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Intraorbital Trauma with Wooden Foreign Body: Report of An Atypical Surgical Case

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CASE REPORT

ABSTRACT

Among the various types of injuries that affect the maxillofacial region, perforating objects can result in doubtful prognosis due to the possibility of reaching vessels, nerves, and other key structures, causing hemorrhages, airway obstruction, brain damage and even death. Foreign bodies in the orbital cavity are usually divided into two categories: inorganic and organic. This report intends to present an atypical case of wooden foreign body remotion from the intraorbital area which was performed surgically in a Public Hospital Center in Sergipe, Brazil. Facial injuries should be evaluated with a rigid protocol to provide quality healthcare, thus minimizing problems during the management of the cases. Imaging examinations should not be neglected, so that careful evaluation of the extent of the lesions and presence of foreign objects can be performed. Although CT is regarded as the gold standard, MRI scans are superior to CT in the diagnosis of small pieces of wood. Surgery is the preferred treatment, in which the surgeons should carefully remove all foreign bodies and residual fragments will result in orbital infection. Postoperative sinus drainage and systemic antibiotic treatments are necessary.

Keywords: Accidental Injuries, Foreign Bodies, Maxillofacial Surgery.

Traumatismo Intraorbitario con Cuerpo Extraño de Madera: Reporte de un Caso Quirúrgico Atípico

RESUMEN

Entre los diversos tipos de lesiones que afectan la región maxilofacial, los objetos perforantes pueden resultar de pronóstico dudoso debido a la posibilidad de alcanzar vasos, nervios y otras estructuras clave, causando hemorragias, obstrucción de las vías respiratorias, daño cerebral e incluso la muerte. Los cuerpos extraños en la cavidad orbitaria generalmente se dividen en dos categorías: inorgánicos y orgánicos. Este informe pretende presentar un caso atípico de extracción de un cuerpo extraño de madera del área intraorbitaria que se realizó quirúrgicamente en un centro hospitalario público en Sergipe, Brasil. Las lesiones faciales deben evaluarse con un protocolo rígido para brindar atención médica de calidad, minimizando así los problemas durante el manejo de los casos. Los exámenes de imagen no deben descuidarse, de modo que se pueda realizar una evaluación cuidadosa de la extensión de las lesiones y la presencia de objetos extraños. Aunque la TC se considera el estándar de oro, las exploraciones de resonancia magnética son superiores a la TC en el diagnóstico de pequeños trozos de madera. La cirugía es el tratamiento preferido, en el que los cirujanos deben eliminar cuidadosamente todos los cuerpos extraños y los fragmentos residuales darán lugar a una infección orbitaria. Es necesario el drenaje sinusal postoperatorio y el tratamiento antibiótico sistémico.

Keywords: Lesiones Accidentales, Cuerpos Extraños, Cirugía Maxilofacial.

INTRODUCTION

Among the various types of injuries that affect the maxillofacial region, perforating objects can result in doubtful prognosis due to the possibility of reaching vessels, nerves, and other key structures, causing hemorrhages, airway obstruction, brain damage and even death (Paganott *et al*., 2022). Stab wounds caused by foreign bodies in the maxillofacial region are uncommon even facilitating a significant risk to the victim's life and can lead to death (Lucena *et al*., 2021; Paganott *et al*., 2022).

This is mainly due to the involvement of large and important blood vessels, causing bleeding. If this injury leads to communication with the oral or nasal cavity, the bleeding can obstruct the patient's airways (Lucena *et al*., 2021). According to Gomes *et al.,* (2023), the face is a region of extreme functional and aesthetic matter. It is an area that serves as a cavity for the sensory organs (hearing, sight, smell, balance, olfaction and taste), as well as forming part of the digestive and respiratory systems (Júnior *et al.*, 2015).

Therefore, when injured, the orbit requires special care so that the individual evolves with few or no physical and psychosocial sequelae (Júnior *et al.*, 2015). Intraocular foreign bodies are the major cause of traumatic injuries in orbit, they have different characteristics, ranging from eyelid edema to cranial orbit trauma, and they occur in severe and sometimes fatal sequelae (Lucena *et al*., 2021).

