CASE REPORT: COMPLEX CRANIOFACIAL TRAUMA DUE TO KNIFE INJURIES - SURGICAL MANAGEMENT AND OUTCOMES

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ABSTRACT

This case report of a 63-year-old man who suffered multiple lacerations which made cranial nerve VII (CN VII) branches damaged creating a lack of function of the frontal elevation and middle and lower face asymmetry, fractures of the zygomaticomaxillary complex (ZMC) and mandibular ramus create malocclusion and sunken malar, and nearly amputated earlobe on the left side of the face after a knife attack. The patient was diagnosed with: Complex wound on the left side of the face, fracture of the zygomaticomaxillary complex and left mandible ramus; damage to the left peripheral VII cranial nerve; partial amputated of the left earlobe due to a knife attack at the 5th hour. The patient was treated with a multidisciplinary surgical intervention including open reduction and internal fixation (ORIF) with titan plates, microsurgical nerve repair, and multi-layered soft tissue reconstruction of the ear and facial wounds. After incident three months, he showed partial recovery in frontal elevation, symmetry of the middle and lower face, partial scar fading, and stable occlusion with proper bone healing.

***Keywords**: Multiple facial wounds, complex craniofacial trauma, facial nerve injury, ear reconstruction, microsurgical nerve repair.*

I. INTRODUCTION

The face is constructed from many different layers, from the bone structure to the skin, every layer stacked on each other creates a unique profile for each person. Facial trauma can be variety from a simple skin abrasion in the skin layer to a complex bone fracture and everything in the lesion's path. A sharp-force trauma like a knife could damage the face from the skin to the bone structure, this include the nerve that runs fairly superficially under the skin layer, most vulnerable is the facial nerve (cranial nerve VII) with its superficial path and multiple branches[1–3]. Injury to the bone layers can cause facial flattening, lack of profile, and malocclusion, mastication issues, and facial asymmetry. Contrary to the face, the ear is poorly vascularized, with multiples lacerations that cause a nearly amputated ear could pose a challenge in reconstruction[4–6].

When dealing with a complex cranial trauma case is important to repair its' base structure which is the bone as well as the overlying tissue and its functions which include nerve damage and the skin laceration for aesthetics. In this case, the primary goals are[2,5,7]:

1. Restoring anatomical alignment of fractures to prevent facial asymmetry.
2. Repairing facial nerve injuries to maximize functional recovery.
3. Achieving aesthetic soft tissue reconstruction with minimal scarring.

This case report highlights the importance of early nerve repair, ORIF, and multi-layered closure in achieving the best outcomes.

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II. CASE PRESENTATION

2.1. History and Examination

A 63-year-old male was brought to the 108 Military Central Hospital emergency department after primarily bandages 5 hours after being cut with a knife. The patient was presented in a shocked state and clinical finding symptoms related to craniofacial trauma are:

Multiple deep lacerations on the left face, extending from the temple to the mandibular angle (*Figure 4*).

Figure 4. **Multiple deep lacerations on the left face, weakness in forehead elevation, midface movement**

Complete transection of the left frontal, buccal, and mandibular branches of the facial nerve (CN VII), with clinical weakness in forehead elevation, midface movement, and lower lip control (*Figure 5*).

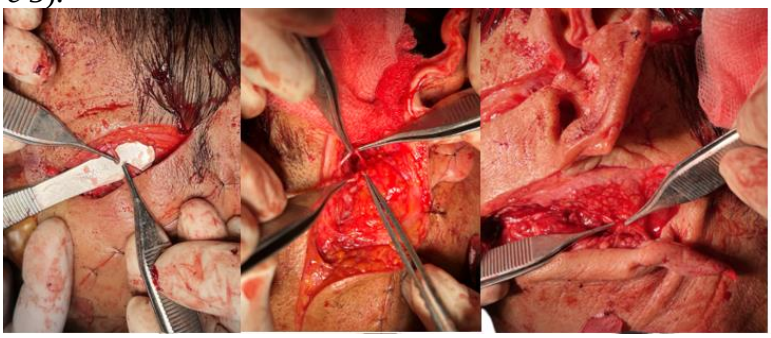

Figure 5. **Complete transection of the left frontal, buccal, and mandibular branches of the facial nerve (CN VII)**

Left ZMC and mandibular ramus fractures showed sunken left malar, and malocclusion and were confirmed by CT imaging (*Figure 6*).

