Advancement flap for facial firework injury repair. A case report

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Case Report

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Background: Facial injuries are a challenge for reconstructive surgery, they can generate disabling injuries, with irreversible aesthetic defects. Trauma due to fireworks injuries has an explosive power equal or greater than that of a hand grenade. These injuries are associated with significant tissue loss, extensive fractures, eye injuries and presence of foreign bodies. The main objective is to restore oral and ocular function and esthetics. The use of tissue expanders are a good option in patients in whom the quantity and quality of adjacent tissue is inadequate, and the defect is very significant. The following is a clinical case of a fireworks injury to the face with repair and placement of a tissue expander.

Keywords: Facial injuries, facial reconstruction, tissue expansion.

Facial injuries are a challenge for reconstructive surgery, since they can generate disabling injuries, as well as irreversible aesthetic defects that generate a very important social and emotional impact. As well as a high cost due to the lengthy repair and recovery process that these require, as well as an interdisciplinary management to achieve the best possible result.

The average age of presentation ranges from 24 to 51 years, with a higher incidence in men, being injuries caused by aggressions the most frequent up to 61%, followed by traffic accidents and falls. (1) The most frequently fractured bone is the mandible in 75% of the cases, followed by the maxilla and bones of the orbit.(2)

Fireworks have an explosive power equal to or greater than that of a hand grenade. High-energy injuries caused by bullets or fireworks are complex injuries, associated with soft and hard tissue injuries, with significant tissue loss, extensive fractures, eye injuries and presence of foreign bodies such as explosive powder residues.(2)

The victims of these injuries are predominantly male and in a high percentage, up to 50%, the people affected are not involved in the activity.

The main objective of treatment is to restore oral, ocular and facial function and esthetics.

The following is a clinical case of a facial trauma caused by pyrotechnics and the sequence in which it was approached and treated.(3)

Case report

Female patient, 59 years old, housewife, married, with a history of hypertension of long evolution and apparent good control, other history denied.

After being at a religious event, she was incidentally injured after the erroneous explosion of a rocket, suffering a traumatic injury to her face. She is attended and taken by paramedics to the emergency department of our HRVGF unit.

Upon arrival at the emergency department, initial management is established by ATLS, securing the airway. Subsequently assessed by our service, a cruciate region covering almost 100% of the left hemiface was found, presenting multiple injuries and powder burns.

A computerized tomography was performed showing multiple fractures at the level of the upper jaw, zygomatic bone, nasal bone and floor of the orbit. Initially, surgical cleaning and debridement is performed, and together with the maxillofacial surgery service, fixation material is placed with titanium plates in the maxilla and mandible.

Preformed titanium mesh is assessed and placed in the left orbital region and then closure and flaps are placed.

She was kept under surveillance and follow-up with adequate clinical evolution, and after a month she underwent a second surgical procedure.

Tissue expander was placed in the neck and the patient was followed up by outpatient with serial dilatations for approximately 1 month.

In a third surgical procedure, the patient underwent an advancement flap from the neck to the cheek with expanded skin/expander flap with adequate coverage at facial level.

The patient was kept under surveillance and 3 months later infiltration with autologous fat injections was performed, with subsequent rejection of the same. However, the patient does not accept to continue with the aesthetic-reconstructive procedure and the follow-up is lost.

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Figure 1. Initial lesion, emergency department approach with orotracheal intubation. Crude lesions, tissue loss, with residual powder.

Discussion

Facial trauma is one of the most complex surgeries in the aesthetic-reconstructive field. A correct initial approach, a complete and thorough evaluation are determinant for the correct evolution and optimal outcome of the patient.