Foreign bodies in the orbital cavity are usually divided into two categories: inorganic and organic. Inorganic foreign bodies are objects made of glass, plastic, and metal such as knives and others. Organic objects are, for example, some wooden objects (Lucena *et al*., 2021). The approach to this type of injury should be taken by a multidisciplinary team, starting with the trauma unit, which should promote airway maintenance and decide on the individual course of action for each patient according to each professional. (Júnior *et al.*, 2010; Santos *et al.*, 2023).

There’s a mechanical classification system for eye injuries used to characterize eye trauma (Lucena *et al*., 2021). Among the classifications, there are three main types: ocular, adnexal and mixed. Ocular trauma can be intraocular, affecting the iris, lens,

choroid, retina and other internal structures of the eye (Lucena *et al*., 2021; Paganott *et al*., 2022). Extraocular, affecting the surface of the cornea or sclera. The appendages can affect the eyelids, orbits, tear ducts and conjunctiva. Mixed lesions occur when multiple extraocular or intraocular structures coexist (Lucena *et al*., 2021) and the premature diagnosis of this type of lesion is required for correct and appropriate management and approach (Gondim *et al*., 2021).

This report intends to present an atypical case of wooden foreign body remotion from the intraorbital area which was performed surgically in a Public Hospital Center in Sergipe, Brazil.

CASE REPORT

A 36-year-old male victim of physical assault was admitted to the Public Emergency Hospital (HUSE) allocated in Aracaju, Sergipe, Brazil, describing an incident where he was physically assaulted. On physical examination, the patient was diagnosed with a wooden object (a snooker cue) stuck in his left nostril, also he presented left periorbital edema, fixed mydriasis, ophthalmoplegia and amaurosis.

During the first evaluation, he was lucid and oriented, hemodynamically stable, with permeable airways and a Glasgow coma scale score of 15. A computed tomography (CT) scan of the skull and face showed an object running across the floor of the orbit and causing a fracture of its posterior wall (optic foramen).

The treatment proposed, together with the neurosurgery and ophthalmology teams, was to remove the foreign body followed by bleeding control, under general anesthesia and to perform a CT scan immediately afterward, to observe possible intracranial bleeding.

Figures 1 to 8 express the surgical steps and clinical aspects of the patient during the evaluation to after the surgical intervention, general anesthesia and surgical approach to remove the foreign body, respectively:

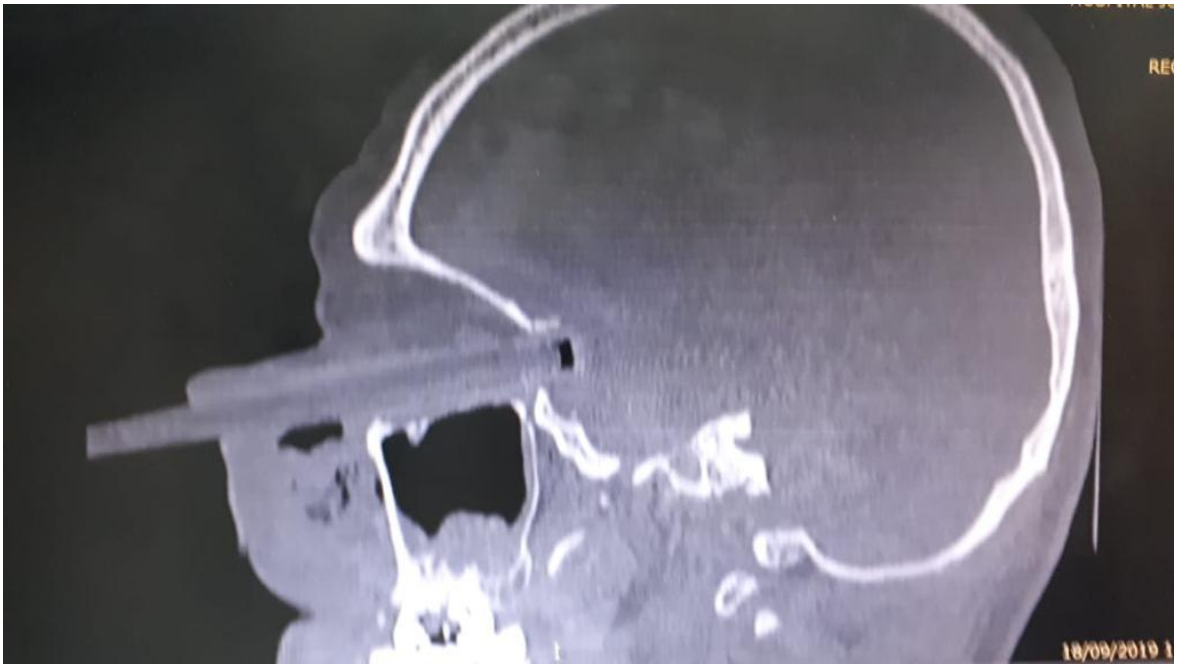
Figure 1. Clinical aspect of the patient's face. A) Frontal aspect and B) lateral view.

