



# An Unusual/Rare Case of Toothbrush Impalement Injury in Floor of Mouth

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## Abstract

Foreign bodies of the aero-digestive tract are commonly seen emergencies in ENT practice. Young children often present with accidental ingestion of foreign bodies like coins and battery cells. However penetrative foreign bodies of the oral cavity and the aerodigestive tract are relatively rare. They can mostly be managed conservatively, however, they may develop life threatening complications like deep neck space infections and major arterial injury in few cases. After doing extensive literature search, we could find only 1 similar case with impaled toothbrush in the floor of mouth. Therefore, we are reporting only the second case of a child who presented with impalement of toothbrush in the floor of mouth. The toothbrush was surgically removed under general anaesthesia and post-operative period was uneventful. Take home message is to not forcefully pull out the foreign body and seek otorhinolaryngological intervention at the earliest.

## Introduction

Foreign bodies of the aero-digestive tract are commonly seen emergencies in ENT practice. Young children often present with accidental ingestion of foreign bodies like coins and battery cells. However penetrative foreign bodies of the oral cavity and the aerodigestive tract are relatively rare. The very thought of an impaled foreign body is startling for the doctors, but more so, for the family members it is a horrific and disturbing sight. The whole family rushes the child to the hospital and it's very difficult to counsel and console the parents.

Such penetrating injuries may be caused by pointed objects like pens, pencils, toothbrush or toy parts. These injuries are more common in the soft palate, the tonsils and the posterior pharyngeal wall [1–3]. They can mostly be managed conservatively, however, they may develop life

threatening complications like deep neck space infections and major arterial injury in few cases [4–6].

Penetrating wounds with retained foreign bodies are even more uncommon. After doing extensive literature search, we could find only 1 similar case with impaled toothbrush in the floor of mouth. Therefore, we are reporting the second case of a child who presented with impalement of toothbrush in the floor of mouth.

## Case Report

An 8-year-old boy was brought to the ENT emergency with an accidental impalement of a toothbrush in the oral cavity (Fig. 1). As per the parents the child slipped in the bathroom while brushing his teeth 2 h back. It was accompanied by mild blood loss only. On examination, the vitals were stable. The child was wincing in pain and irritable. On local examination a plastic toothbrush was seen protruding through the mouth with the head of the toothbrush along with its bristles impaled in the left lateral floor of mouth. There were few blood clots adjacent to site of penetration along with drooling of saliva. However, there was no active bleed and no signs of airway obstruction. The child was uncooperative for

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**Fig. 1** Toothbrush impalement in floor of mouth. (Bristles impacted in floor of mouth)

further oropharyngeal/laryngeal examination. Remaining ENT and systemic examination were within normal limits. In view of the obvious nature of the injury and accessibility to the site of penetration no haematological, biochemical or radiological examination was undertaken.

The child was planned for removal of foreign body under general anaesthesia and shifted to the emergency operation theatre. Appropriate informed consent was taken from the parents. The plastic handle of the toothbrush was cut short with the help of a small saw so as to enable mask ventilation. The child was intubated via oro-tracheal route. Doyen's mouth gag was applied and the tongue was retracted to the right side for better visualization of the penetration site. The toothbrush was seen embedded in the floor of the mouth at the level of the last and second last molar, just anterior to the tonsillo-lingual sulcus (Fig. 1). The entry wound was slightly enlarged through a small incision. The head of the toothbrush was seen lying within the bulk of genioglossus muscle. Submandibular duct was spared. The toothbrush was removed gently, bleeding vessels were cauterised and haemostasis achieved. The wound was irrigated with a solution of 5% betadine, saline and hydrogen peroxide and closed in a single layer using absorbable 3–0 sutures (Figs. 2 and 3).

The patient was allowed orally from post op day 1 along with 2% Betadine mouth wash. He was given intravenous antibiotics in the form of co-amoxiclav + metronidazole and adequate analgesics in the form of ibuprofen. He was discharged on post-operative day 3 on oral medications. On

follow up after 10 days the wound showed good healing and the patient recovered well.

