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Case Series

Split Facial Injury: A Unique Type of Complex Soft Tissue Injury of the Face-Case Series

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Abstract

The face is fundamental to human appearance and function. Facial wounds with or without life- and/or sight-threatening complications, may occur in isolation or may be associated with significant injuries elsewhere (such as ocular or traumatic brain injuries). Depending on the extent of the facial injuries, maxillofacial surgeons, otolaryngologists, ophthalmologists and plastic surgeons have a key role in the management of these patients after they have received acute trauma care. Split facial injury represents a unique and severe type of facial injury that results from forceful collision of the face on a stationary object.

Introduction

The face consists of several organs and aesthetic units of which two or more is usually affected by split facial injuries. The face is can be divided into three different zones; these are the upper, middle, and lower facial zones (Figure 1A). [1] The upper zone extends from the hairline to the glabella. The middle zone extends from the glabella to the subnasale. The lower zone extends from the subnasale to the menton. The frontal view of the face can be split into five equal vertical segments.[1] Two segments are occupied by the eyes, extending from the lateral canthus to the medial canthus. One segment extends from one medial canthus to the other and contains the nose, and the last two segments extend from the lateral canthi to the lateral border of the ipsilateral temple. [1] A very important considerations in any type of facial reconstructive surgery, as regards to severe facial trauma, is the use of the facial aesthetic subunits (Figure 1B). [2] This concept of facial aesthetic subunits was first described by Gonzales-Ulloa to emphasize the need for restoring facial skin units in complete regions as opposed

to "patch" work. [2] He believed that superior surgical results can be obtained in complex facial reconstruction by replacing lost skin with grafts or flaps of similar histology, thickness, and texture [2].

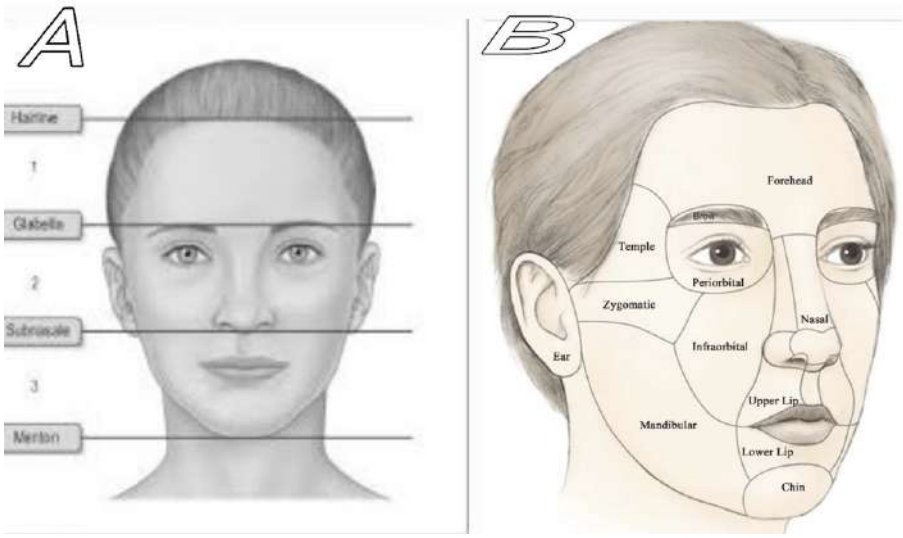

Figure 1A: The 3 equal zones of the human face. **Figure 1B:** Aesthetic units of the human face.

Case Summary I

A 31-year-old motorcycle rider who presented to the accident and emergency unit of our facility with a 2-hour history of loss of consciousness and extensive facial wound. He had run into the back of a stationary truck while riding his motorcycle at a high speed without wearing a protective crash helmet. The patient sustained an obliquely shaped, open book-like wound that involved the right orbit and extended through the midface to the upper lip. There was associated rupture of the right eyeball (Figure 2A).

Figure 2: A: Splitting injury to the face and underlying maxillary fracture. **B:** Immediate postoperative appearance.

He was resuscitated appropriately using the advance trauma life support (ATLS) protocol, and had emergency wound exploration, haemostasis and facial reconstitution (Figure 2B). The patient made clinical recovery and was discharged home postoperative day 10.

Case Summary II

A 36-year-old unrestrained front seat passenger of a commercial bus that ran into the back of a stationary truck presenting with an hour history of loss of consciousness and extensive facial wounds. He sustained an open book-like wound involving the right temporal region and extending superiorly into the forehead with exposure of a fractured part of the frontal bone, and inferiorly through the right nasolabial fold and the right ala nasi. There was traumatic rupture of the right eyeball (Figure 3A). The patient was resuscitated appropriately in line with the advanced trauma life support (ATLS) protocol and had emergency wound exploration, haemostasis and facial reconstitution (Figure 3B and 3C). He was discharged home after making satisfactory clinical improvement.

Figure 3: A: Splitting injury to the face. White arrow is pointing to fracture superolateral wall of the right orbital wall. **B:** Immediate postoperative appearance. **C:** Second day postoperative period.

