



## APPROACH TO FACIAL TRAUMA IN POLYTRAUMATIZED PATIENTS

## ABORDAGEM DO TRAUMA FACIAL EM POLITRAUMATIZADOS

## ABORDAJE DEL TRAUMA FACIAL EN PACIENTES POLITRAUMATIZADOS

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### ABSTRACT

Facial trauma in polytraumatized patients is a highly complex condition that requires a robust interdisciplinary approach, frequently associated with traffic accidents and high-energy injuries. This narrative review analyzes current management strategies, emphasizing the prioritization of hemodynamic stabilization and airway maintenance according to Advanced Trauma Life Support (ATLS) protocols, often postponing definitive facial treatment under the Damage Control doctrine. The findings indicate the superiority of surgical intervention with rigid osteosynthesis over conservative treatment in reducing functional and aesthetic sequelae, such as malocclusion and asymmetry. The study discusses specific challenges, such as the management of fractures in atrophic mandibles (which may require bone grafting according to the Luhr classification) and the need for immediate microsurgical replantation in cases of traumatic amputations.

**Keywords:** Facial Trauma. Polytraumatized Patient. Oral and Maxillofacial Surgery. Rigid Osteosynthesis. ATLS. Mandibular Fractures. Microsurgery. Damage Control.

### RESUMO

O trauma facial em pacientes politraumatizados é uma condição de alta complexidade que exige uma abordagem interdisciplinar robusta, frequentemente associada a acidentes de trânsito e lesões de alta energia. Esta revisão narrativa analisa as estratégias atuais de manejo, enfatizando a priorização da estabilização hemodinâmica e da manutenção da via aérea conforme os protocolos do Advanced Trauma Life Support

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(ATLS), muitas vezes postergando o tratamento definitivo da face sob a doutrina de Controle de Danos. Os resultados indicam a superioridade da intervenção cirúrgica com osteossíntese rígida sobre o tratamento conservador na redução de sequelas funcionais e estéticas, como maloclusão e assimetria. O estudo discute desafios específicos, como o manejo de fraturas em mandíbulas atróficas (que podem exigir enxertia óssea conforme a classificação de Luhr) e a necessidade de replantação microcirúrgica imediata em casos de amputações traumáticas.

**Palavras-chave:** Trauma Facial. Politraumatizado. Cirurgia Bucomaxilofacial. Osteossíntese Rígida. ATLS. Fraturas Mandibulares. Microcirurgia. Controle de Danos.

## RESUMEN

El trauma facial en pacientes politraumatizados es una condición de alta complejidad que requiere un enfoque interdisciplinario sólido, frecuentemente asociado con accidentes de tránsito y lesiones de alta energía. Esta revisión narrativa analiza las estrategias actuales de manejo, enfatizando la priorización de la estabilización hemodinámica y el mantenimiento de la vía aérea de acuerdo con los protocolos del Advanced Trauma Life Support (ATLS), postergando a menudo el tratamiento definitivo de la cara bajo la doctrina de Control de Daños. Los resultados indican la superioridad de la intervención quirúrgica con osteosíntesis rígida sobre el tratamiento conservador en la reducción de secuelas funcionales y estéticas, como maloclusión y asimetría. El estudio aborda desafíos específicos, como el manejo de fracturas en mandíbulas atróficas (que pueden requerir injertos óseos según la clasificación de Luhr) y la necesidad de reimplantación microquirúrgica inmediata en casos de amputaciones traumáticas.

**Palabras clave:** Trauma Facial. Paciente Politraumatizado. Cirugía Bucomaxilofacial. Osteosíntesis Rígida. ATLS. Fracturas Mandibulares. Microcirugía. Control de Daños.



## 1 INTRODUCTION

Maxillofacial trauma is a widely present clinical reality on a global scale (Ghanaati, 2022). Often, these trauma patterns do not occur in isolation, but are associated with additional injuries that require neurosurgical intervention or trauma surgery for the extremities (Ghanaati, 2022). This complexity underlines the need for an interdisciplinary approach. Trauma to the facial region can lead to several deformities, resulting in facial disproportions and disorders of physiological functions (Boljevic et al., 2023). More severe injuries, such as traumatic amputations of the face or scalp, require acute and specialized management, ideally with microsurgery, as they can have devastating consequences (Rittri et al., 2024). The treatment of facial fractures, such as those of the atrophic mandible, constitutes a particular challenge due to poor bone quality and reduced vascularization (Cienfuegos, 2023). Thus, this article aims to synthesize recent scientific evidence and current therapeutic approaches for the management of facial trauma in polytrauma patients, highlighting the complexity and need for multidisciplinary intervention.