## Discussion

Foreign bodies of the aero-digestive tract form a sizeable chunk of ENT emergencies. However, impaled foreign body is not a frequent sight. There have been a few reports of ingestion of a toothbrush with the foreign body seen lodged at the level of cricopharynx and even lower down at the level of pylorus [7]. Toothbrush may also be responsible for oropharyngeal trauma as well as penetrative injuries of the oral cavity.

Potentially serious sequelae of such injuries are not rare. These may be in the form of deep neck space abscess, subcutaneous emphysema, salivary ductal injuries, internal/external/common carotid artery thrombosis [8].

A quick but thorough history should be taken followed by a quick and relevant examination in such cases after ensuring that the vitals are stable. A computed tomography scan can be very helpful to further localize the exact site of penetration and to visualize important structures in its vicinity. Penetrating injuries of the floor of mouth can predispose to parapharyngeal and retropharyngeal space infections via the submandibular and sublingual spaces [9]. As per the study published in 2010 by Kato T et al. 73 out of 230 patients had toothbrush impalement injury and 7 developed advanced infections and needed hospital stay. They suggested that



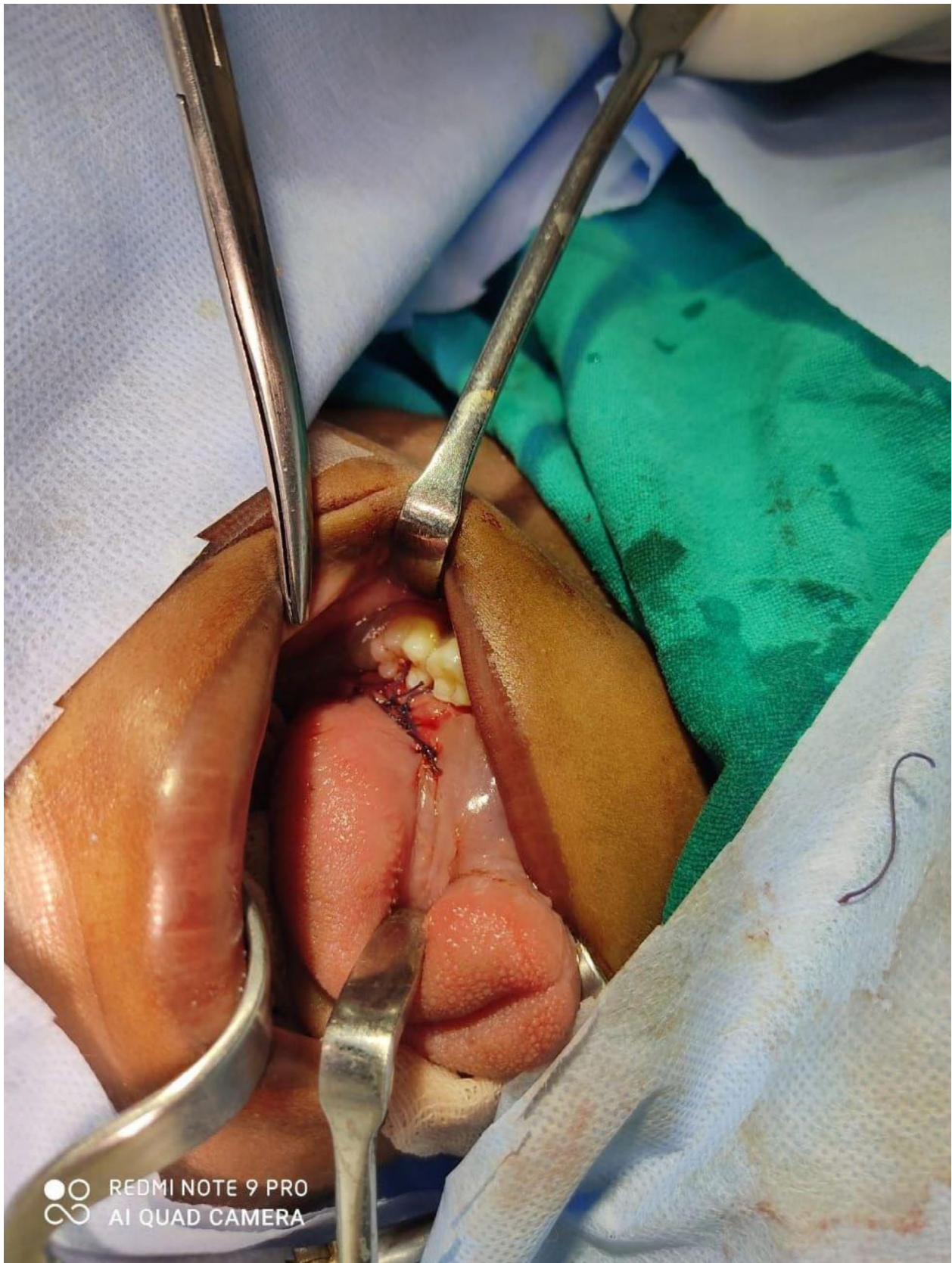
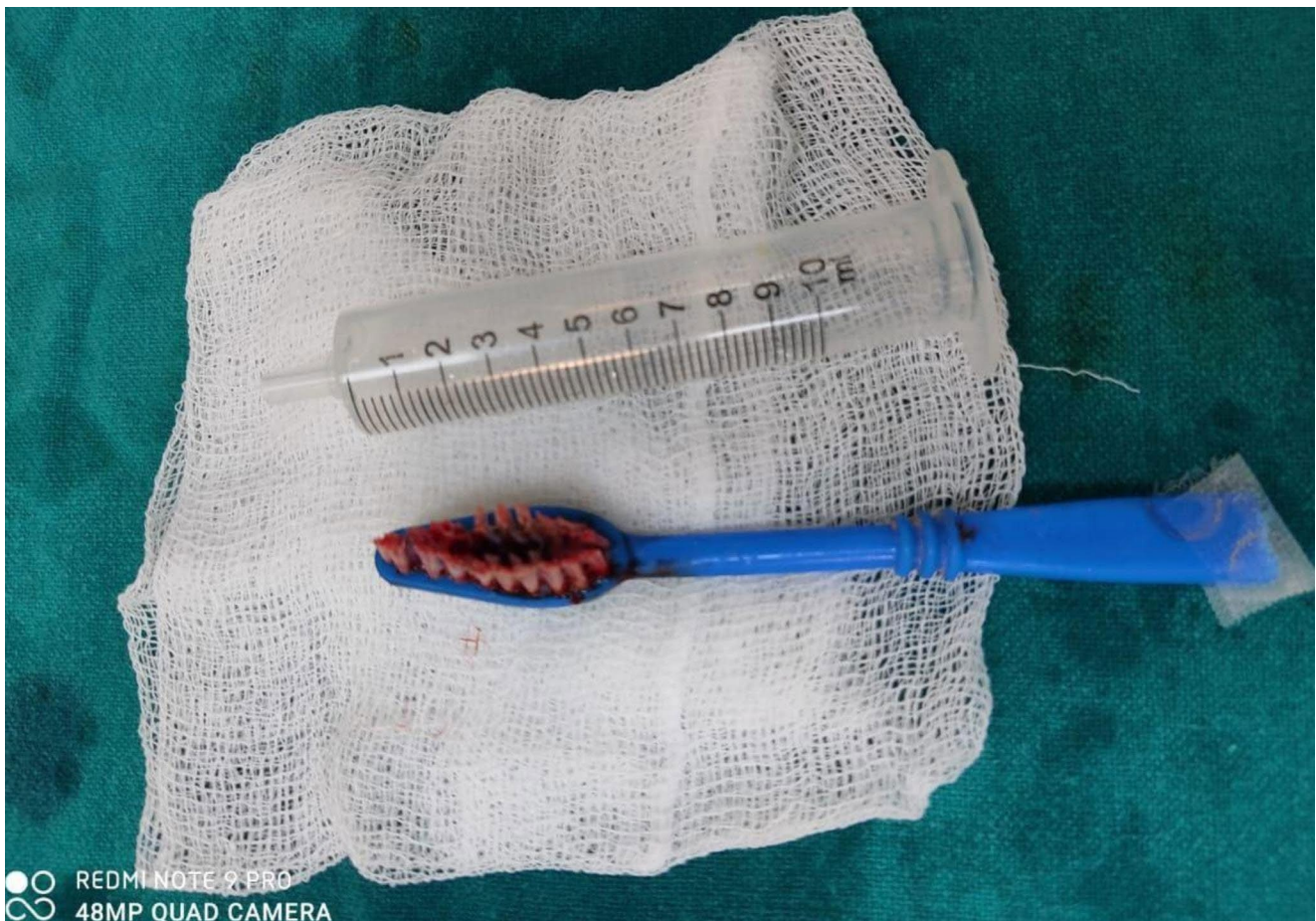


