI tract, and conservative management with watchful clinical and radiological observation is generally recommended; 10% to 20% of swallowed foreign bodies require nonoperative intervention such as endoscopy, and only about 1% require surgery.\(^2,7-9\) According to the American Society for Gastrointestinal Endoscopy (ASGE), surgical intervention should be considered if an object has failed to progress along the tract after 3 days, and the patient should be advised to report vomiting, abdominal pain, elevated temperature, hematemesis, or melena immediately.\(^10\) The ASGE also reported that emergency endoscopic intervention is required in cases of sharp foreign body ingestion, because the risk of complication is as great as 35% when a sharp object has been swallowed.\(^10\) In the present case report, the needle had penetrated the patient’s stomach lining. This situation could have led to local inflammation, pain, bleeding, scarring, and obstruction, or the needle could have eroded through the GI tract.
Spitz and Gracia et al reported that the duodenum is the most common site of perforation secondary to foreign body ingestion, whereas MacManus identified the ileocecal region as the most common site\textsuperscript{11-13}. As in the present case, plain radiography sometimes is not effective in localizing radiopaque objects. Computed tomography or magnetic resonance imaging is indicated in such cases to enhance the detection of foreign bodies or complications (e.g., perforations or migrations).\textsuperscript{14}

The incident described in the present case report suggests that rubber dam should be used in all endodontic and restorative procedures to provide a sterile operating field and to avoid the risk of inhalation or ingestion. Barkmeier et al emphasized the importance of using rubber dam and oral packing to minimize the occurrence of swallowed foreign objects.\textsuperscript{15} Sit-down dentistry, in which the patient lies in a supine or semisupine position, considerably increases the risk that instruments, files, restorations, and other foreign objects will directly enter the oropharynx. Therefore, the clinician should observe greater caution when treating a patient lying in a supine or semisupine position.

Foreign body aspiration can be fatal, so every dentist should be aware of basic life support steps, and all dental offices should develop and practice emergency response protocols. Jevon and Haas have provided sound guidelines for managing medical emergencies in the dental office and the professional responsibilities of dental practitioners.\textsuperscript{16,17} Ingested foreign bodies mostly do not cause any complication and are discharged safely through the patient’s stools, but the possibility of complications such as abscess, fistula, peritonitis, and septicemia should never be ignored.\textsuperscript{18}

**Conclusion**

The majority of ingested foreign bodies pass spontaneously and do not cause any severe complications. However, careful clinical and radiographic monitoring of the patient is advised until the foreign body is eliminated from the body. Possible complications such as perforation, migration, and vascular injuries should always be kept in mind.\textsuperscript{6} The clinician should ensure that the foreign object has left the body and the patient is completely healthy before discharge.

All efforts should be made to prevent such accidents, and rubber dam or at least oral packing with gauze should be applied before any procedure such as endodontic treatment. It is also advisable to use locking syringes to prevent detachment of the needle from the syringe during injection. Most important, dentists should be vigilant at all times during procedures.

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References


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