CASE REPORT

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Penetrating craniofacial trauma caused by a saw blade – Case Report

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Abstract

The case is presented of a patient with severe facial trauma associated with the penetration of a large metallic foreign body lodged in the facial bones. The patient suffered extensive facial trauma while cutting wood,. An ENT examination revealed a metallic foreign body – a wide saw blade protruding 20 cm above the surface of the skin. The remaining 12 cm of the saw blade penetrated the left orbit, damaging the upper and lateral walls of the left maxillary sinus, the nasal bones, the left ethmoid bone, the nasal septum and the right pterygoid process. The end of the foreign body reached the anterior margin of the foramen magnum, causing a 6 mm fragment of the anterior margin to break off and displace posteriorly. Surgery was performed under general endotracheal anaesthesia to remove the foreign body and treat the wounds to the nose and left orbit. The wound healed without complications. On the 11th day after the operation, the patient was discharged home with no symptoms.

Key words

facial trauma, occupational Injury, facial penetrating trauma, foreign body removal

INTRODUCTION

Although penetrating injuries of the facial skeleton are uncommon compared with blunt facial trauma, accounting for a small proportion of maxillofacial injuries, they are associated with a disproportionately high risk of severe complications, such as damage to the eyeball, cranial nerves, intracranial arteries, or secondary infections and haemorrhages [1, 2]. The most frequent mechanisms include workplace accidents involving mechanical tools, traffic accidents, and assaults with sharp objects.

Imaging studies play a central role in the diagnostic workup and surgical planning of penetrating craniofacial trauma. Computed tomography is the basic diagnostic test used to determine the location of a foreign body, its penetration path and relationship to bone, vascular and nerve structures [3, 4]. In selected cases, vascular imaging is required to exclude arterial or venous injury.

In the context of therapeutic management, it is important not only to remove the foreign body, but also to ensure airway patency, secure the circulatory system, control bleeding, and protect the structures of the eye and central nervous system [5, 6].

The aim of this article is to present the case of a patient with severe facial trauma associated with the penetration of a large metallic foreign body (a saw blade), and discuss the various diagnostic and surgical methods which are necessary in such treatment.

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CASE REPORT

A 43-year-old male sustained extensive craniofacial trauma after accidental penetration of facial structures by a saw blade while cutting wood at a sawmill. The patient was initially admitted to a local hospital, where his condition was stabilized and initial CT imaging was performed. He was subsequently transferred to the Otolaryngology Clinic approximately 6 hours after the injury.

On admission, the patient underwent a structured trauma assessment. He was conscious, fully oriented to time and place, and responded appropriately to questions. Vital signs: blood pressure 130/90 mmHg, heart rate 65 beats/min, respiratory rate 15 breaths/min, oxygen saturation 98% on room air, body temperature within normal limits. The patient was haemodynamically stable. Airway and breathing: airway patent, no signs of respiratory distress. Circulation: no active external bleeding; peripheral perfusion preserved.

ENT examination revealed no injury to the external auditory canals, middle ear structures, or larynx. A metallic foreign body was visible, protruding approximately 20 cm externally from the facial soft tissues. The total length of the saw blade was approximately 32 cm, with an estimated intrabony penetration depth of approximately 12 cm (Fig. 1).

Ophthalmologic assessment demonstrated normal visual acuity, due to the foreign body, reduced mobility of the left eyeball, and normal pupillary reflexes. No evidence of globe rupture was found. Cranial nerve examination revealed no deficits. Neurological assessment: Glasgow Coma Scale (GCS) score was 15. No focal neurological deficits were observed. Cranial nerve examination: no deficits in cranial nerves II–XII were identified.

