



Complex Facial Reconstruction after Severe Facial Trauma Due to a Work Accident. Case Study

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Abstract

The article refers to a case of complex facial reconstruction after a serious facial trauma following a work accident. The 62-year-old patient was urgently admitted to the clinic following a complex facial trauma secondary to a work accident. At the time of admission, a CT scan of the skull, chest, abdomen, blood tests, cardiology, neurosurgery, otorhinolaryngology, bucomaxillofacial and ophthalmology evaluations are carried out.

Emergency surgery was performed after performing paraclinical and laboratory investigations following the therapeutic protocol for polytraumatized patients. 2 months postoperatively, the reconstructive surgical treatment continued with the treatment of post-traumatic sequela of the right upper eyelid. The result obtained at this moment is considered very good from a functional and aesthetic point of view. A new assessment from an aesthetic point of view will be carried out again 9 months postoperatively when the appropriateness of a surgical intervention for aesthetic purposes will be decided.

In complex facial traumas, reconstructive surgical interventions are performed in stages, starting from the emergency and continuing over the following months until a maximal functional and aesthetic result is obtained.

Facial reconstruction is complex and involves, depending on the case, the bone, muscle, nerve and skin structures, with the sole purpose of obtaining an adequate function and an aesthetic appearance as best as possible.

Keywords: Facial Trauma, Facial Reconstruction, Lagophthalmia, Emergency Plastic Reconstructive Surgery

INTRODUCTION

Complex facial trauma presents significant challenges for both patients and the medical teams involved in their treatment. These traumas can result from car accidents, falls, assaults, or other violent incidents, and can affect bony structures, soft tissues, and essential facial functions. Facial reconstruction aims to restore both functionality and aesthetic appearance, having a major impact on patients' quality of life.

The initial evaluation of the patient includes a detailed clinical examination and the use of advanced imaging methods such as computed tomography (CT) and magnetic resonance imaging (MRI). These techniques allow precise visualization of affected structures, helping to identify fractures, soft tissue injuries, and other associated complications.

Treatment planning involves a multidisciplinary approach, including maxillofacial surgeons, plastic surgeons, ophthalmologists and other relevant specialties.

The surgical treatment is staged and begins as an emergency,

then continues until a maximal functional and aesthetic result is obtained. Postoperative care is crucial to the long-term success of facial reconstruction. This includes close monitoring of healing, pain management, infection prevention and physiotherapy to restore motor and sensory functions of the face.

Complex facial trauma can have a significant psychological impact on patients. Psychological counseling and emotional support are essential to help patients cope with changes in appearance and to facilitate social reintegration.

Facial reconstruction in complex trauma cases is a dynamic and multidisciplinary field that requires advanced technical expertise and a holistic approach to the patient. Technological advances and innovations in surgical techniques continue to improve outcomes and quality of life for patients affected by such trauma. With proper planning and a dedicated medical team, it is possible to achieve remarkable results in restoring the functionality and aesthetic appearance of the face.

MATERIALS AND METHODS

A 62-year-old patient is hospitalized urgently for a complex facial trauma following a work accident (crushing accident). At the initial clinical examination, crushing wounds were found in the frontal, upper and lower right eyelid region with soft tissue defects and also in midface region and the right buccal commissure (Fig 1). The wounds are heavily contaminated with telluric particles and other foreign bodies.



Fig 1. Preoperative View

The cranial injury is accompanied by cervical and thoracoabdominal contusion. Upon admission to the hospital, interdisciplinary consultations of general surgery, neurosurgery, maxillofacial surgery, otorhinolaryngology and ophthalmology are requested. Cranial, thoracic, abdominal CT is recommended, blood tests and bacteriological culture from facial wounds are collected. At the same time, appropriate hemohydroelectrolytic resuscitation measures are instituted for posttraumatic and hemorrhagic shock. CT scan does not confirm thoracoabdominal lesions. Cranial CT scan shows right frontal and maxillary hemosinus without surgical indication and extensive facial muscle lesions. The ophthalmological examination does not show any damage to the right eyeball.



Fig 2. Preoperative View

Emergency surgical intervention is decided simultaneously with hemodynamic balancing treatment. Under general anesthesia, excisional debridement of devitalized tissues and lavage with saline solution and antiseptic solutions is performed.

We found intraoperatively avulsion of right frontal muscle, corrugator, orbicularis and procerus. We found also avulsion of upper and lower lids with soft tissue defects, avulsion of the right eyebrow, avulsion of zygomaticus major, minor, risorius, buccinator, levator labii superioris and levator labii superioris et alaeque nasi muscles. We also found the partial avulsion of the zygomatic and buccal branches of the facial nerve and the anterior part of the parotid gland (Fig.3).



Fig 3. After Debridement

We proceeded to the reinsertion of right frontalis, corrugator and procerus muscles. We practiced miorrhaphy for zygomaticus major, minor, risorius, orbicularis oris, orbicularis oculi and elevator palpebrae superioris muscles. The Stenon duct was found intact.



Fig 4. Immediate Postoperative View

Complete healing took 14 days under antibiotic, anti-inflammatory and sedative treatment. Clinical evaluation performed 6 weeks postoperatively highlights skin scars with favorable evolution at the midface and frontal level and the presence of a retractable scar at the level of the upper

right eyelid that causes a moderate degree of lagophthalmia (Fig 5).



Fig 5. Postoperative View (6 Weeks)

The function of the right levator palpebrae superioris muscle is limited to 50% and the function of the orbicularis oculi muscle is almost completely restored. There is slight static and dynamic asymmetry of the right buccal commissure compared to the left one.