Case Summary III

A 25-year-old undergraduate female student who was the passenger of a commercial motorcycle that ran into the back of a stationary truck and brought into the Accident and Emergency unit with a two-hour history of loss of consciousness and severe facial wounds. The examination finding revealed an asymmetric open wound extending from the left temporal region of the scalp through the left frontal hairline to the medial canthus of the left eye, nasolabial groove, base of the left alar base to the right side of the upper lip. She was appropriately resuscitated, had brain Computed Tomography (CT) scan which excluded intracranial haemorrhage, and had emergency surgery for facial reconstitution (Figure 3A and B).

Figure 3: A: Immediate postoperative appearance of a reconstituted. **B:** Second day postoperative appearance.

Discussion

Split facial injury is a severe symmetric or asymmetric full thickness soft tissue wound involving the three zones of the face with disruption of the form of one or more aesthetic unit per zone, with or without bony involvement.

Reports of split facial injuries are scarce in the literature. One reported case of split facial injuries occurred in a 16-year-old boy, who slipped while attempting to dive off the seaside Manara Promenade in Beirut, Lebanon. [3] The slip caused him to miss the ocean and instead hit his face on the concrete slab 40 feet below the Manara Promenade. He died two days later from associated spinal fracture and intracranial bleeding. [3] The mechanism of split facial injuries relates to the collision of the face with a stationary, hard objects. In this series, hard metallic object on the back of a truck, and in the cited case in the literature, a hard, solid pavement. The severity of the split injury is dependent on the speed of impact, hardness of the stationary object and use of protective helmet. Generally, facial injuries can be classified into four groups according to the urgency of the treatment necessary. [4] Type I facial injuries are life- or sight-threatening and require immediate or urgent treatment intervention such as securing the patency of the airway, haemostasis, relieving of intraocular pressure via canthotomy and cantholysis. Type II facial injuries are heavily contaminated with some open fracture of the facial bones in a haemodynamically stable patient and requires treatment within a few hours. The Type III facial injuries are facial injuries that require treatment within 24 hours. This includes some facial fractures and clean lacerations. The Type IV facial injuries are the ones whose treatment can wait for more than 24 hours if necessary. The split facial injuries in this series belong to the Type I facial injuries.

Facial injuries themselves are rarely life-threatening. Split facial injuries are however an exception. They are classified as type I facial injuries due to the extensive fascial involvement, volume of blood loss, and involvement of specialized organs, such as the nose and eyes. This severe and life-threatening type was seen in the first and second patients of this series in which there was associated rupture of the right eyeball. The complexity of this type of facial injuries is represented by the potential for loss of relationship between the functional and aesthetic subunits of the craniofacial region and therefore it is important that after the preservation of life, the repair done justifies both form and function. [5] Thus, split facial injuries should therefore, be appropriately managed by a pan-discipline team of Plastic Surgeons, Maxillofacial Surgeons, Otolaryngologists, Anaesthetists and Neurosurgeons who have the thorough knowledge of applied anatomy, an aesthetic sense and meticulous atraumatic tissue handling expertise coupled with emergency surgical skills to repair all the composite structures simultaneously. [6] Closure of the wound should optimally occur as soon as the patient is stabilized. Closure within 12 hours, or ideally within 6 hours, lowers rates of infection, improves cosmetic outcomes, and prevents subsequent swelling from obscuring landmarks [7,8].

Documentation of all findings identified during the primary survey in the emergency room should be done in details on the patient's card. Clinical photographic documentation of the soft tissue injuries is necessary for the consulting specialists planning and decision making as well as follow-up, scientific, or medicolegal reason. Sometimes, photographs may also keep too many consults from inspecting the injured area which would otherwise greatly increase the risk of infection. [9] Plain radiographs of the injured areas still constitute the gold standard for the radiologic examination of split facial injury and thus, are mandatory, except in cases in which the patients have haemodynamic instability as seen in the patients in this series. The x-ray is primarily intended to exclude, or confirm an underlying fracture as well as its complexity. Besides, it can also help to reveal foreign body within the soft tissues. [9] The goals of management of split facial injuries are the preservation of life, and restoration of the form and function of the face and organs. This is particularly crucial because these types of facial injuries are in most cases, life-threatening and as such the preservation of life supersedes any other goal. Its severity can extend to affect neural function, chewing, sight and salivary outflow. Our proposed classification of split facial injury is as follows: type I is when there is isolated soft tissue injury; type II is when there is associated fracture of the underlying bone(s) and/or air sinus(es); type III split facial injuries are those that involve the nose and/or orbit is involved; type IV split facial injury is that in which there is exposure of the brain mater; while type V is one in which there is combination of any of type I – IV. Worse prognosis is associated with excessive bleeding that is associated with haemodynamic instability, involvement of one or more craniofacial orifices or air sinuses, ocular involvement. Other severity factors are associated fracture of the underlying craniofacial bones, exposure of the brain mater and associated traumatic brain injury.

Conclusion

Split facial injury is a severe life-threatening form of facial injury that presents with a symmetric or asymmetric longitudinal division of the face. It results usually from the collision of a fast-accelerating face on a stationary object with devastating consequences. The aim of treatment is to preserve life, and facial reconstitution.

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