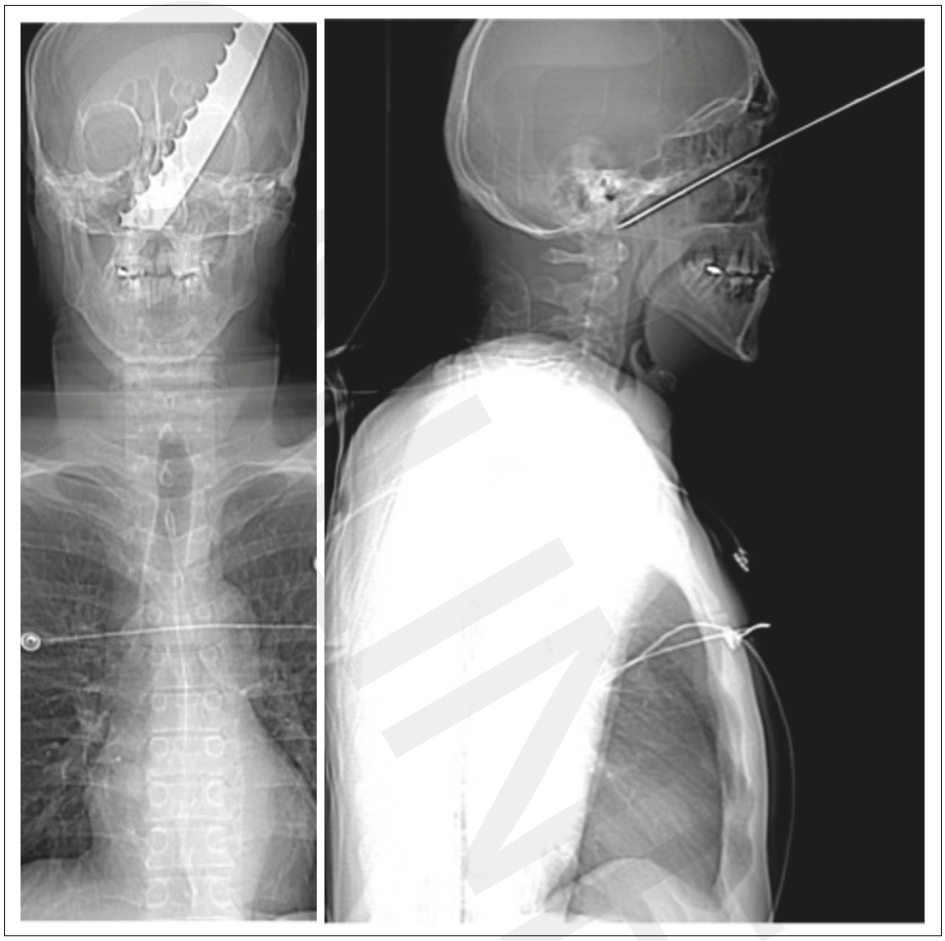

Figure 1. Removed metallic saw blade that penetrated the craniofacial structures

Computed tomography (CT) revealed the presence of a 30-mm-wide metallic saw blade penetrating the medial wall of the left orbit and extending posteriorly and toward the right side. The trajectory involved the upper and lateral walls of the left maxillary sinus, nasal bones, left ethmoid bone, nasal septum, and right pterygoid process. The tip of the foreign body reached the anterior margin of the foramen magnum, resulting in displacement of a 6mm fracture fragment of its anterior margin (Fig. 2).

The trajectory of the foreign body was carefully analyzed: it followed an oblique course from the left orbital region toward the skull base and contralateral side, traversing the maxillary sinus, ethmoid complex, and nasal septum, and extending toward the right pterygoid process. The tip of the blade reached the anterior margin of the foramen magnum, placing it in close proximity to critical neurovascular structures, including the internal carotid artery, vertebral arteries, and lower cranial nerves. CT angiography was performed to assess potential vascular injury. No evidence of arterial disruption, pseudoaneurysm, arteriovenous fistula, or active bleeding was identified.

The patient was qualified for urgent surgical removal of the foreign body. The procedure was performed under general endotracheal anesthesia. Surgical exposure was achieved by widening the entry point at the maxillary frontal process. Bone fragments obstructing visualization were carefully removed from the left nasal cavity to allow controlled visualization of the foreign body trajectory.

Intraoperative visualization: The procedure was performed under direct visualization. Surrounding soft tissues, particularly within the orbit, were gently mobilized to prevent additional injury during extraction. Vascular control: Special attention was paid to vascular structures along the trajectory. Active bleeding from the ethmoidal artery was identified and successfully coagulated.

