



# Foreign Body (Scissors) in the Frontal Sinus: A Case Report

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## Abstract

Foreign Bodies (FB) piercing the frontal sinus is infrequently reported in the literature. Cases of foreign body penetration to the frontal sinus possess a special concern because of the close proximity of the dura mater and the frontal lobe to the posterior table of the frontal sinus. This case report presents a rare clinical scenario of an 8-year-old boy who accidentally suffered a traumatic injury and presented with an embedded metallic FB (Scissors) into his forehead. The scissors were penetrating through the anterior table of the frontal sinus reaching just before the posterior table which was not involved as proved by Computerized Tomography (CT). Unexpectedly, the boy has no CT signs of brain injury or focal neurological deficit. CSF leakage was further excluded. Under General Anesthesia (GA), the FB was retrieved using the existing wound of penetration to access the frontal sinus. The sinus was thoroughly explored, and the integrity of the posterior table was confirmed. The outer table fracture was reduced and fixed in place without plating or placing a mesh. Clinically, the patient was stable and had no early postoperative complications. Postoperative CT was auspicious, it showed no fluid collection and assured consistent fixation. No long-term complications were encountered in 6 months of follow-up.

## Introduction

Foreign Bodies (FB) penetrating the frontal sinus are rare presentations in the Oral and Maxillofacial Surgery (OMS) Department and are poorly documented in the literature. Road traffic accidents are the usual mode of trauma. The management of skull penetrating injuries requires collaboration between the OMS team and neurosurgeons. Radiological imaging role is crucial for making an accurate diagnosis and a decision regarding further management [1]. The main objective of the management plan is the early removal of the foreign body to avoid frontal sinusitis and both early and late-onset complications. Reestablishment of the facial esthetic contour and maintenance of the normal sinus anatomy-if feasible- are important for a satisfying outcome [2]. Short-term complications include Cerebrospinal Fluid (CSF) leakage, meningitis, and epidural abscess [3]. On the other hand, mucocele, chronic sinusitis, mucopyocele and brain abscess are long-term complications of frontal sinus fractures [2]. Treatment decisions substantially depend on a variety of factors, including the type of fracture, degree of posterior table fracture, nasofrontal duct damage, neurological status, concomitant head trauma, and the existence of a CSF leakage [4].

## Case Presentation

An 8-year-old boy presented to the emergency department of Najran General Hospital (Saudi Arabia) with scissors penetrating his forehead after he fell with his forehead on the tip of the blades which he was holding in his hand during playing with his sister (Figure 1). The boy did not lose consciousness or experience any neurological symptoms following the accident as his parents stated. He was otherwise fit and healthy. On examination, he was alert and oriented; his Glasgow Coma Scale (GCS) was 15. No focal neurological signs were detected, and there was no evidence of CSF leakage. The scissors were piercing through his forehead, 2 cm above the medial end of the right supra orbital ridge. The entry wound was approximately 10 mm × 5 mm in size. He was vitally stable, and his laboratory values were within normal. Fine slices of 2 mm CT on the brain and facial bone with 3-D reconstruction revealed the scissors penetrating across the anterior table and stopping just at the posterior table of the frontal sinus with no signs of extra-Dural or intracranial

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Figure 1: Showing preoperative view of the FB.

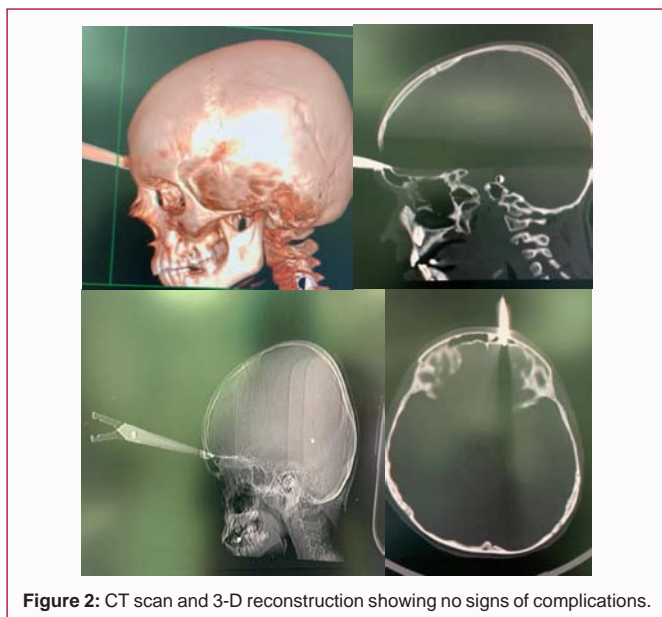


Figure 2: CT scan and 3-D reconstruction showing no signs of complications.