## 2 METHODOLOGY

The present study is a bibliographic review of a narrative nature, elaborated with the objective of synthesizing and analyzing recent scientific evidence on the approach to facial trauma in polytrauma patients. The data were searched in the PubMed database, using the descriptors "Facial Injuries", "Treatment" and "Surgery". These terms were combined using the Boolean operators AND and OR, in accordance with the Medical Subject Headings (MeSH) terminology. Articles published in the last five years, available in full and written in Portuguese or English, that directly addressed the topic, were included. Studies that did not have a direct relationship with the central theme, duplicate publications, narrative reviews with low methodological rigor, and articles not indexed in the database used were excluded. The selection of studies was carried out in two phases: screening of titles and abstracts, followed by the evaluation of full texts to confirm relevance. The extracted data were organized descriptively.

## 3 RESULTS AND DISCUSSION

Craniomaxillofacial lesions (CMF) may account for about 30% of all admitted trauma cases, highlighting the need for interdisciplinary surgical planning that involves



trauma surgeons, neurosurgeons, and CMF surgeons (Ghanaati, 2022). The most common pattern of injury appears to be the middle third of the face (Ghanaati, 2022).

Le Fort fractures, resulting from high-energy trauma, are classified into three types (I, II, and III) that represent the progression of skeletal disjunction of the middle third of the face. This classification is essential for diagnosis and surgical planning, especially in Type III, which implies craniofacial dissociation and risk of associated injuries. (HOHMAN, M. H., 2025)

The initial management of the polytrauma patient, especially those with associated maxillofacial trauma, is guided by the principles of Advanced Trauma Life Support (ATLS). This protocol established a sequential and systematic approach (ABCDE), which revolutionized trauma care by instituting a framework in which the top priority is to immediately address life-threatening conditions. In the context of facial trauma, attention immediately turns to airway management, given the high likelihood of obstruction due to bleeding, edema, or displacement of bone fragments. Historically, ATLS has brought a common language and essential framework to the care of patients with multiple injuries. Consequently, the definitive treatment of craniomaxillofacial lesions (CMF) is often postponed to the secondary phase of trauma management, adhering to the doctrine of Damage Control. (WILES, M. D., 2015)

A prospective case-control study compared the outcomes of surgical treatment (split between transcutaneous and transmucosal access) and conservative treatment in 90 patients (Boljevic et al., 2023). Complications monitored before and after treatment included malocclusions, paresthesias, facial asymmetry, diplopia, and limited mouth opening (Boljevic et al., 2023). The findings indicated that surgical methods significantly reduce malocclusions, paresthesias, and facial asymmetry (Boljevic et al., 2023). Notably, no statistical difference was found in the reduction of complications between the skin (transcutaneous) or mucosal (transmucosal) access (Boljevic et al., 2023).

In specific scenarios, such as fractures in atrophic jaws, treatment with plates and screws (osteosynthesis) has been shown to be a reliable procedure (Cienfuegos, 2023). Luhr's classification proved useful in guiding the need for bone grafting (Cienfuegos, 2023). For Luhr class II and III atrophies, the use of a cancellous bone graft, sometimes taken from the proximal third of the tibia, was applied to optimize the osteogenic response at the fracture site (Cienfuegos, 2023).



The therapeutic approach to facial fractures is primarily aimed at the faithful reconstitution of the three-dimensional skeletal architecture and the restoration of the patient's functional occlusion. For this purpose, rigid osteosynthesis — employing titanium miniplate and microplate systems — has established itself as the standard of care, given its ability to confer biomechanical stability and provide early functional rehabilitation. In scenarios of particular clinical challenge, such as fractures in atrophic jaws, these impose inherent limitations due to compromised bone density and reduced vascular supply. The study by Cienfuegos (2023) corroborates that the Luhr Classification acts as a robust criterion for determining the need for biological and structural support. For class II and III atrophies, the application of an autologous spongy bone graft (often obtained from the proximal third of the tibia) transcends mere volumetric filling. Its primary objective is the optimization of osteogenesis, through the supply of osteoprogenitor cells and essential growth factors to promote bone healing in a niche with intrinsically diminished reparative capacity.

