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Delayed Partial Extrusion of a Transorbital Toothbrush Handle Extending Into the Infratemporal Space

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Abstract

Retained foreign bodies following facial trauma may present late with atypical manifestations, particularly when composed of radiolucent materials such as plastic. We report a 44-year-old male referred to the otolaryngology service with delayed self-extrusion of a long tubular foreign body following an assault-related facial injury. The CT revealed a well-defined hypodense structure entering the inferonasal aspect of the right orbit, coursing through the extraconal compartment, breaching the orbital floor, traversing the maxillary sinus, and extending into the infratemporal space. Despite this extensive trajectory, the patient demonstrated preserved vision and full extraocular movements. The foreign body, later identified as a toothbrush handle, was successfully removed without complications. This case highlights the importance of early imaging in penetrating facial trauma and describes a rare example of delayed partial self-extrusion of a transorbital foreign body managed via a combined surgical approach.

Categories: Trauma, Otolaryngology, Ophthalmology
Keywords: delayed extrusion, infratemporal space, orbital trauma, toothbrush handle, transorbital foreign body

Introduction

Penetrating injuries to the orbit and midface can result in retained foreign bodies that remain clinically silent for prolonged periods [1]. Plastic objects are particularly challenging to detect due to their low radiodensity and subtle appearance on imaging, often leading to them being overlooked during primary trauma evaluations [2,3]. The orbit shares intimate anatomical relationships with the paranasal sinuses and deep facial spaces [4]. Consequently, penetrating objects can traverse multiple compartments while rarely producing overt neurological or ophthalmological deficits.

Retained orbital foreign bodies that go unrecognized can result in significant complications, including orbital cellulitis, abscess formation, fistula development, and, rarely, intracranial extension. When such objects extend beyond the orbit into the infratemporal space via the inferior orbital fissure, they may also come into proximity with the maxillary and mandibular divisions of the trigeminal nerve, the pterygoid venous plexus, and branches of the internal maxillary artery, carrying a theoretical risk of neurovascular injury. Conventional CT, while sensitive for metallic and glass foreign bodies, is known to be less reliable in detecting radiolucent plastic material, which may appear only as a subtle hypodense structure easily mistaken for soft tissue or air, contributing to missed or delayed diagnosis. Delayed spontaneous extrusion of retained foreign bodies has been described only sporadically in the literature, predominantly in relation to wooden foreign bodies; reports specifically describing a plastic transorbital foreign body with partial self-extrusion and extension into the infratemporal space, as in the present case, are exceptionally rare [2,3,5].

Delayed migration and spontaneous extrusion of retained foreign bodies are rare phenomena infrequently described in the otolaryngology literature [5]. We present an unusual case of a transorbital foreign body extending into the infratemporal fossa with delayed partial self-extrusion. Unlike previously reported infratemporal foreign bodies, which have largely involved wood or metal and presented primarily with trismus or a palpable mass, the present case is distinguished by its plastic composition, its transorbital entry point, and its spontaneous partial self-extrusion through the original wound tract.

Case Presentation

A 44-year-old male was referred from the emergency department to the otolaryngology service with a one-week history of progressive partial extrusion of a foreign body near the right orbit. The patient reported a history of assault during a physical altercation approximately 1.5 months prior. Following the initial facial trauma, he underwent primary wound suturing for a laceration just below and adjacent to the medial canthus at a local hospital. No imaging records were available from that initial treatment. Over the preceding week, he noticed the gradual outward migration of a firm plastic structure through the healed wound site. There was no history of diplopia, diminished vision, pain on eye movement, nasal obstruction, epistaxis, or epiphora. Detailed records of the initial assessment and management provided by the first treating hospital,

including any imaging performed at that time, were not available to us.