Source: elaborated by the authors.

Figure 2. Patient after the intubation and general anesthesia.

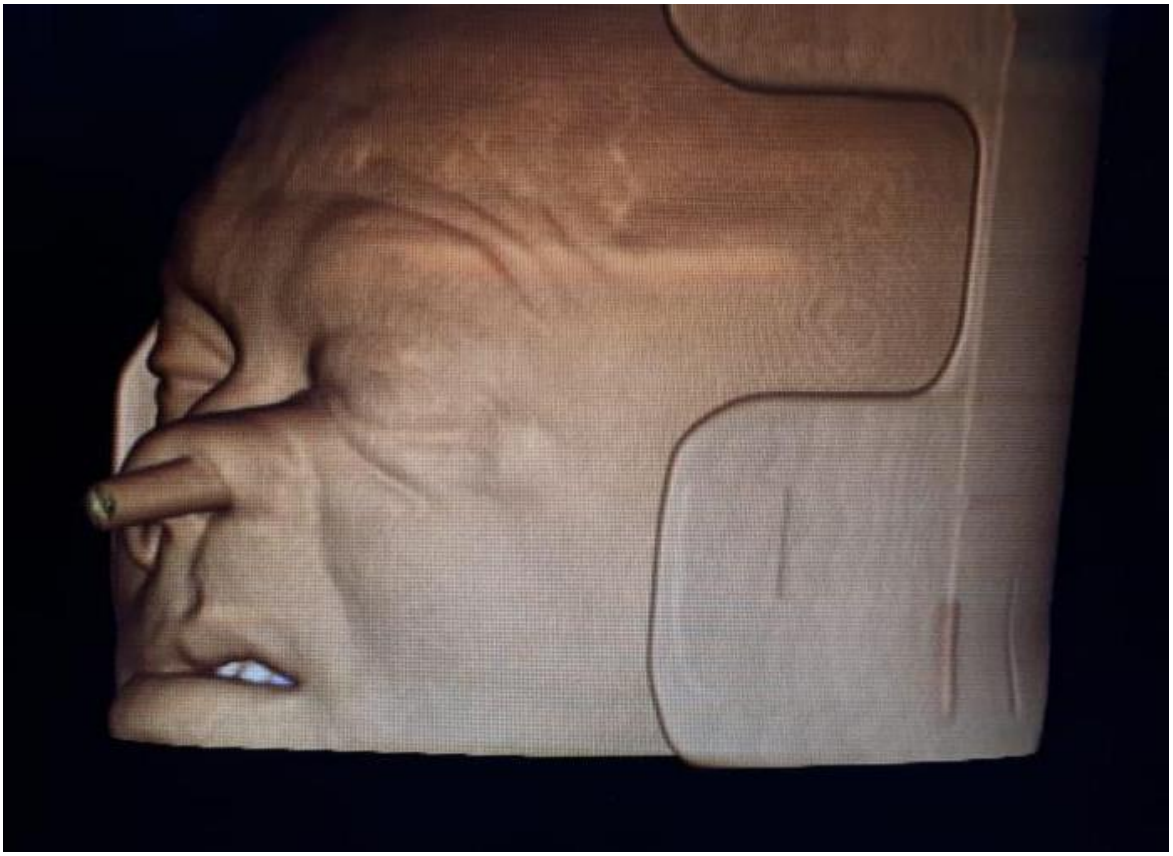
Source: elaborated by the authors.