hemorrhage, or pneumocephalus (Figure 2). Informed consent was obtained from his parents for retrieval of the FB and fixation of the frontal sinus fracture. Surgery was arranged in collaboration between OMS and neurosurgery teams. Under GA along with oral endotracheal intubation, the scissors were carefully retracted, the wound was slightly elongated and the subperiosteal flap was raised to get access to the frontal sinus. The posterior table was minimally affected with no evident Dural tear. A small, preserved piece of bone from the anterior table was returned to its original place and fixed with Vicryl sutures then the wound was closed in layers (Figure 3). Postoperatively, the patient had normal neurological observations with no signs of neurological deficit or CSF leakage from the wound or the nose. The patient was discharged on day 3 postoperatively with no complications. For 6 months of follow-up, no signs of CSF leakage, neurological complications, sinusitis, infection, or mucocele were detected.

### Discussion

The management of frontal sinus fractures could be challenging. Treatment options include observation, Open Reduction with Internal Fixation (ORIF), sinus obliteration, and sinus cranialization. The algorithm of therapy relies on 5 anatomic parameters including nasofrontal duct fractures, fractures of the outer table, fractures of the



Figure 3: Operative and postoperative views showing surgical steps.

posterior table, Dural tears, and degree of fracture comminution [5]. Non-displaced linear anterior table fractures with patent nasofrontal duct are typically treated with only clinical observation and sinus precautions are recommended. On the other hand, depressed anterior table fractures require elevation and fixation to prevent esthetic deformation. When the fracture involves the posterior table and the nasofrontal duct is obstructed, either sinus obliteration or cranialization is indicated [4]. Obliteration and cranialization of the frontal sinus is becoming the gold standard for fractures with injury of the Frontal Sinus Outflow Tract (FSOT) and dura mater [6]. Surgical approaches for the management of frontal sinus trauma range from conservative to aggressive techniques, surgeons usually do not prefer using aggressive procedures such as Obliteration, packing, or cranialization of the frontal sinus [7-9].

A coronal incision is the recommended technique for frontal sinus surgical access because of its adaptability. It provides unmatched exposure and can be utilized for various maxillofacial fractures or as a neurosurgical approach. A coronal approach may be used to harvest the per cranium, muscle, fascia, and split calvaria bone. Although the coronal technique is the gold standard, minor fractures could be treated with minimally invasive endoscopic approaches. A gull-wing approach as well as unilateral or bilateral sub brow is additional methods. To expose the fracture site, a forehead laceration or mid forehead furrow may be applied. It is necessary to customize the surgical technique according to the patient and the present situation [10].

Fractures of the frontal sinus typically occur due to anterior blunt force trauma. The majority of these fractures result from road traffic accidents [10-12]. Documented penetrating injuries to the frontal sinus are rare in literature. This is probably due to the high mortality rate associated with this kind of injury as serious brain injury can occur. This case report is unique because of the unusual clinical and radiological presentation as the FB penetrated through the anterior table of the frontal sinus and stopped just at the posterior table with no Dural tear or brain injury. Moreover, the patient scored 15 on GCS with no neurological symptoms or signs and no CSF leakage.

Complications and adverse results related to treated and untreated

fractures of the frontal sinus are still contributing to the uncertainty about the best treatment for these traumas. A higher probability of postoperative complications has been noticed in patients with frontal sinus fractures and concomitant mid face fractures, and in cases admitted with a GCS of 13 or below [13]. Infection of the brain is a life-threatening complication likely to complicate the care of fractures of the frontal sinus. Early postoperative complications (within 6 months after treatment) include CSF leakage, meningitis, wound infection and frontal sinusitis whereas late postoperative complications (after 6 months) are usually limited to CSF leakage and frontal mucocele or pyomucocele [4]. The patient in this case report was followed up for 6 months in OMS and neurosurgery outpatient clinic with no evidence of early complications and he is scheduled for another 6 month-review.

## Conclusion

Penetrating injury to the frontal sinus is rare in the literature probably due to the high mortality rate. This case report presents a rare clinical scenario where there is a FB (scissors) penetrating the anterior table of the frontal sinus and stopped just at the posterior table of an 8-year-old boy with no brain injury or Dural tear, and no subsequent neurological deficit or CSF leakage.

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