Clinical examination

Upon examination, the patient was conscious and hemodynamically stable. A cylindrical plastic foreign body was seen protruding externally by approximately 1.5 cm. Visual acuity was preserved, and extraocular movements were full and painless (Figures *1*-*2*). No proptosis, chemosis, or gaze restrictions were noted. An ophthalmology evaluation confirmed intact ocular motility, the absence of globe injury, and no active nasal bleeding. Pupillary reactions were also normal and symmetrical bilaterally, with no relative afferent pupillary defect. Fundoscopic examination revealed a healthy optic disc and macula, with no evidence of retinal hemorrhage, optic disc edema, or choroidal involvement.



FIGURE 1: Lateral view of the protruding foreign body

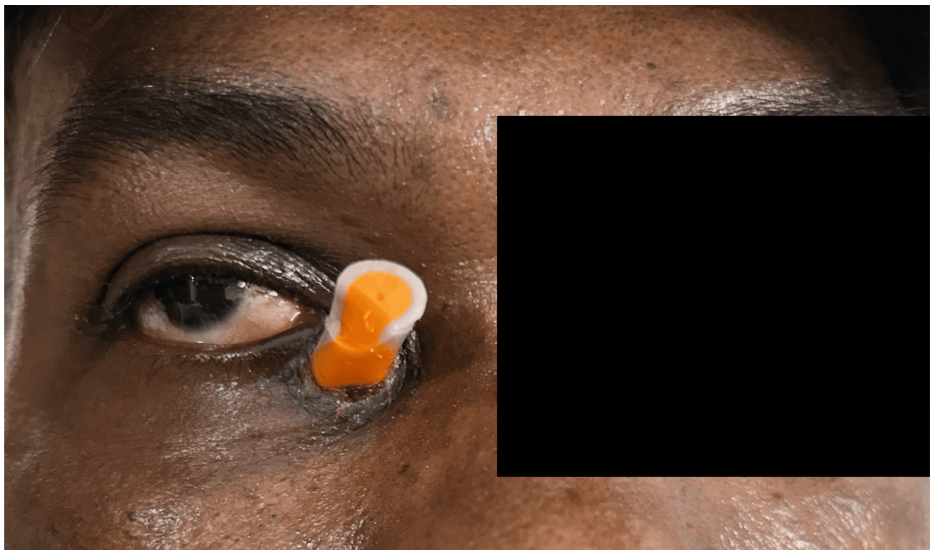


FIGURE 2: Frontal view of the foreign body

Radiological findings

In the emergency setting, a non-contrast CT scan with 3D reconstruction of the nose, paranasal sinuses, and orbit demonstrated a well-defined, tubular, hypodense structure (~6 × 1.2 cm). The structure entered the inferonasal aspect of the right orbit within the extraconal compartment, abutting the inferonasal globe and the inferior rectus muscle. It fractured the orbital floor medial to the inferior orbital canal, extended through the cranial aspect of the right maxillary sinus, and traversed the retroantral fat into the infratemporal space, where it abutted the lateral pterygoid muscle (Figures *3*-*4*).