Figure 3. CT scan showing the wooden foreign body penetrating the orbit cavity.



Source: elaborated by the authors.

Figure 4. 3D reconstruction to do the surgical plan.



Source: elaborated by the authors.

Figure 5. Removal of the wooden foreign body.

Source: elaborated by the authors.

Figure 6. Clinical appearance of fragment removed from patient's face

Source: elaborated by the authors.

Figure 7. The clinical situation of the orbital, infraorbital and ocular regions.

Source: elaborated by the authors.

Figure 8. Patient after the removal in the operation room.

Source: elaborated by the authors.

DISCUSSION

Facial trauma resulting from a stabbing injury can induce serious complications, especially if noble structures are injured, and can include: soft tissue laceration, soft

tissue laceration with bone fracture, soft tissue laceration with bone tissue fracture and foreign body retention in the region (Erkutlu *et al.*, 2011; Gondim *et al*., 2022; Paganott *et al*., 2022).

During primary care, it is necessary to follow the Advanced Trauma Life Support (ATLS) protocol by maintaining the airway and controlling hemorrhage; since, due to its high vascularization, facial FAB can trigger considerable hemorrhage and consequent hypovolemic shock (Lucena *et al.,* 2021; Júnior *et al.*, 2015). In addition, a neurological assessment should also be carried out at the start of treatment (Paganott *et al*., 2022). Likewise, in conformity with Jesus *et al.*, (2023) patients with systemic complications always need to have a medical history before any treatments.

The complexity of orbital anatomy can become a real challenge to procedures in patients with wooden foreign bodies (IWFB) (Gondim *et al*., 2022). These types of wounds can be life-threatening, depending on the patient's age, the injury location and other complications (Gondim *et al*., 2022). Due to the risk of meaningful neurological and vascular complications, it is important to clarify where the foreign body is located, likewise, it is vital to determine the most appropriate surgical approach to remove the object and overcome potential complications (Erkutlu *et al.*, 2011).

Facial aggressions perpetrated with melee weapons cause injuries that are difficult to treat, affirms Ferreira *et al*., (2020) and a possible aesthetic-functional sequel can induce irreparable damage to the patients. The management of penetrating injuries in the maxillofacial region depends on their nature and extent, the type of weapon used, and the anatomical structures affected. These injuries can have easy resolution or fatal consequences (Paganott *et al*., 2022).

However, it is widely accepted that initial treatment requires maintenance of the airways, control of possible bleeding and proper diagnosis (Ferreira *et al*., 2020). Due to location and projection, trauma to the face or skull can be associated with multiple orbital injuries, which can be characterized as orbital fractures (orbital floor, orbital roof, medial wall, lateral wall, zygomatic maxillary complex, naso-orbital-ethmoidal complex and orbital apex), soft tissue injuries, injuries to neurovascular structures, muscles and directly involving the eyeball itself (Gondim *et al*., 2021).

During trauma to the orbital cavity, 16% of foreign bodies remain in the region, classified as inorganic (glass and metal) and organic (wood) bodies, with the group of

organic foreign bodies being characteristic as they present a greater risk to the individual due to the formation of abscesses and intraorbital lesions that develop during a continuous source of infection, based on the reactivity inherent to the nature of the material (Gondim *et al*., 2021). Araújo *et al*., (2023) declare that the intervention should be immediate since oculo-orbital traumas generally evolve with irreversible sequelae and a critical prognosis when postponed (Lucena *et al*., 2021).