For the most severe cases, such as traumatic amputations of the face (nose, lip, ear) or scalp, acute microsurgical replanting is the treatment of choice (Rittri et al., 2024). This approach offers the best functional and aesthetic results, and the literature reports success rates above 70% for urgent microvascular replantations on the face and scalp (Rittri et al., 2024).

The etiology of facial trauma exhibits significant geographic heterogeneity. While in European contexts the predominance of motor vehicle traumas (TVAs) and traffic accidents (Ghanaati, 2022; Rittri et al., 2024) results in high-energy injuries, which are often associated with complex skeletal fracture patterns, such as Le Fort and panfacial fractures, which compromise the middle third of the face. In contrast, the systematic review on sports trauma (Shreya et al., 2022) illustrates the predominance of low-energy mechanisms in the spectrum of orofacial injuries in India. Such mechanisms result in a higher incidence of dentoalveolar trauma and focal soft tissue lesions (lacerations). This etiological diversity and the consequent variation in trauma kinematics underline the imperative that diagnostic and clinical treatment protocols be adaptable and guided by the epidemiological profile and the regionally prevalent lesion pattern.

In specific contexts such as sports-related facial trauma, a systematic review identified dental injuries as the most common type of orofacial injury (Shreya et al., 2022).



However, in general, soft tissue injuries (such as lip and cheek lacerations) were the most frequently reported (Shreya et al., 2022).

Regional causes vary: in European countries, road and traffic accidents are prevalent, while in other regions, factors such as animal bites or work accidents may be more common (GHANAATI, 2022; RITTRI et al., 2024).

Facial amputation injuries, while rare, can be devastating, affecting self-esteem, social integration, and functions such as eating and breathing (RITTRI et al., 2024). Procedures of this type involve vascular anastomoses under a microscope, with cold ischemia times up to 33 hours reported in successful cases, although longer periods increase the risk of failure (RITTRI et al., 2024).

In cases of post-reimplantation venous stasis, therapy with leeches (*Hirudo medicinalis*) can be employed, associated with prophylactic antibiotics and blood transfusions (RITTRI et al., 2024).

Proper storage of amputated tissue (wrapped in gauze moistened in sodium chloride solution, in a sealed and refrigerated plastic bag) as well as the elapsed time, is vital to preserve the viability of replantation (RITTRI et al., 2024)

#### 4 CONCLUSION

Facial trauma in polytrauma patients represents a therapeutic dilemma inherent to its etiological and anatomical complexity, requiring a synergistic and interdisciplinary approach. The synthesis of the reviewed evidence reiterates that priority clinical management should focus on resuscitation and hemodynamic stabilization of the patient, in accordance with the Advanced Trauma Life Support (ATLS) protocol. Consequently, the definitive treatment of craniomaxillofacial lesions (CMF) is often postponed to the secondary phase of trauma management, adhering to the doctrine of Damage Control.

Recognition of the Le Fort pattern (I, II, or III) is essential for the planning of reduction and fixation, aiming at the restoration of functional occlusion and skeletal architecture. The treatment of high-grade fractures requires immediate interprofessional collaboration, minimizing complications and optimizing patient outcome. (HOHMAN, M. H., 2025)

The results obtained demonstrate the unequivocal superiority of surgical intervention compared to conservative management, particularly in mitigating functional (malocclusions) and aesthetic (facial asymmetry) sequelae (Boljevic et al., 2023). Rigid



osteosynthesis emerges as the therapeutic pillar for the restoration of the facial bone framework, including in specific challenges such as atrophic jaw fracture (Cienfuegos, 2023). In addition, acute microsurgical replanting is the gold standard for the management of amputation lesions, maximizing aesthetic-functional results (Rittri et al., 2024).

In short, the success of the clinical outcome is not restricted to the proficiency of the operative technique, but is intrinsically linked to strict adherence to protocols that optimize surgical time as a function of the patient's global physiological stability. The validation and implementation of unified protocols, along with the conduct of prospective studies focused on long-term functional outcomes, are scientific imperatives to improve the standard of care provided to this cohort of high-complexity patients.

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