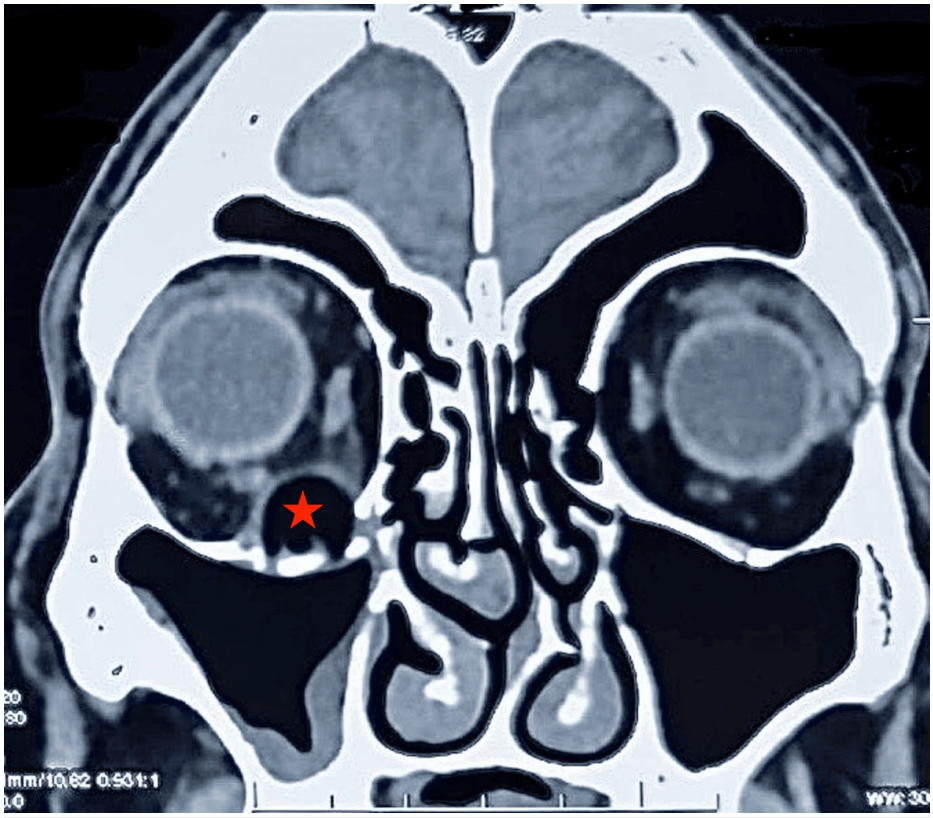


FIGURE 3: Coronal CT slice demonstrating the hypodense foreign body (red star) and its relationship to the orbital floor

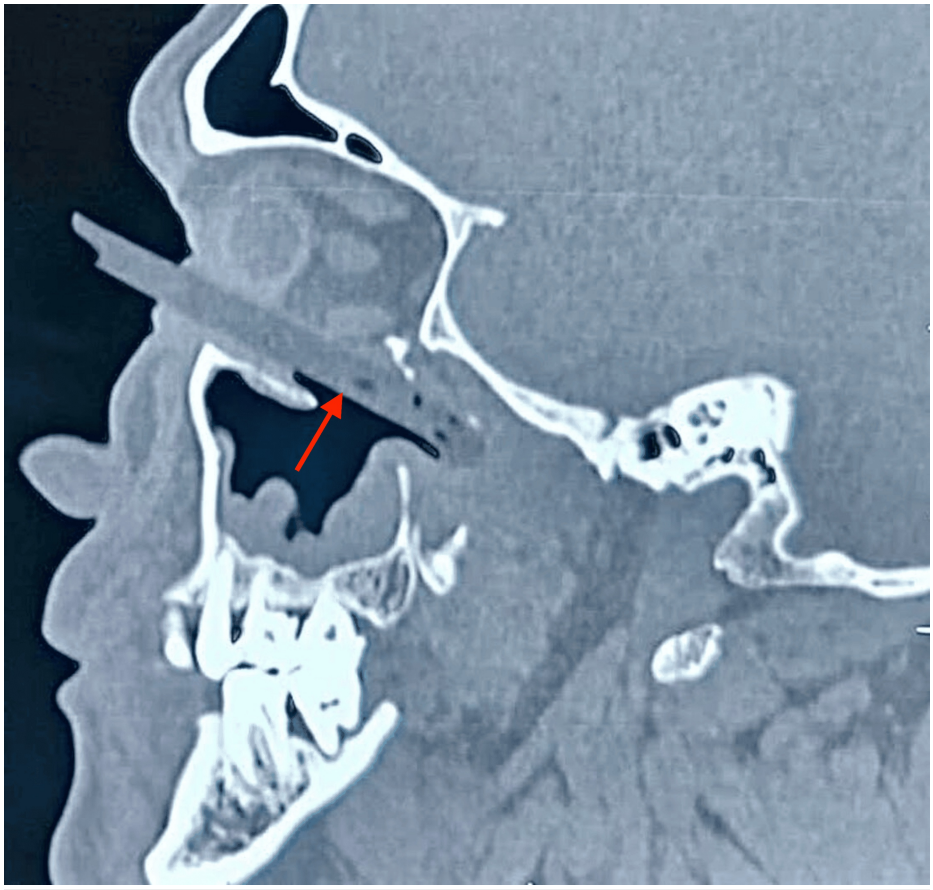


FIGURE 4: Sagittal CT slice showing the anatomical trajectory (arrow) through the orbit and sinus spaces