It seems logical to believe that imaging should be used to evaluate the extent and trajectory of lesions caused by perforating objects and correlate possible damages caused to anatomical structures, such as maxillary sinus, eyeballs, nerves, blood vessels, brain, and cervical vertebrae (Ferreira *et al*., 2020). Also, in penetrating, blunt, and blast injuries, recognizing and addressing orbital and periorbital foreign bodies that may cause significant structural and functional deformity is very important (Sundar, 2021). Intraorbital foreign bodies (IOFBs) are typically caused by a high-velocity trauma to the orbit but may also occur after relatively trivial trauma and according to You *et al.*, (2021) constitute 16.7% of orbital injuries.

The diagnosis can be confirmed through imaging exams, making surgical planning possible when indicated and it is essential to collect as much information as possible regarding the location, to execute a planned, precise and efficient surgical approach (Paganott *et al*., 2022). The therapeutic approach and prognosis vary according to the composition and location of the foreign body and the presence or absence of infection (Paganott *et al*., 2022).

Several studies have assessed accidents caused by perforating objects, such as knives, scissors, umbrella handles, hooks, arrows, firearm projectiles, forks, spoons, and twigs, among others. However, the case presented in our study seems to be rare based on the recent publication reports overviewed during the literature review to perform this article (Ferreira *et al*., 2020; Paganott *et al.*, 2022). Scheepers and Lownie have emphasized the role of angiography in the correlation of injuries with the proximity of the great vessels, thus preventing a possible trans-operative hemorrhage (Ferreira *et al*., 2020).

If possible, perforating objects should be removed carefully through the same entrance trajectory, avoiding a pendulum movement of the blade tip (Ferreira *et al*., 2020). If trans-operative hemorrhage occurs, selective embolization or vessel ligation

may be considered during surgery (Ferreira *et al*., 2020). Sometimes, a multidisciplinary team is needed (Ferreira *et al*., 2020).

Any functional changes, complications, or sequels need to be observed in the postoperative period during the patient's recovery (Paganott *et al*., 2022). A late follow-up is important to evaluate ocular function against healing (Ferreira *et al*., 2020). The subtarsal approach, through percutaneous access, can generate a deficiency in the eyelid with the possibility of the development of ectropion or entropion. The loss of orbital fat can develop into diplopia (Ferreira *et al*.,2020).

The diagnosis of IOWFBs is sometimes difficult due to insufficient information regarding the history of trauma, as well as the insufficiency in the external signs. In addition, radiologic diagnosis of IOWFBs is always uncertain and quite difficult, because the low density of IOWFBs is similar to air and adipose tissue on initial computed tomography (You *et al*., 2021)

Pre-operative examinations should be requested to evaluate regions that may be damaged during removal (Ferreira *et al*., 2020). Therefore, given the history of ocular trauma and suspicion of a foreign body retained in the orbit, a thorough clinical evaluation is necessary, often associated with imaging resources, especially orbital CT, aiming to identify the location of the foreign body and identify the type of object, to make an early diagnosis and establish the best therapeutic plan (Lucena *et al*., 2021; You *et al*., 2021).

FINAL CONSIDERATIONS

Facial injuries should be evaluated with a rigid protocol to provide quality healthcare, thus minimizing problems during the management of the cases. Imaging examinations should not be neglected, so that careful evaluation of the extent of the lesions and presence of foreign objects can be performed.

Furthermore, the removal of organic foreign bodies is a challenge for surgeons due to the possibility of remnants in the region caused by the composition and deformation of the fragment during trauma and its removal. An accurate diagnosis requires a detailed trauma history, careful ocular examination, as well as empirical reading of imaging examinations. A wooden body inside the orbital cavity, even if it can

be visualized, can present considerable difficulties in treatment. A multidisciplinary assessment is essential to draw up the correct treatment plan.

Although CT is regarded as the gold standard, MRI scans are superior to CT in the diagnosis of small pieces of wood. Surgery is the preferred treatment, in which the surgeons should carefully remove all foreign bodies and residual fragments will result in orbital infection. Postoperative sinus drainage and systemic antibiotic treatments are necessary.

