

Apply 'Dam' before you say 'Damn': A case report

Abstract: With increasing legal implications in dental practice, one has to be careful so as to avoid accidents in practice. Although rare, ingestion or inhalation of endodontic instruments during treatment without rubber dam can result in clinical complications and subsequent legal proceedings. The purpose of this paper is to describe a clinical case of accidental aspiration of an endodontic file with emphasis on the preventive measures to avoid such an accident and management if such mishap occurs.

Keywords: Iatrogenic, ingestion, aspiration, foreign body, rubber-dam.

INTRODUCTION:

Accidents are unpleasant incidences that happen when we are careless or when we do not follow the safety rules.¹ Iatrogenic accidents during routine clinical procedures are unpredictable and can occur sometimes regardless of all the possible precautions taken. The golden line 'prevention is better than cure' seems to be more of a saying and less of belief when we see cases such as accidental aspiration/swallowing of foreign objects.²

A serious complication of clinical dentistry is the aspiration or swallowing of an instrument used in oral cavity.³ Ingestion or aspiration of instruments or materials used in treatment can occur in every field of the dental profession.⁴ However such accidents occur especially if the procedure is done without the application of a rubber dam.⁵ It is encountered mostly in children (approximately 73-80%) but may also happen to adults, especially patients having psychiatric problems, mental retardation, or altered consciousness due to some sedation.¹ These foreign objects can be of various sizes and shapes, ranging from small, large, elongated, round, sharp and blunt. Small prosthesis like inlays/onlays, single unit crowns during cementation, orthodontic

brackets, rubber-dam clamps, endodontic instruments, teeth, mirror heads are the objects that have been reported to be ingested.¹ Other commonly ingested sharp objects also include sewing needles, tooth picks, chicken and fish bones and paper clips.⁶

Grossman (1974) reported that such iatrogenic errors occurred most frequently when treating posterior mandibular teeth. Grossman (1971) also determined that 87% of foreign bodies entered alimentary tract, whereas 13% aspirated into the respiratory tract.⁷ It has been reported that in most of the cases the foreign bodies pass through gastrointestinal tract without difficulty, in 10-20% of cases require non-surgical intervention, while 1% or less require surgery.⁸ Aspiration, on the other hand is more serious, it has to be retrieved as it may lead to inflammation, respiratory obstruction and even death.¹ The operating dentist should maintain airway patency and immediately seek medical care for the patient.¹ Any delay in the proper management and timely intervention of such accidents may cause severe sequelae and can be lethal. Moreover, such accidents are also a source of emotional distress to the patient and can also dampen the reputation as well as morale of the dentist.²

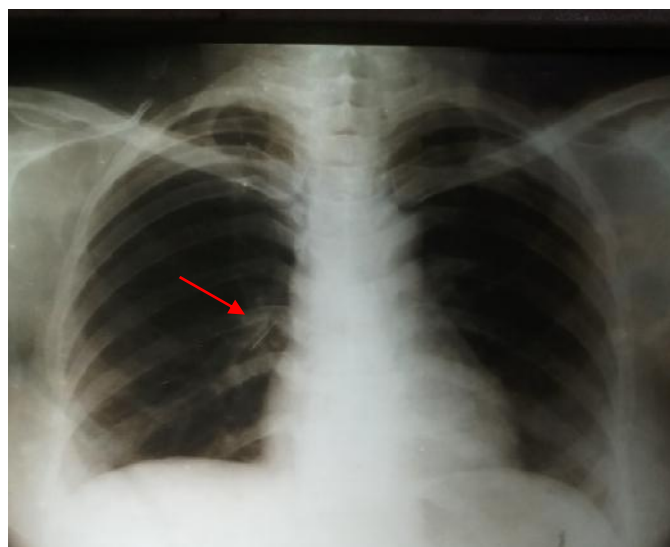
Accidental ingestion or aspiration of foreign bodies may cause various clinical complications such as damage to the digestive tract, abscess formation, peritonitis, septicemia, pneumonia, foreign body granuloma, fistulas, and duodenocolic fissures. The risk of injury increases when the size of swallowed object is more than 5cm or has a pointed shape.⁷ The dentist should have basic knowledge about the diagnostic procedures, complications, and methods of retrieval as well as an ability to reassure the patient.⁴ This article attempts to highlight the risks associated and management of aspirated/ingested cases along with case report of endodontic instrument aspiration while doing root canal treatment (RCT) in a dental college.

CASE REPORT:

A 33-year-old healthy female patient reported to the Department of Conservative Dentistry and Endodontics Swami devi dyal dental college and Hospital, Barwala, Haryana with a chief complaint of pain in the left lower Ist premolar. Root canal treatment was carried out without the application of rubber dam as the coronal structure of tooth was severely broken down. While doing biomechanical preparation (BMP) the patient coughed and the 20 K-file slipped

55 accidentally into the posterior region of oral cavity, the operator bent aside to pick-up tweezer so
56 that file could be retrieved and in the mean while patient swallowed that instrument. There was
57 no floss tied to the instrument. Attempts were made to retrieve the file but were not successful.

