



# Duodenal Perforation by Swallowed Toothbrush: Case Report and Review of Literature

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## Abstract

Foreign Body (FB) ingestion is usually seen in children but can occur in adults accidentally or intentionally in certain group of patients. Various objects have been reported in medical literature but toothbrush ingestion is rare. Although most of these FB pass through the alimentary tract without consequences but the spontaneous passage of toothbrush is an exception. We report a case of perforation of third part of duodenum by 17 cm long toothbrush causing peritonitis that was removed after exploratory laparotomy. The duodenum was repaired and though postoperative period was long but there were no complications.

**Keywords:** Toothbrush ingestion; Duodenal perforation

## Introduction

FB ingestion is not infrequent in emergency department especially in children [1,2]. Although mostly accidental, but a few with mental health issues or prisoners can swallow different kinds of FB like toothpicks, fish or meat bones, screws, coins, metal clips and tooth brush [1,3-6]. Majority of these FB pass through the alimentary tract without complications [7], but sometimes these can lead to obstruction or perforation of the bowel necessitating abdominal exploration by laparoscopy or laparotomy [1]. Spontaneous passage of toothbrush is not mentioned in literature as we describe our case of duodenal perforation leading to peritonitis and exploratory laparotomy.

## Case

21 years old male patients presented to the emergency department with four days history of abdominal pain started gradually, diffuse and was more pronounced in the left lower quadrant. In addition, he also developed abdominal distension, nausea and vomiting. His bowel habits were, however, normal. The patient claimed that he swallowed a toothbrush about a year ago in an attempt to commit suicide. He did not suffer any symptoms until the day he presented in the emergency department. His past medical, surgical and family histories were unremarkable. Upon presentation, his pulse was 80/min, normotensive, afebrile and was in moderate pain. His abdomen was mildly distended, tender all over with marked guarding

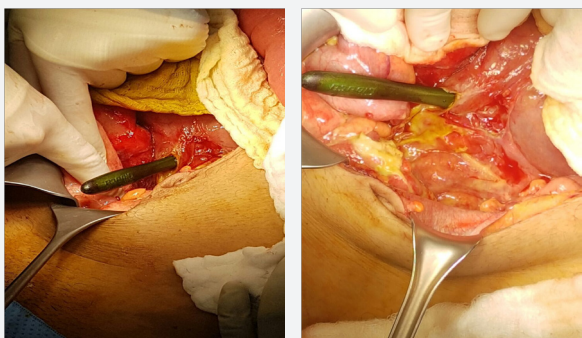
and tenderness in the left lower quadrant. His genital exam was normal.



Figure 1: CT scan showing the toothbrush in duodenum.

His White cell count was 17.8 mm<sup>3</sup>, Hemoglobin 12.9 g/dl, slightly deranged renal functions (BUN 9.9mmol, Creatinine 113mmol), whereas electrolytes were normal. The patient underwent Computed Tomography (CT) abdomen with oral and IV contrast that showed a linear foreign body 17 cm in length (toothbrush) with its tip seen in the 3rd part of duodenum, perforating it and extending caudally to the left iliac fossa with tiny air loculi and extravasation of oral contrast (Figure 1). Minimal free fluid was seen with diffuse mesenteric stranding. There was mild dilatation of jejunum with no transition zone. The rest of the small bowel including the colon was normal. The patient was admitted as a case of peritonitis due to duodenal

perforation and was taken to the operation theatre after fluid resuscitation.



Figures 2 & 3: Toothbrush seen coming out of duodenum

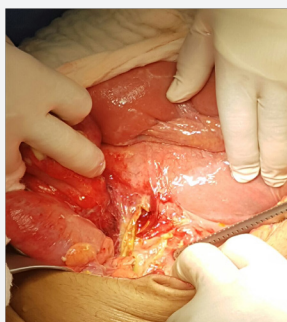


Figure 4: The perforation in duodenum after removing the toothbrush.

The patient underwent exploratory laparotomy that revealed moderate amount of purulent fluid in the left lower quadrant and minimal fluid in the rest of the three quadrants, small bowel was blanketed with fibrinous material, a toothbrush was seen protruding from the third part of duodenum (Figures 2-4). The upper end of the toothbrush was still inside the duodenal lumen whereas the lower end was extending towards the left iliac fossa. There was some bile leak through perforation by the toothbrush itself. The rest of the small bowel was examined and found to be normal. The toothbrush was removed and the perforated area was closed by placing a Malecot catheter that was fixed using purse-string sutures forming a controlled fistula (Figures 5 & 6). The peritoneal cavity was thoroughly washed and drains were left in both lower quadrants along with nasogastric tube for drainage of the stomach. The abdomen was closed in layers.