Foreign body removal: After confirming that no soft tissue structures were entrapped by the serrated edges of the blade, the foreign body was carefully extracted along its original trajectory under full visual control. Wounds of the conjunctiva, external nose, and lower eyelid were sutured.

Figure 2. CT scans demonstrating a metallic penetrating saw blade traversing the craniofacial structures, including the left orbit and paranasal sinuses

Bilateral anterior nasal packing was applied. On the right side, a Foley catheter was inserted due to bleeding from the nasopharyngeal mucosa. Operative metrics: Total operative time was approximately 2 hours. Estimated blood loss was minimal. No intraoperative complications occurred.

Perioperative antibiotic therapy was administered to prevent infectious complications associated with penetrating craniofacial trauma involving sinonasal structures. The patient received intravenous timentin (3 × 3.2 g/day) and metronidazole (2 × 0.5 g/day) for 10 days. This regimen was selected to provide broad-spectrum coverage, including aerobic and anaerobic bacteria typical of the upper respiratory and sinonasal flora.

The postoperative course was uncomplicated. Mild conjunctival edema, hyperemia, and lacrimation of the left eye were observed initially and resolved spontaneously. Analgesic treatment included metamizole and paracetamol. Tetanus prophylaxis had been administered at the initial hospital.

The patient was discharged home on postoperative day 11. Follow-up was conducted via telemedicine one year after surgery. At follow-up, the patient reported no visual disturbances or diplopia, normal ocular motility. The patient reported normal facial sensation with no signs of trigeminal nerve dysfunction. No sinonasal symptoms such as obstruction, discharge, or recurrent infection were noted. External scars were well healed with satisfactory cosmetic outcome. The patient had returned to normal daily and professional activities and did not report chronic pain or psychological sequelae.

DISCUSSION

Penetrating craniofacial injuries represent a significant surgical challenge due to the complex anatomy of the facial skeleton and the proximity of critical neurovascular structures. Their aetiology includes both traffic accidents and workplace injuries, especially those involving mechanical tools [7]. Contemporary analyses show that this type of injury is associated with a high risk of neurological, vascular and infectious complications, and their effective treatment requires an interdisciplinary approach [8]. Compared with similar cases reported in the literature, the present case is distinctive due to the exceptional length of the foreign body, its oblique trajectory, and its proximity to the foramen magnum, combined with a favourable long-term outcome.

The primary diagnostic tool in such cases remains computed tomography, which allows for accurate determination of the penetration path, location of the foreign body and its relationship to bone and vascular-nerve structures. In cases of suspected vascular damage or penetration of the skull base, angiographic examinations are recommended, as they can reveal damage to the carotid arteries or venous sinuses [9,10]. The literature emphasises that surgical management of penetrating injuries should always be performed in an operating theatre, after a full imaging assessment, in accordance with safety rules — premature removal of a foreign body may lead to massive haemorrhage or damage to the central nervous system [11]

Potential complications, such as cerebrospinal fluid leakage, vascular injury, intracranial infection, traumatic aneurysm formation, and permanent ocular deficits, were notably absent in this patient. The favourable outcome underscores the importance of meticulous imaging-based planning, controlled operative removal of the foreign body, and close multidisciplinary collaboration.

Delayed vascular complications, including pseudoaneurysm formation or arteriovenous fistulas, have been described after penetrating craniofacial trauma. Therefore, long-term follow-up is essential, even in asymptomatic patients.

CONCLUSIONS

Patients with severe penetrating craniofacial injuries involving large foreign bodies should be treated in specialized centres. Foreign bodies should never be removed outside the operating room or prior to complete imaging assessment. Computed tomography is crucial in assessing the extent of the injury and planning treatment, as it allows for accurate determination of the location of the foreign body in relation to the bone structures, eye socket and skull base.

Early involvement of otolaryngology, neurosurgery, and ophthalmology is recommended in any suspected orbit or skull base injury. Long-term follow-up of at least 12 months is advisable to detect delayed vascular, neurological, or infectious complications.

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