58 Patient was immediately sent to the general hospital for an immediate Posterior-anterior chest
59 and abdomen radiograph to confirm the status of the instrument. On radiographic examination a
60 radio-opaque object in the right bronchus was observed (Fig 1). Patient was normal with normal
61 breathing sounds and respiratory rate. The patient was informed about the presence of the
62 instrument in the lung and was immediately referred to pulmonary medicine department of PGI
63 Chandigarh to attempt its removal. Consent was obtained from the guardians accompanying the
64 patient. Fiber-optic bronchoscopy was planned and was immediately carried out successfully
65 under local anesthesia. Post-operative radiograph was taken (Fig 2). Root canal treatment was
66 completed successfully after that. She reported healthy and asymptomatic at her 6 months recall
67 visit.



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72 Figure 1: Radiograph showing endodontic file in right bronchus

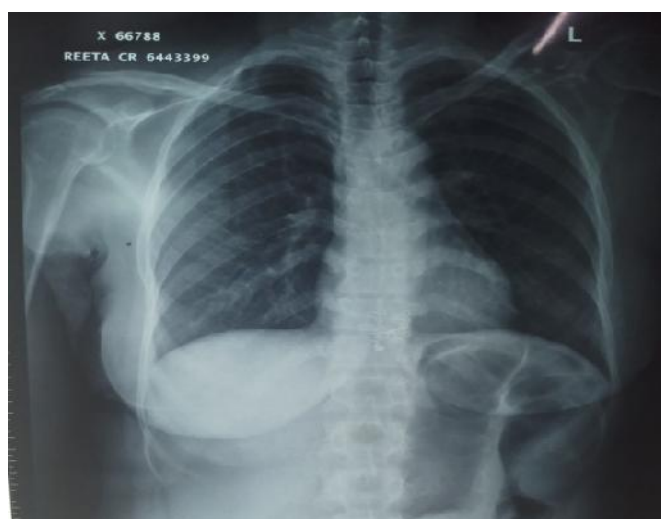


Figure 2: Post-operative radiograph showing no sign of instrument in the Right bronchus



Figure 3: Retrieved endodontic K-file

DISCUSSION:

Accidental foreign body ingestion and aspiration are among myriad emergencies that seem to arise in dental practice. However, the actual documented occurrence of such incidences of accidental ingestion during clinical dental treatment may be under reported. The episodes although are said to be few in occurrence or occasionally, still happen despite being entirely preventable.⁹ According to Susini et al, the prevalence of aspiration of endodontic instruments was 0.0009 per 100,000 root canal treatments and prevalence of ingestion was 0.08 per 100,000 root canal treatments.¹⁰ Dentists have to be aware of patient-related factors also which make the patient more prone to swallow foreign bodies e.g. children, patient with excessive gag-reflex small oral cavity and short palate. Also patients with acroglossia, a thick neck, overweight

patients, pregnant women and patients on medications especially those with psychiatric diseases. These patients should be informed and instructed to control swallowing reflex. Patients in which the coordination of the deglutition and cough reflexes are affected should be treated in a more upright position.⁸

Safety during treatment is an important component of root canal therapy.¹¹ In endodontics, it is possible to minimize the risk of inhalation and ingestion of root canal instruments by using a rubber dam on a routine basis.⁴ The use of Rubber dam for root canal treatment is mandatory.¹² Practitioners must take precautions to prevent patient aspiration or ingestion of instruments by using Rubber dam at all times during endodontic therapy. Students learning in a dental institute are prone to make mistakes while learning. Although rubber-dam application is always advised and must but still it is at times neglected. The significance of floss attached to the instrument all the more becomes relevant with the students doing root canal treatment. In this case both these methods were neglected thus, making it accident prone. Treatment with a Rubber dam serves many purposes including patient protection from aspiration or swallowing of instruments, retraction of hard and soft tissues, improved visibility and prevention of contamination of root canal system. The main and most important purpose is patient safety. Yet a recent national survey showed that only 59% of general dentists and 92% of endodontists routinely use rubber dam during root canal treatment.¹¹