Management

The patient was scheduled for surgery under general anesthesia because the preoperative tamponade effect of the foreign body over adjacent vascular structures was unknown. A combined endoscopic and open approach was selected to optimize access and visualization. An endoscopic uncinectomy and widening of the maxillary sinus ostium were performed. The toothbrush foreign body was identified within the maxillary sinus, piercing the posterior wall and surrounded by granulation tissue. The posterior wall of the maxillary sinus was carefully removed using a Kerrison bone punch.

Externally, an incision was made around the entry site, and flaps were elevated. The object was gently pulled out externally while simultaneously monitoring the maxillary sinus endoscopically to assess for bleeding from the retroantral space and sinus tract. The retrieved object measured approximately 8 cm and was identified as a toothbrush handle (Figures *5*-*7*).

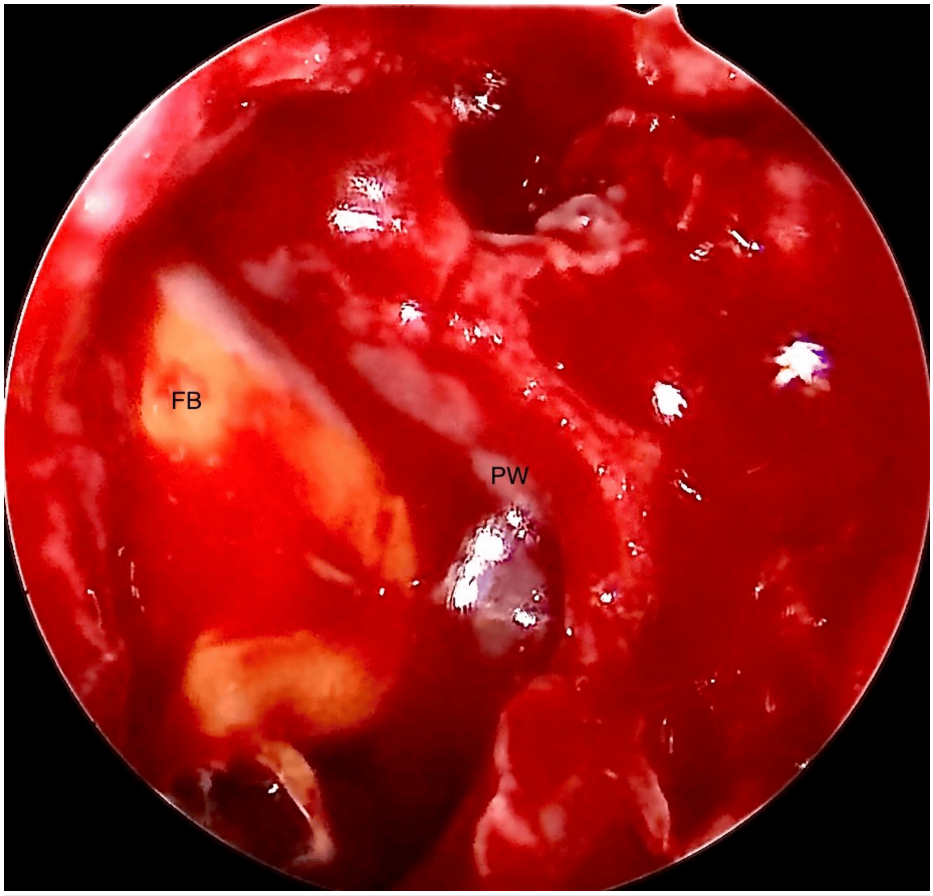


FIGURE 5: Endoscopic view showing the foreign body (FB) piercing the posterior wall (PW) of the maxillary sinus