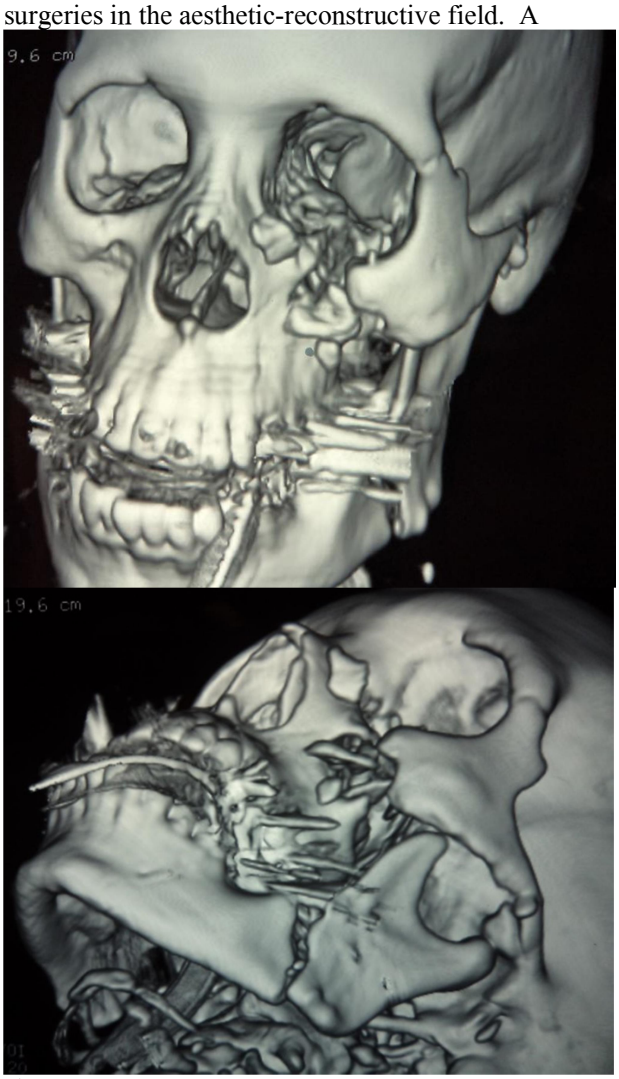

Figure 2. CT with bone reconstruction showing multiple fractures involving the lower and upper jaw, zygomatic bone and floor of the orbit.

Figure 3. First surgical intervention with cleanliness and debridement, healthy tissue approach. Fixation of facial fractures.

Initially, the physical examination alone cannot reliably rule out facial fractures, taking into account various distracters, facial swelling and the patient's own obtundation. As we can initially observe in our patient, the injury may appear overwhelming, with multiple wounds, loss of continuity, edema and bleeding.(1)

Figure 4. Second surgical intervention with cleaning and surgical planning.

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Figure 5. Placement of the tissue expander in the neck, with application of the solution on an outpatient basis.

Diagnostic imaging is essential to understand the anatomical structures involved in order to plan the surgical approach and intraoperative technique. Subsequently, reconstruction begins with an initial thorough debridement of all devitalized tissues and any foreign bodies. Subsequently, the soft tissues should be closed, free of tension and the maxillofacial skeletal structure restored. (2)

As what was performed in our patient, internal fixation with open reduction with titanium plates should be performed first when there are no large bony gaps, allowing pain reduction and establishing a framework for planning the definitive reconstruction. The goal of treatment is always to restore oral, ocular and facial function and esthetics.

If there is soft tissue loss with exposed structures as in this case, a combination of reconstructive procedures is necessary to obtain an optimal result. In this case we opted for the placement of a tissue expander, in this case the precise indications were that the quantity and quality of the adjacent tissue was inadequate, in addition to the fact that the defect was very significant.(3)

Considering that the donor site should provide sufficient tissue to correct the defect, as well as adequate color, texture, elasticity and laxity, the decision was made to place the expander in the cervical region. Taking into account the size of the expander and the position of the incisions and their scars.(4)

Recovery is prolonged, a meticulous process and with risk of tissue loss or rejection and necrosis. However, our patient showed an adequate evolution with adequate esthetic results.

Conclusion

Facial trauma surgery must be a meticulous process with multidisciplinary interventions in order to

Figure 6. Post-surgical follow-up at one week (above) and 3 months (below).

Achieve optimal aesthetic and reconstructive results.

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In the case of a fireworks injury, the recovery process is long and requires multiple surgical interventions.

Tissue expansion has evolved extensively and has become an invaluable reconstructive option in breast reconstruction and burn defects.

The results are getting better and better and more therapeutic options can be provided.

Conflicts of interests

The authors declare no conflicts of interest.

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