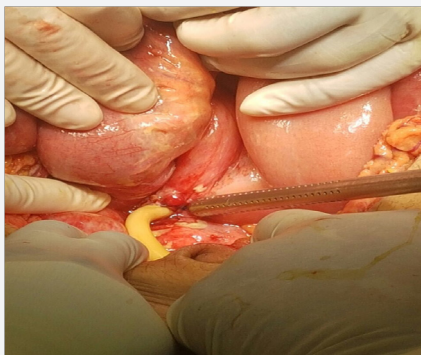


Figure 5: Closure of duodenum over Malecot drain.



Figure 6: The Toothbrush.

Postoperatively, the patient was kept nil per mouth, and started on Total Parenteral Nutrition (TPN), and the Malecot drain (duodenostomy) output was monitored. Strict input and output charting was done. The output through the duodenostomy initially ranged between 200-300ml (greenish). However, once the patient was started on oral fluids, his duodenostomy output rose to 2000ml (greenish). He was again kept nil per mouth for a week and a Nasojejunal (NJ) tube was inserted. TPN was continued. A week later, he was once again started on oral fluids which were tolerated well. NJ tube was removed and the patient was gradually started on full diet that was followed by cessation of TPN. Meanwhile, the patient received somatostatin 3mg continuous IV infusion twice daily for 5 days that resulted in decrease in the output of duodenostomy and the Malecot was eventually removed about one month after the surgery. The fistula tract got obliterated with fibrosis. The patient was also referred to a psychiatrist due to suicide tendency. The patient was counseled well and safely discharged from the hospital about a month after surgery in good health.

### Discussion

Ingestion of FB can be multi-factorial, a history of mental illness, alcohol intoxication or imprisonment should be specially sought particularly in adults [3,6] along with poor vision and drug addiction. FBs, except elongated ones, that have passed through the esophagus uneventfully pass in 70-80% of cases [8]. Rare migration of FBs outside the bowel lumen to pleura, heart, liver, kidney, psoas muscle and inferior vena cava have been reported [2,9-11]. Toothbrush migration is mentioned in literature but the spontaneous passage from upper gastrointestinal tract to colon is reported only by Kim et al. [12] in which a schizophrenic patient presented with abdominal sepsis. On exploration, a fistula was found between hepatic flexure to the liver with intervening abscess. It can present after long intervals as in our patient after one year but after 4 years as described by Karim et al. [13] as it was embedded in pylorus. However objects more than 6 cm long or >2.5 cm wide will have difficulty in passing through the C-loop of duodenum because of its fixed retroperitoneal position [13]. Impaction can lead to perforation or obstruction of the bowel resulting in considerable sepsis and mortality [1] as happened in our case. The signs of perforation are evident with increasing generalized abdominal pain, distension and rigidity. Other manifestations in the form of abscess, inflammatory mass, intestinal obstruction, fistula formation and bleeding may rarely

be encountered [14,15]. However; sepsis is the major cause of death in intestinal perforations [16].

In our case, perforation was in third part of duodenum just proximal to duodeno-jejunal flexure due to acute angulations as mentioned by Selivanov [15]. Abdominal X-ray and Computed Tomography (CT) can detect most of the ingested FBs including toothbrush, although the plastic portion is radiolucent [17]. CT scan is particularly useful in delineating the toothbrush and its possible complications such as intestinal perforation and there has not been a single false negative report until date [1]. As the spontaneous passage of toothbrush is not possible early endoscopic removal from the stomach and duodenum is recommended [3,5,18,19]. Ertan et al. [20] first reported successful endoscopic toothbrush removal, but if there are signs of sepsis secondary to peritonitis then surgical removal should be carried out without delay to avert significant morbidity and mortality [3]. Laparoscopic removal is also mentioned by Wishner and Rogers [21] and Karim et al. [13].

## Conclusion

It is extremely unlikely for ingested toothbrush to pass through the alimentary tract spontaneously; therefore, early attempts should be done to remove it by endoscopy as it may likely be impacted in the stomach or duodenum. If, however, it has caused the perforation of the bowel then early surgical intervention is considered either by laparoscopy or open surgery, since the morbidity may be prolonged.

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