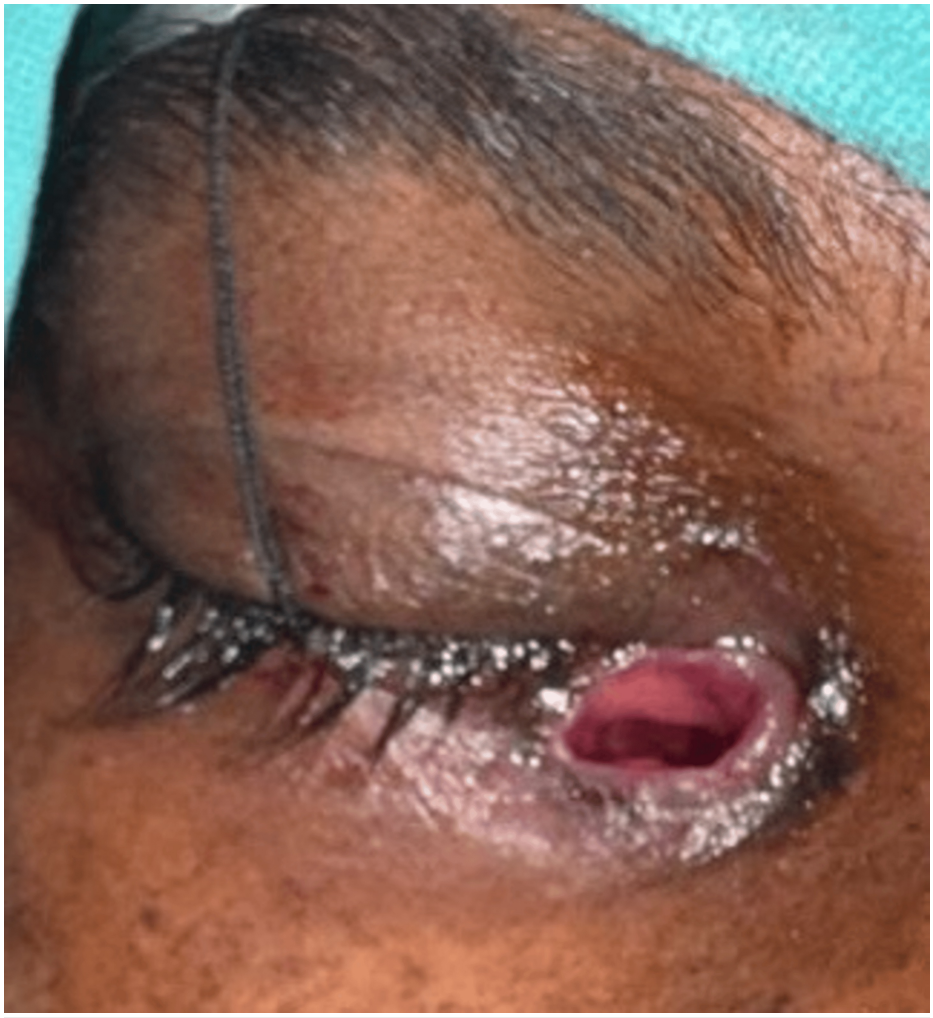


FIGURE 6: External wound site following foreign body extraction

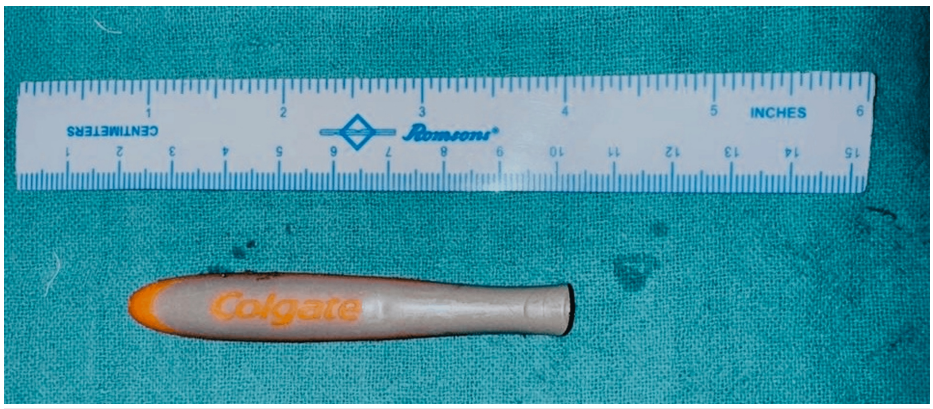


FIGURE 7: Retrieved 8 cm toothbrush handle measured against a surgical scale

The discrepancy between the length estimated on CT (approximately 6 cm) and the extracted specimen (8 cm) is most likely attributable to partial volume averaging on axial imaging combined with a distal segment of the foreign body that was embedded within granulation tissue and not clearly delineated from surrounding soft tissue density on preoperative