REFERÊNCIAS

ALMEIDA JÚNIOR et al. Ferimento a faca impactada na face (Síndrome de Jael): relato de caso. Rev. cir. traumatol. buco-maxilo-fac, v.10 no.1 Camaragibe Jan./Mar. 2010.

DE ARAÚJO, Maria Eduarda Reis et al. Abordagem cirúrgica de urgência para remoção de corpo estranho na face: relato de caso. **Revista de Odontologia da UNESP**, v. 52, n. Especial, p. 0-0, 2024.

ERKUTLU, İbrahim et al. Unusual penetration of a construction nail through the orbit to the cranium: a case report. **Ulus Travma Acil Cerrahi Derg**, v. 17, n. 1, p. 79-82, 2011.

FERREIRA, Mário Serra et al. Remoção de arma branca esquecida em órbita: relato de caso. **RGO-Revista Gaúcha de Odontologia**, v. 68, p. e20200008, 2020.

GOMES, L. S. de O.; COSTA, L. R. S.; BEZERRA, R. M.; BRITO, T. A. P.; GARCIA, J. J.; DE ASSIS, A. F. Ferimento por arma branca impactada na face: relato de caso. Brazilian Journal of Health Review, *[S. l.]*, v. 6, n. 3, p. 9015–9022, 2023.

GONDIM, Ricardo Franklin et al. Removal of organic foreign body after motorcycle accident: An unusual case report. 2021.

Gondim, Ricardo Franklin et all. Remoção De Corpo Estranho De Madeira Intraorbital Com Reconstrução Imediata De Soalho Órbital Com Enxerto De Ramo Mandibular Em Abordagem De Urgência. **Revista Científica do Instituto Dr. José Frota**, n. 2, p. 37-39, 2022.

LUCENA, V. R. dos S.; MEDEIROS, T. D. N. .; MORAIS, H. H. A. de .; SOUZA JÚNIOR, E. F. de .; FERNANDES, A. V. . Diagnosis and management of trauma by penetrating foreign body in orbit: Case series. Research, Society and Development, *[S. l.]*, v. 10, n. 5, p. e49910515320, 2021. DOI: 10.33448/rsd-v10i5.15320.

SANTOS, André Luis Silva et al. Ferimento provocado por arma branca impactada em região maxilofacial: Relato de caso.PubSaúde, v.14, a472. ,2023

Santos, L.S.S., Silva, S.S., Silva, L.S., Oliveira Neto, J.A., Albuquerque, H.I.M., & Sousa, L.M.A. Ferimento provocado por arma branca impactada em região maxilofacial: Relato de caso. Pubsaúde, 14, a472. DOI: https://dx.doi.org/10.31533/pubsaude14.a472

SILVA, Maria Alves Garcia Santos. Remoção de arma branca esquecida em órbita: relato de caso.

SUNDAR, Gangadhara. Orbital Trauma: Orbital Soft Tissue Injuries and Intraorbital Foreign Bodies. **Atlas of Orbital Imaging**, p. 1-12, 2020.

PAGANOTTI, Germano Gianizeli et al. Corpo estranho intra-orbitário: relato de caso: Infra-orbital foering body: case report. **Brazilian Journal of Health Review**, v. 5, n. 4, p. 16972-16984, 2022.

JESUS , O. R. V. de; GUERRA , C. B. de M. C.; GUEDES, E. V. B.; ARAÚJO, M. E. de. Oral Health Care and Multidisciplinary Knowledge at the Volunteering Work in Peru: an Experience Report. Brazilian Journal of Implantology and Health Sciences, *[S. l.]*, v. 5, n. 5, p. 5743–5761, 2023. DOI: 10.36557/2674-8169.2023v5n5p5743-5761.

YOU, Ya-Yan et al. Intraorbital wooden foreign bodies: case series and literature review. **International Journal of Ophthalmology**, v. 14, n. 10, p. 1619, 2021.