If the patient is allergic to Rubber dam, rotary files are preferred to hand files for root canal treatment. In patients intolerant to this safety measure due to high gag reflex, the chair position becomes more meaningful during the intervention. Such patients should be seated more upright, with head turned to one side. If hand files are to be used, a thread or dental floss should be tied around the file handle so that it can be retrieved if accidentally ingested. While rubber dam reduces the risk of aspiration and ingestion during any procedure, it is possible for the dam clamp itself to be aspirated. To reduce this risk, Alexander and Delholm and Meyers have suggested that dental floss be used to secure the clamp.¹³ The gauze screen (4×4 inch) is placed in the posterior oral cavity to block the access of small items to the oropharynx in case of orthodontic patients and patients with prosthetic appliances.² Clinicians should always work in a dry environment rather than wet to minimize the chances of slippage through the clinician's fingers.⁵

Swallowed objects can get lodged in the pharynx, esophagus, stomach, intestine or simply pass through the gastrointestinal tract. Aspirated foreign bodies can get lodged in the larynx, trachea or bronchus and is more serious situation with the possibility of suffocation.¹⁰

The majority of ingested foreign bodies pass spontaneously but serious complications such as bowel perforation and obstruction can occur.⁸ In case of aspiration, a radiographic examination and localization of the foreign body forms the first line of management. A radiographic examination helps to detect the presence/absence of the foreign body, as in our case before proceeding to the treatment first of all radiograph was taken to locate the instrument which was found in the right bronchus and then after locating the aspirated endodontic file bronchoscopy was performed successfully. Computerized tomography (CT) has an added advantage over conventional radiographs in localization of foreign body. A CT scan is helpful in visualizing the radio-opaque foreign bodies and the alveolar collapse. CT scan can depict a foreign body in the lumen of tracheobronchial tree, as also the three-dimensional position of foreign body.¹⁴ Aspirated foreign body is a medical emergency that requires immediate intervention. Management of ingested dental objects depends on the nature of the object, the anatomical location of the object and patient's clinical condition. Localization of an impacted foreign body by means of radiography is important before endoscopic approach. Contrast radiography or CT may be required to localize radiolucent objects such as dental prosthesis and toothpicks. Conservative monitoring is appropriate if the patient ingested a dental object that is not sharp or irregularly shaped, is less than 2.5 cm in diameter and less than 6 cm in length. Confirmatory radiographic documentation of passage is mandatory when using a conservative approach. During the period of watchful waiting, the patient should eat a high-fiber diet, watch stool to confirm the passage of object and look for symptoms such as fever, pain, black stool or bleeding that can suggest ongoing complications. If passage of a blunt foreign body is not confirmed within seven days, or if the patient becomes symptomatic, the clinician should obtain abdominal radiograph and refer the patient to a physician for endoscopic retrieval.¹⁵

When an iatrogenic accident occurs, it is very important to remain calm and to know how to manage and protect themselves against such accidents. The clinician should be able to recognize signs and symptoms of air and gastric obstruction if any dental item gets lost in the oropharynx.

146 The patient should be placed in a reclined phase, and encouraged to cough forcibly to clear
 147 airway. If it does not bring any improvement, and airway is getting compromised with symptoms
 148 like choking, inspiratory stridor, forced breathing then Heimlich maneuver should be carried out
 149 to alleviate the laryngeal obstruction. If retrieval of foreign body does not becomes feasible,
 150 basic emergency life support treatments must be initiated till any definite treatment.²

151 If airway is not compromised, assessment for any lost or missing instrument should be done
 152 promptly with a high suspicion of mishap. If the object is found in the oral cavity, its retrieval,
 153 identification, and confirmation that object is intact should be immediately done followed by
 154 reassuring the patient. If object is not retrieved patient should be informed about the
 155 complications and must be escorted to the hospital to confirm the status of lost object using
 156 comprehensive diagnostic tests (chest and abdomen radiographs) and help to decide the required
 157 medical action.²

158 If the foreign body has entered into the respiratory tract, before extracting the foreign object, its
 159 anatomical location must be identified to avoid any further complications. Once localized,
 160 bronchoscopy is the treatment of choice for removal of aspirated objects.²

161 If the foreign body has entered the GI tract, its removal is determined according to the patients
 162 age, size, shape, anatomic location and time since the ingestion. The possible sites for impaction
 163 along GI tract are pharynx, upper esophageal sphincter, pylorus, duodenojejunal flexure,
 164 ileocecal junction, appendix, rectosigmoid junction, anus or patients with previous GI surgery.
 165 The judgement of risks of aspiration, obstruction, or perforation determines the timing of
 166 endoscopy. Flexible endoscopy is the procedure of choice to retrieve such objects in the GI
 167 tract.²

168 Thus, if precautions would have been taken this accident might not have happen.

169 **CONCLUSION:** As per old adage “prevention is better than cure” these mishaps can be
 170 prevented by adhering to preventive measures like rubber dam application, tie floss on
 171 instruments and use of gauze screen. Dentist should have proper knowledge of signs and
 172 symptoms and should know how to manage such situations whenever any mishaps happen and
 173 appropriate potentially life-saving treatment should be given.

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