

Removal of a large and concealed wooden foreign body from the orbit and mandible using multimodal image navigation: a case report

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Dear Editor,

We report a rare case involving a wooden foreign body lodged in the orbit. Despite only a minimal portion being externally visible, thorough examination disclosed that the majority of the object was concealed within the orbital cavity. Ultimately, a multidisciplinary surgical intervention successfully facilitated the removal of the substantial foreign body. This case underscores the importance of not being misled by the superficial appearance of foreign bodies in clinical practice, and it highlights the importance of considering the full extent and severity of foreign bodies. As it highlights the importance of considering the full extent and severity of foreign bodies, even when only a minimal part is apparent, ophthalmologists should enhance the corresponding imaging examinations to avoid overlooking such foreign objects and the potential serious consequences they may cause. Intraorbital foreign bodies (IOFB) are commonly encountered in clinical practice^[1]. It commonly occurs among young people and is usually associated with high-velocity craniofacial trauma forces like traffic trauma, occupational injuries or even simpler injuries such as daily household chores^[2-3]. Since an orbital

trauma with an IOFB, is considered a surgical emergency, immediate diagnosis and management plan is mandatory. This study was approved by Ethics Committee of our hospital and adhered to the Declaration of Helsinki. Written informed consent was obtained from the patient for publication of this Case Report and any accompanying images.

Case Report A 60-year-old man visited the ophthalmology department on February 24, 2025, with right eye pain and vision loss after being hit by a tree branch 15h earlier. Clinical assessment revealed a short and small wooden foreign body obliquely embedded downward into the anterior orbit from right upper eyelid (Figure 1A). The vision and intraocular pressure of his right eye could not be accurately measured due to the extreme swelling and tightness of the upper eyelid caused by the trauma. Orbital computed tomography (CT) and magnetic resonance imaging (MRI) revealed a linear, low-density foreign body extending obliquely inferoposteriorly along the inferior aspect of the eye globe, traversing the anterior orbit, fracturing the orbital floor, and extending into the mandibular facial region. Associated findings included traumatic injury to the inferior rectus muscle, comminuted orbital floor fracture, and multiple concomitant maxillofacial fractures (Figure 1B–1D). Computed tomography angiography (CTA) of face confirmed the IOFB next to the facial artery.

A multidisciplinary team, in collaboration with the department of stomatology, successfully removed the foreign body under general anesthesia. The procedure involved a submandibular incision approximately 2 cm below the mandibular border. Following the incision through the skin, subcutaneous tissue, and platysma from a submandibular incision, enabling precise identification of the anterior end of the foreign body (Figure 2A). The tail end of the foreign body, protruding externally, was securely grasped with vascular forceps and extracted cephalad under controlled traction. The foreign body, a long cylindrical shape wood measuring 140 mm×10 mm×10 mm, was extracted through the upper eyelid, and a negative pressure drainage tube was inserted *via* the submandibular incision (Figure 2B, 2C). Upon removal of the bone fragments, the surgical site was irrigated with dilute gentamicin solution, and



Figure 1 Photograph of orbital foreign body and emergency imaging of orbital CT and MRI A: A wooden foreign body obliquely embedded downward into the right superior orbit. Orbital CT plain scan (B), MRI (C) and 3D reconstruction (D), identified multiple fractures in the right maxillofacial region and a tubular hypodense shadow within the right orbit, maxillary sinus, and parapharyngeal space. CT: Computed tomography; MRI: Magnetic resonance imaging.



Figure 2 A wooden object measuring 140 mm × 10 mm × 10 mm was extracted through the upper eyelid A: The distal end of the foreign body was located in the posterior medial submandibular gland. B: A wooden object measuring 140 mm × 10 mm × 10 mm (C), was extracted through the upper eyelid, and the drainage tube was inserted *via* the submandibular incision.

the conjunctiva and skin were sutured.

Postoperatively, antibiotics and tetanus prophylaxis were administered. By the first postoperative day, there were no signs of infection such as pus in the wound. The visual acuity of the right eye was recorded at 0.5 (logMAR), with an intraocular pressure of 10 mm Hg. The ocular shape was intact, ocular motility was normal, and orbital CT and MRI examination revealed no foreign bodies or bone fragments.

DISCUSSION

IOFBs are typically caused by a high-velocity trauma to the orbit, constitute 16.7% of orbital injuries^[4-6]. Orbital woody foreign bodies have been reported in a number of cases. However, the occurrence of a giant woody IOFB, measuring up to 140 mm, penetrating the orbit and maxillofacial region is exceedingly rare.

However, there were several suggestions for the treatment of giant woody IOFB patients. First, although the foreign body appeared small externally, a thorough examination revealed that a significantly larger object was concealed within the body. This case underscores the importance of not being misled by the superficial appearance of foreign bodies in clinical practice. A comprehensive assessment of the injury mechanism and the nature of the foreign body is essential, along with the judicious selection of appropriate imaging modalities to support accurate diagnosis, reduce the risk of missed detection, and prevent the development of severe complications.

Second, preoperative multimodal imaging examinations are highly necessary as they can assist clinicians in reducing the rate of missed diagnoses. When woody IOFB are missed, the consequences can be devastating. While the gold standard diagnostic imaging is CT, the review showed that initial CT scan missed up to 47.9% of IOFBs^[7-9]. On CT imaging, in the acute stage, wood appears as a low-density similar to shadows, making it challenging to differentiate them from air^[10]. MRI should be prioritized for assessing vegetative trauma due to its superior efficacy over CT in detecting foreign bodies and displaying soft tissue injuries, especially in diagnosis of small pieces of wood^[11-14].

Third, preoperative multimodal imaging examinations demonstrate significant superiority in guiding surgical treatment plans. Pre-surgery CTA exams are needed to check for facial blood vessel injuries and prepare for transfusions. In this case, pre-surgery CTA shows the IOFB was in close proximity to the facial artery. A downward extraction risked damaging the facial artery, potentially causing significant hemorrhage. Therefore, the object was then extracted upward through the upper eyelid, and no major bleeding occurred during the operation. Luckily, the preoperative CTA showed the foreign body hadn't damaged the facial artery in this case. If the artery were compromised, a preoperative digital subtraction angiography (DSA)^[15] would assess the vascular state, and facial artery embolization

would be done before removing the foreign body to reduce intraoperative bleeding risks.

Lastly, a multi-disciplinary approach is essential due to the injury's complexity and surgical challenges. Considering the deep-seated nature of the foreign body, drainage tube implantation is advised to reduce postoperative infection risks, and intraoperative irrigation with antibiotic saline and postoperative anti-infection treatment are necessary.

In conclusion, the trajectory of the foreign body is striking, with only a small portion visible externally. Performing surgical intervention without comprehensive preoperative evaluation could result in significant complications owing to inadequate preparation. This finding warrants clinical vigilance and merits careful consideration by ophthalmologists, as it highlights the importance of considering the full extent and severity of foreign bodies, even when only a minimal part is apparent.

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