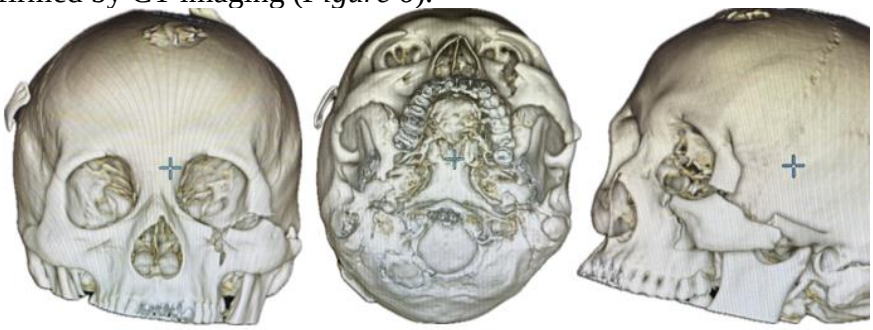

Figure 6. **Left ZMC and mandibular ramus fractures**

A severe left ear laceration, dividing the auricle into three parts, with near-total amputation of the earlobe (*Figure 4*).

No frontal bone fracture, intracranial injury, or airway compromise.

Anatomical Considerations

Facial Nerve (Cranial Nerve VII)[3]

The facial nerve (CN VII) is a mixed nerve that controls the facial muscles to express emotions, eye closure, and lip movement also responsible for taste sensation and some automatic functions like salivation and lacrimation. In the hemifacial area, it branches into several divisions, including:

- Frontal branch – responsible for forehead elevation and eyebrow movement. Injury to this branch leads to reduced eyebrow movement and difficulty in forehead wrinkling.
- Zygomatic branch – helps eye closure and blinking. Damage can result in the inability to close the eye completely, increasing the risk of corneal exposure.
- Buccal branch – controls movement of the lip and cheek. Impairment leads to asymmetry while smiling or difficulty whistling or blowing.
- Mandibular branch – controls the lower lip and chin movement. Damage to this branch shows asymmetry in the lower face region.
- Cervical branch – innervates the platysma muscles which helps tighten the neck area.
- In this case, with symptoms shown on the left side of the face, it is suitable to conclude that the frontal, buccal, and mandibular branches were all affected, needing microsurgical repair to restore facial function.

Zygomaticomaxillary Complex (ZMC)[7]

The Zygomaticomaxillary Complex (ZMC) is a critical structural part of the midface. It consists of three key junctions:

- Zygomaticofrontal suture – provides orbital support, crucial for maintaining eye position and function.
- Zygomaticomaxillary buttress – contributes to midface projection and supports the upper jaw.
- Zygomaticotemporal junction – ensures cheek stability and facial contour.

A ZMC fracture can affect both aesthetics and function which showed malar sunkening, orbital misalignment, and trismus. ORIF was needed to be performed in this case to restore facial projection and occlusion.

External Ear Anatomy[4]

The auricle consists of skin, perichondrium, and cartilage, with a limited blood supply, making it easy to ischemia and necrosis after traumatic injury.

The earlobe, composed of fatty tissue and skin, has a better vascular supply. In this case, where the earlobe is nearly amputated it needs careful preservation to ensure survival.

Understanding these anatomical structures was critical to diagnosing the proper damaged nerve, helping locate the transverse nerves to perform nerve repair, fracture reductions and fixations, and ear reconstruction, ensuring optimal functional and cosmetic outcomes for the patient.

Surgical Management

The patient underwent surgery under general anesthesia, following a systematic approach from: fracture management, facial nerve repair, and ear reconstruction.

Fracture Management

Through the existing lacerations in the temple, malar, and buccal area, we performed open reduction and internal fixation (ORIF) to stabilize the left zygomaticomaxillary complex (ZMC) and mandibular ramus fractures using titanium plates and screws. Being able to approach the fracture sites through existing lacerations helps reduce scars caused by surgery and also brings a direct dissection plane from the skin to the

fracture site. Proper ZMC alignment will restore midface projection, preserving facial contour and orbital support and the fixation of the mandibular ramus fracture ensures correct occlusion.

Facial Nerve Repair

Challenges faced with this case were multiple lacerations transverse the left side of the face could cut through the facial nerves at many levels, we found, in this case, the left frontal branch was cut into two parts, zygomatic, and the mandibular branches were meticulously identified under 3.5× surgical loupes while bluntly dissecting through the wounds' opening. A direct epineural repair technique was used (*Figure 7*):

- Clean nerve ends were carefully realigned.
- 8-0 nylon micro sutures were used for precise coaptation, ensuring accurate realignment of fascicles.
- Minimal tension was kept at the repair site to optimize regeneration.