imaging; this additional segment became apparent only on direct intraoperative visualization.

Post-removal examination demonstrated intact ocular movements and 6/6 vision (Figure *8*). The patient was

followed up for a period of six months, with no evidence of infection, enophthalmos, or recurrent symptoms at the final follow-up visit. A timeline of the clinical events leading up to the resolution is presented in Table *1*.

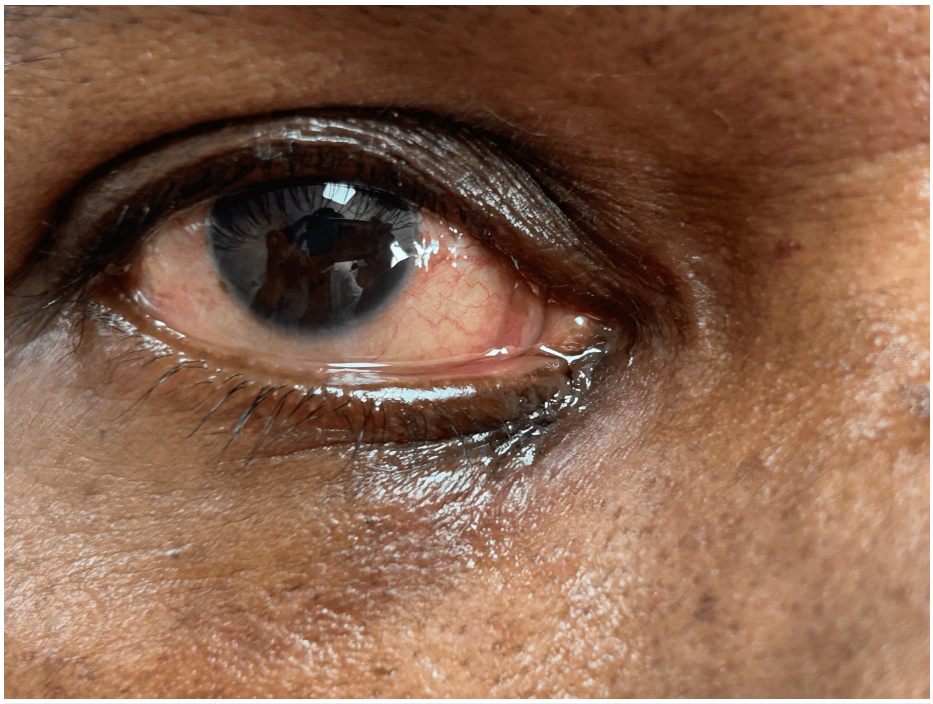


FIGURE 8: Postoperative picture showing completely preserved ocular appearance and intact eye function