The MRI examination performed 8 weeks postoperatively shows decreasing right upper palpebral edema and fibrosis at the level of the right levator palpebrae superioris muscle, which certifies the decrease in its functionality.

We decided to practice "Z" plasty at the level of the retractile scar of the right upper eyelid to correct the lagophthalmos, excision of the scar tissue and resection with shortening and reinsertion of the tendon of the right levator palpebrae superioris muscle.

The evolution was favorable with the restoration of the function of the right levator palpebrae superioris muscle and the correction of lagophthalmia (Fig 6).



Fig 6. Postoperative View (10 Weeks)

Other clinical evaluations will follow at 6 and 9 months after the trauma.

RESULTS AND DISCUSSIONS

The early approach to facial reconstructive procedures after complex facial trauma increases the chance of obtaining

superior functional and aesthetic results.

The surgical reconstruction of all the destroyed anatomical elements was started from the moment of the first surgical intervention.

Correct surgical debridement and precise hemostasis represent the absolutely necessary surgical attitude before starting the reconstruction of the damaged facial anatomical structures. In this case, the individual restoration of each damaged anatomical element allowed obtaining a good functional and aesthetic result at 4 weeks after trauma. There are similar situations in which reconstructive procedures involve the use of skin grafts or locoregional or distant flaps. In such situations, we frequently used cervicofacial and pectoralis major flaps for large facial defects or frontal flaps by pyramid or nasal lobe reconstructions.

In the presented case, the evaluation made 6 weeks after the trauma revealed moderate lagophthalmia in the right eye due to the right upper palpebral retractile scar and slight dysfunction of the levator palpebrae superioris muscle. The "Z" plasty procedure performed at the level of the right upper eyelid and the resection with the reinsertion of the right levator palpebrae superioris muscle tendon successfully resolved the functional deficit at the level of the right eye.

We will continue the monitoring in the following months to continue the surgical treatment if this becomes necessary. We will consider frontal and midface scars susceptible to treatment, but this will be decided 9 months after the trauma.

Postoperative Care Protocol

Wound Care and Infection Prevention

- Regular cleaning and dressing changes.
- Antibiotic therapy: Administer prophylactic antibiotics to prevent infections, especially in cases with open fractures or extensive soft tissue injury.
- Monitoring for signs of infection.

Pain Management

- Analgesics: Use a combination of medications (NSAIDs, acetaminophen, opioids) for pain relief.

Swelling and Bruising Management

- Cold compresses during the first 24-48 hours to reduce swelling.
- Elevation.

Nutritional Support

- Diet modifications.
- Hydration.

Monitoring and Managing Complications

- Regular follow-up appointments.
- Imaging studies: Use X-rays, CT scans, or MRIs as needed to assess the healing process.

Oral and Dental Care

- Mouth rinses: Use antiseptic mouthwashes to maintain oral hygiene.
- Dental evaluations: Regular dental check-ups and interventions if teeth are involved in the trauma.

CONCLUSIONS

Complex facial traumas are severe medical conditions that require special attention and a multidisciplinary approach to ensure optimal functional and aesthetic recovery. Facial reconstruction represents a substantial challenge for the surgical team, given the complexity of the anatomical structures of the face and their importance in defining individual identity. Therefore, this procedure must be performed with precision and care in order to restore not only the functionality, but also the physical appearance of the patient.

Complex facial trauma can result from car accidents, falls, violence, or other injuries that can affect the skin, bony structures, muscles, nerves, and other soft tissues of the face. Facial reconstruction is not only a medical necessity, but also an essential component in the emotional and psychological healing process of patients.

Before starting any surgery, it is essential to carry out a thorough injury assessment, including:

- Detailed physical examination
- Magnetic resonance imaging (MRI) or computed tomography (CT)
- Evaluation of nerve function and facial muscles
- Multidisciplinary consultations with specialists in maxillofacial surgery, otorhinolaryngology, ophthalmology and other relevant fields

Once the initial assessment is complete, a customized surgical plan is developed. This plan must address the following aspects:

- Repair and reconstruction of fractured bones
- Restoring the integrity and function of soft tissues
- Restoring the aesthetic appearance of the face
- Preserving or restoring critical sensory and motor functions

Implementation of a rigorous postoperative monitoring protocol is essential to optimize results and reduce the

risk of complications after complex posttraumatic facial reconstructions. It is important that patients strictly follow medical recommendations and actively participate in the recovery process. Postoperative monitoring after complex posttraumatic facial reconstruction is essential to ensure adequate recovery and minimize complications. This involves several steps and important aspects:

Immediate postoperative assessment:

1. Observation of vital functions: blood pressure, heart rate, oxygen saturation, respiratory rate.
2. Pain control: use of appropriate analgesics to maintain patient comfort.
3. Bleeding and edema monitoring: checking operated areas for signs of excessive bleeding or abnormal swelling.
4. Wound care: changing dressings according to protocol and maintaining rigorous hygiene to prevent infection.
5. Assessment of healing: monitoring the appearance of wounds to detect signs of infection or dehiscence (opening of the wound).
6. Management of complications
7. Functional and aesthetic supervision: monitoring facial functions (speech, mastication and facial expressions) and the healing process to assess the aesthetic results and identify the need for further adjustments or interventions.
8. Therapy and rehabilitation: physical therapy (to maintain the mobility and functionality of the facial muscles) and occupational therapy.
9. Psychological support

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