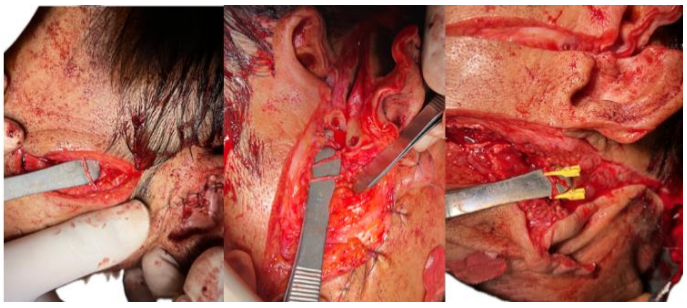

Figure 7. **Left cranial nerve VII repairs: left: frontal branch; middle: frontal and buccal branch; right: mandibular branch**

Ear Reconstruction

Given the complex laceration, with the ear divided into three parts and the earlobe nearly severed, a meticulous layered reconstruction was performed. Cartilage suturing was used to restore structural integrity followed by proper skin closure. The earlobe was reattached with simple single 4.0 nylon sutures apart 1 cm each suture to reduce damage to the microvascular system (*Figure 8*).

Figure 8. **Wounds closure and ear reconstruction**

Postoperative Course and Follow-Up

The patient had wound dressing changed twice a day, antibiotics, pain medications post-operation, and a close monitoring of wound infection and nerve function recovery. The patient was discharged after 5 days with antibiotics and pain medications.

At the three-month follow-up, the frontal branch of the facial nerve showed partial recovery, with mild weakness in forehead elevation, while the buccal and mandibular branches fully regained function which show the ability to whistle and symmetry in the middle and lower face (*Figure 9*).

The ear laceration healed well with proper contour and shape. The facial scars had partially faded (*Figure 9*).

Figure 9. **Partial recovery of the frontal branch, the buccal and mandibular branches fully regained function, ear laceration healed, and facial scars partially faded**

The radiographic evaluation confirmed that the fractures are in acceptable anatomical alignment, preserving normal occlusion and facial symmetry, highlighting the success of the surgical intervention *Figure 10).*

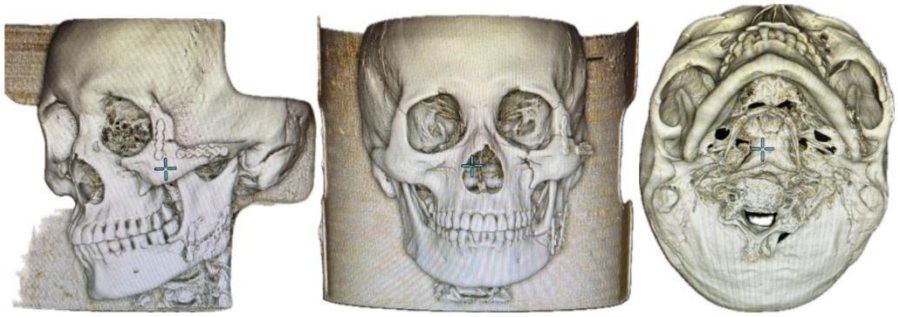

Figure 10. **Reduced bone with titan plates**

III. DISCUSSION

Elderly patients suffer from craniofacial trauma especially involving nerve damage presents multiple challenges related to aging factors[1]. In elderly patients the ability to regenerate is reduced, which affects nerve recovery, bone density is softer will make fractures heal slower[7,8]. Even through the challenges presented in this case, early and meticulous surgical treatment is crucial to optimize for both functional and aesthetic.

Facial Nerve Repair and Recovery Rates

Nerve repair less than 72 hours after injury is essential to prevent irreversible nerve damage shown as Wallerian degeneration[9]. The frontal branch of the facial nerve in this case which was separated into two parts indicated more difficulty in recovering compared to the zygomatic and mandibular branches[1–3].

Fracture Management Considerations

Open reduction and internal fixation (ORIF) with the approach through the exiting lacerations help reduce scarring and better fracture field visibility[10]. Delayed bone

reduction in ZMC and mandibular fractures can result in malar sunkening, trismus, and facial asymmetry. With early ORIF the patient maintained proper occlusion, facial symmetry, and anatomic integrity, which helps the rehabilitation faster[7,11,12].

Ear Reconstruction Considerations

Successful ear reconstruction requires a layered closure technique with cartilage being repaired to keep the ear structure and contour, the nearly separated earlobe needed to preserve the microvascular as much as possible to reduce the risk of necrosis[5,6].

Overall, this case shows the importance of a multidisciplinary approach in craniofacial trauma surgical treatment with early nerve repair, precise fracture management, and soft tissue reconstruction can result in excellent functional and aesthetic outcomes, even in elderly patients.

IV. CONCLUSION

This case shows a multidisciplinary intervention in complex craniofacial trauma by sharp-force objects in elderly patients. Utilizing the existing lacerations to approach the surgical field, early ORIF, microsurgical nerve repair, and soft tissue reconstruction resulted in a functional and aesthetic outcome.

V. CONFLICT OF INTEREST AND FUNDING

The authors declare no conflict of interest related to this case report.

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