

# Maxillofacial and Mandibular Fractures in Sports



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## KEYWORDS

• Mandibular fracture • Maxillary fracture • Zygoma fracture • Orbital fracture

## KEY POINTS

- Sports activities account for between 3% and 29% of facial injuries and 10% and 42% of facial fractures depending on the population under study.
- Mandibular fractures can cause acute airway compromise in athletes owing to severe bleeding as well as posterior displacement of the muscles that support airway patency.
- Zygoma fractures can result in significant ocular problems both in the acute setting and over the longer term.
- The most common fractures of the facial skeleton related to sports activities are nasal, mandibular, and zygoma fractures.
- Decisions regarding return to play must be individualized, considering age, compliance, pattern of injury, treatment, time since injury, and the likelihood of another facial injury.

## INTRODUCTION

Various studies have evaluated the extent to which athletic injuries contribute to the overall incidence of facial fractures. In 1 review, sports accounted for between 3% and 29% of all facial injuries and between 10% and 42% of all facial fractures.<sup>1</sup> In the United States and all developed Western cultures, fractures of the facial skeleton most commonly occur owing to interpersonal violence or motor vehicle crashes. The incidence of facial fractures from sporting activities has clearly decreased over time owing to better preventive measures (helmets, visors, safety glasses, etc). However, this decreasing trend is offset to a certain degree by the emergence of relatively new, more dangerous sports activities, or “pushing the envelope” of traditional sports activities.<sup>2–6</sup> Fractures can occur from contact between athletes, and between athletes and their surroundings (including their equipment). Contact between athletes is the most common cause of facial fractures associated with sporting activities.<sup>7</sup> Football, soccer, hockey, and baseball are involved most frequently in sports-related cases of facial bone fracture, owing to the contact nature of these sports and the high energies sustained during impacts.<sup>1,2,6,7</sup>

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Clin Sports Med 36 (2017) 355–368

<http://dx.doi.org/10.1016/j.csm.2016.11.007>

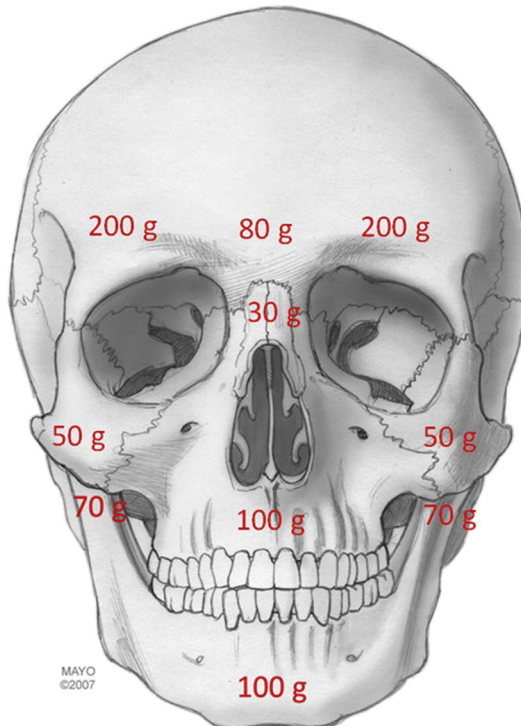
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The force needed to fracture the facial skeleton is actually quite high (Fig. 1). The facial skeleton acts as a “crumple zone” to protect the intracranial contents from injury. This undoubtedly evolved as a protective mechanism over millennia. The facial skeleton contains several bony buttresses of thick bone, with intervening thinner bone between (Fig. 2). Inside of this lattice are the paranasal sinuses, which serve many functions, including phonation and humidification, as well as a means to lighten the head overall. The practical effect of this arrangement is to disperse and direct energy applied to the anterior and inferior facial region away from the cranium.

Patient age has a significant impact on both the types of injuries that occur and the treatments that can be offered. Growth and development of the face occurs in female patients up to approximately 13 to 16 years of age, with male patients completing facial skeletal growth at approximately 16 to 20 years of age, and occasionally later. The face develops as an inferior-anterior projection of the skull base, assuming an ever-greater presence in the overall head, neck, and cranial anatomy over time. In addition, younger patients tend to have much softer, less calcified bony structures. The combination of these 2 factors means that younger patients have a less prominent face that is more elastic than adult patients, whose facial bones are both less pliable and more prominent. This impacts fracture patterns and incidence accordingly.

The diagnosis of maxillofacial fractures is accomplished via history, including mechanism of injury, combined with physical examination and imaging. The head and neck is a highly vascular and well-innervated region of the body. Therefore, most patients with maxillofacial fractures have severe immediate pain and quickly develop significant



**Fig. 1.** Forces needed to fracture the facial bones. (Copyright © Mayo Foundation for Medical Education and Research. All rights reserved.)

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