

Perforation of the cervical esophagus due to an ingested toothbrush

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CASE PRESENTATION

A man in his 50s with a long history of schizophrenia was transported to the emergency department because his caregiver noticed a stick-like object protruding from his posterior oropharynx. A toothbrush handle was found lodged in the oropharynx on oral examination. A detailed history could not be obtained due to his underlying mental illness. He was febrile to 38°C, but other vital signs were normal. He was not in respiratory distress. Physical examination was unremarkable except for mild tenderness in the left neck with crepitus. Laboratory tests showed mild leukocytosis. A contrast-enhanced CT scan of the head and neck revealed the end of a toothbrush handle wedged into the soft palate and the toothbrush head protruding into the cervical esophagus, surrounded by extensive emphysematous changes in the soft tissues of the neck bilaterally. The toothbrush measured approximately 15 cm long × 1.5 cm wide ([figure 1](#)).

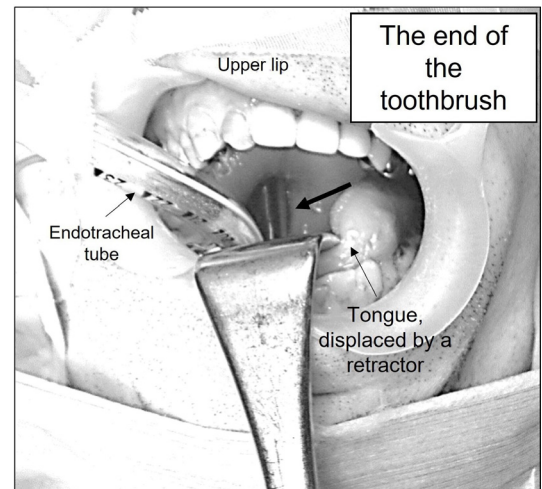


Figure 2 Frontal view of the patient's oral cavity in the operating room. The end of the toothbrush handle is wedged into the palate.

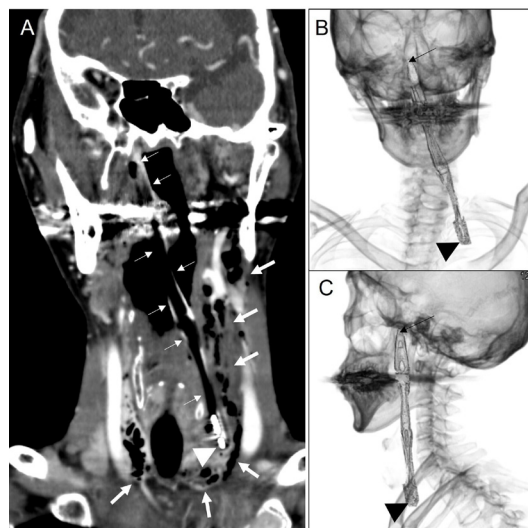


Figure 1 (A) Coronal view of a CT scan of the head and neck with intravenous contrast. The toothbrush is positioned obliquely from the floor of the palate to the cervical esophagus (narrow arrows). Emphysematous changes have spread bilaterally in the soft tissues of the neck (wide arrows). The head of the toothbrush is in the cervical esophagus (arrowhead). (B,C) The scout view of the head and neck was overlaid with a 3D constructed image of a toothbrush. The end of the handle is on the floor of the palate (narrow arrow), and the head is in the cervical esophagus (arrowhead).

WHAT WOULD YOU DO?

1. No oral intake and administer intravenous broad-spectrum antibiotics.
2. Food bolus challenge to analyze if the toothbrush will pass spontaneously.
3. Retrieve the toothbrush with emergency laryngoscopy and endoscopy.
4. Left cervical exploration.

WHAT WE DID AND WHY

After obtaining the patient's consent, the following treatments were performed. Initially, endoscopic removal was considered; however, this was thought to be associated with a high risk because the edge of the toothbrush could further damage the floor of the palate. Therefore, the patient was brought to the operating room for a left cervical exploration. Fiberoptic laryngoscope-guided orotracheal intubation was performed to avoid dislodgement of the toothbrush. The end of the toothbrush handle was clearly buried in the floor of the palate ([figure 2](#)). The toothbrush handle was cut with pliers inserted through the mouth and the end of the toothbrush was removed transorally. On the floor of the palate, a 5 mm laceration was closed with absorbable sutures.