Fig. 2 Operative site sutured with the removed toothbrush





**Fig. 3** Removed toothbrush

toothbrush bristles harbor more microbes as compared to other penetrating foreign bodies [10].

Other contributing factors include the exposure of the wound to saliva, effect of gravity as well as direct implantation of anaerobic organisms from the oral cavity into the deep neck spaces. As was seen in a study published by Kumar S. et al. in 2008 where they had a patient with retained broken toothbrush head in pterygomandibular space for 11 months. The patient had a self-draining abscess in the oral cavity with involvement of ipsilateral submandibular space [11].

In 2013 Sasaki R. et al., reported a similar case of impalement of toothbrush in the floor of mouth of an autistic child where the tip of toothbrush was lying superficial to mylohyoid muscle [12]. However in our case it had pierced the genioglossus muscle and thus lingual vessels and submandibular gland duct were at a risk of injury. However, the toothbrush was lying lateral to the critical structures and morbidity was thus avoided.

Umibe A et al. reported a sinister case in 2017 from Japan where a 28-month-old girl with impaled toothbrush in left tonsillar fossa reaching posteriorly till the carotid bifurcation. She was managed by a multidisciplinary team in the

surgical emergency. Angiography revealed normal flow in the carotid arteries [13].

In a case report published in 2016 by Kara I. et al., sharp foreign body impalement was seen in the posterior wall of pharynx leading to significant bleeding and aspiration of blood along with breathing difficulty in a 2-year-old boy. He was managed with emergency surgical removal of foreign body and repair of the defect with post-operative ICU stay [14]. Because of the severity of its complications, patients with penetrating trauma should be closely monitored for haemorrhage, signs of airway obstruction, fever, wound infection and neurologic changes [15].

The treatment protocol for these patients includes assessment under general anaesthesia, removal of the foreign body, thorough betadine and hydrogen peroxide irrigation, wound repair followed by antibiotic administration to prevent subsequent infection. The role of radiological imaging is complementary to the diagnosis whenever possible.

In our case successful removal of toothbrush and quick recovery of the patient is attributed to early presentation, prompt examination and diagnosis, emergent operative procedure, thorough antiseptic wound irrigation and adequate

intravenous broad-spectrum antibiotics both peri-operatively and post-operatively.

## Conclusion

Impaled foreign bodies of the floor of mouth are rare. When encountered with, they warrant quick and relevant assessment, prompt surgical removal and close monitoring of the patient owing to its propensity to cause severe and life-threatening complications like deep neck space infections, carotid injury and aspiration of blood. Utmost emphasis is laid upon thorough antiseptic irrigation of wound along with adequate antibiotic cover.

The take home message for parents is to avoid pulling and removing the foreign body at home to prevent massive haemorrhage and aspiration. Seek medical help as soon as possible.

## Declarations

**Conflict of Interest** There are no conflicts of interest.

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**Ethical Clearance** Obtained from institution ethics committee.

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