Timepoint	Event
Day zero	Facial trauma during physical altercation; primary wound suturing at local hospital (no imaging performed)
~Week five (1.5 months)	Patient begins to notice gradual outward migration of a firm structure through the healed wound
~Week six	Referral to emergency department, then otolaryngology; CT imaging performed; diagnosis established
Same admission	Combined endoscopic and open surgical extraction; 8 cm toothbrush handle removed
Six-month postoperative	Final follow-up: intact ocular movements, 6/6 vision, uneventful recovery

TABLE 1: Timeline of clinical events

Discussion

Penetrating periorbital trauma presents a significant diagnostic challenge due to the intricate anatomy of the orbit and its continuity with adjacent facial compartments [1,6]. Retained plastic foreign bodies are easily missed during initial evaluations because of their low attenuation on CT scans and the absence of metallic artifacts, which frequently leads to delayed presentations [2,3,7,8]. Despite the close proximity of the object to critical structures, including the inferior rectus muscle and the globe, this patient exhibited no ocular motility restriction or visual impairment [1]. This favorable presentation suggests that the foreign body remained confined to the extraconal or subperiosteal space, sparing the intraconal contents and the optic nerve-sheath complex.

In this case, imaging revealed an unusual trajectory beginning at the inferonasal orbit, coursing through the extraconal compartment, breaching the orbital floor, and extending into the infratemporal space via the maxillary sinus and retroantral fat [4,9,10]. The thin orbital floor provides a potential pathway for penetrating objects to travel along anatomical planes of least resistance [4]. On retrospective correlation with the intraoperative findings, the terminal portion of the trajectory passed in close proximity to the infraorbital neurovascular bundle and the pterygoid venous plexus without disrupting either structure,

which may partly explain the absence of neurological or significant hemorrhagic sequelae in this case.

Delayed self-extrusion is a rare phenomenon, and its underlying mechanism remains incompletely understood. Proposed, though unproven, mechanisms in the literature include chronic low-grade inflammation, progressive granulation tissue formation around the foreign body, and cyclical mechanical forces generated by facial muscle activity, any of which could theoretically favor gradual outward migration along the original wound tract; however, these remain hypotheses rather than established mechanisms, and the present case cannot by itself confirm which, if any, was responsible [5,7,11]. The relative biological inertness generally attributed to plastic materials may have contributed to the absence of severe infection in this single patient, but this should be interpreted cautiously, as one case cannot establish the general safety of retained plastic foreign bodies. [7]

From an otolaryngological standpoint, this case emphasizes the importance of maintaining a high index of suspicion for retained foreign bodies in facial trauma, especially when the exact mechanism of injury is unclear [6,9]. Early CT imaging plays a crucial role in identifying radiolucent foreign bodies and delineating their precise anatomical course [2,3,12]. Furthermore, multidisciplinary collaboration between ENT, radiology, and ophthalmology is essential for safe management planning [1,9]. The unusual extension of this foreign body into the masticator space underscores the potential for penetrating trauma to involve deep facial compartments without presenting overt initial symptoms [13,14]. Clinical awareness of such rare presentations can help prevent missed diagnoses and avoid serious long-term complications.

Conclusions

Transorbital foreign bodies extending into deep facial spaces are rare and can remain asymptomatic for prolonged periods. This case illustrates an unusual anatomical trajectory extending from the orbit into the infratemporal space, with delayed partial spontaneous extrusion and preserved ocular function in this single patient, highlighting the importance of high-resolution imaging and multidisciplinary management in such presentations. It also underscores the need to carefully evaluate the mechanism of injury in penetrating facial trauma, as a high index of suspicion is essential to avoid missing non-apparent, radiolucent foreign bodies such as this one. As a single case report with a defined short-term follow-up, these findings should not be generalized to suggest that retained plastic foreign bodies are inherently well tolerated; broader conclusions regarding prognosis would require larger case series with longer follow-up. Early recognition and meticulous surgical extraction are essential to ensure favourable patient outcomes.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Deepika Saini, Swezal Lohia, Prince Handa, Ashish Gopal, Ishwar Singh, Ranjan Kumar Sahoo

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Supervision: Ashish Gopal, Ishwar Singh

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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