An oblique incision was then made along with the anterior edge of the left sternocleidomastoid muscle to expose the cervical esophagus. A 5 mm perforation was found in the upper portion of the cervical esophagus. The head of the toothbrush reached into the esophagus deeper than the perforation.

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Figure 3

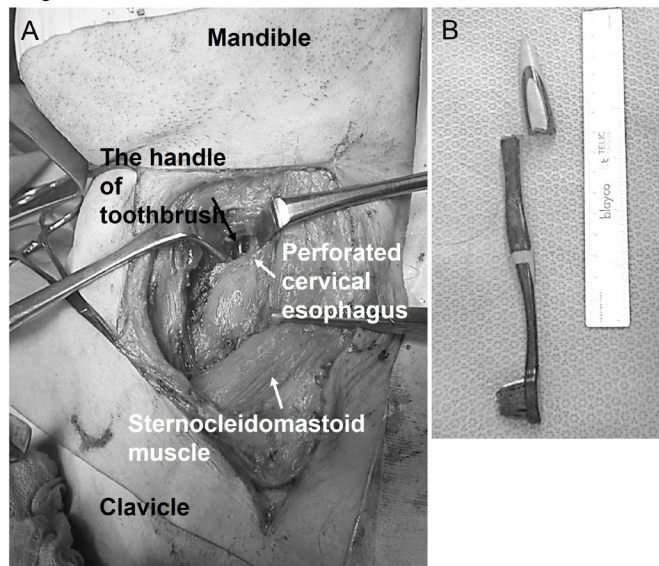


Figure 3 (A) Intraoperative view of left cervical exploration. A 5 mm perforation was observed on the cephalad side of the cervical esophagus. Presumably perforated while swallowing the toothbrush, the head of the toothbrush is even deeper in the esophagus. (B) Extracted toothbrush. For safe removal, the handle portion was cut intraorally (ruler is 15 cm).

The rest of the toothbrush was removed through the perforation which was enlarged to 1 cm (figure 3). The perforation was closed in two layers. Contamination had spread to the left side of the trachea as well as to the anterior and contralateral sides of the trachea. Because of concerns about airway compromise due to edema of the peritracheal tissue, a tracheostomy was performed to protect the airway. Because of the laceration on the soft palate, there was a concern that the oral tracheal intubation tube would compromise the wound. Therefore, an oral tracheal intubation tube was converted to a tracheostomy during operation. After copious irrigation, Penrose drains were placed behind the cervical esophagus and upper mediastinum. The wound was closed in layers.

His postoperative course was prolonged due to severe infection of the cervical soft tissues and mediastinitis. Tazobactam/piperacillin, vancomycin, and micafungin as well as daily irrigation and drainage were continued for 14 days. After the cervical inflammation abated, the tracheostomy tube was removed prior to discharge.

DISCUSSION

In this patient, an ingested toothbrush perforated the cervical esophagus and caused mediastinitis. The end of the toothbrush was embedded in the floor of the palate, precluding safe endoscopic removal, necessitating surgical removal. Most ingested foreign bodies are not impacted in tissues and pass spontaneously without the need for intervention. Approximately 10 to 20 percent of patients need endoscopic removal and less than 1 percent of patients require surgical removal.

A toothbrush as an esophageal foreign body is relatively rare. It is commonly seen in young females with eating disorders such as anorexia nervosa and bulimia. A long object such as a toothbrush will not pass through the esophagus spontaneously. If the foreign body remains impacted for more than 24 hours in the esophagus, the risk of major complications such as perforation with or without mediastinitis, retropharyngeal abscess and aorto-esophageal fistula increases 14 times compared with removal within 24 hours. Therefore, it is recommended that all foreign bodies in the esophagus are removed within 24 hours. Surgical removal is rarely indicated, but is necessary when an endoscopic approach fails and/or when severe complications such as esophageal perforation and mediastinitis have occurred.

A toothbrush as an esophageal foreign body cannot pass through gastrointestinal tract spontaneously and can cause severe complications such as perforation and mediastinitis. Surgical removal should be considered with a failure of endoscopic removal and/or the development of complications.

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