



Received: 10-10-2023
Accepted: 20-11-2023

ISSN: 2583-049X

Management of Sever Maxillofacial Trauma as a Result of Car Accident: A Case Series

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Abstract

Craniomaxillofacial trauma reconstruction developed into a highly specialized field of treatment options following advanced diagnostic modalities in the past 15 years. Therefore, it plays a prominent role in patient care in several disciplines and necessitates close collaboration of specialists such as Craniomaxillofacial/facial surgeons, trauma, car accident neurosurgeons, ophthalmologists, trauma surgeons, and others. 1st case with a hole in her face, 2nd case with a crush mandibular trauma and 3rd with maxilloorbital defects, whom all with car

accident we describe, early management of penetrating maxillofacial trauma in an injured patient as a result of an industrial accident begins with standard and accepted protocols of ATLS. Timely intervention, which includes early wound exploration and debridement, anatomic fixation and repair of fractured bone fragments, early definitive management of soft tissue, and appropriate antimicrobial coverage including tetanus prophylaxis, is critical in achieving favorable outcomes with penetrating maxillofacial injury as a result of a car accident.

Keywords: Craniomaxillofacial, Surgery, ATLS, Trauma, Injury

Background

Penetrating facial injury can be life-threatening and often necessitates emergency management. Table saws are popular industrial tools that are frequently used at home or at work to cut wood. Many of the injuries related to stationary saws involve hands and fingers. Although facial injury as a result of table saws is rare, on occasion, a wooden object can kickback out of the saw causing a projectile and can result in significant damage to the maxillofacial structures of the operator^[1]. Management of maxillofacial injuries as it relates to battlefield trauma from high-velocity/high-energy projectiles has been examined extensively in the literature; however, less attention has been given to injuries secondary to lower velocity projectiles in the civilian industrial setting^[2, 3, 4]. Initial management of a patient with a penetrating facial injury can lead to challenging problems and requires a comprehensive and multidisciplinary approach^[5]. It is also critical to leave the impacted object in place, while controlling ongoing hemorrhage by application of direct pressure and packing of the wound^[6, 7]. Many times, extraneous objects tamponade vascular structures and should be removed in the controlled setting of an operating room^[8]. This case series show Maxillofacial injury need cooperation between parts of surgery.

Case presentation

Case 1

A 19 years old man with car accident and a hole in his Maxillary part and face.



Fig 1: A hole in maxillary part and face

We reconstruct and repair this hole and structures that damaged.

Case 2:

A 42 years old man with car accident that Maxillofacial and Mandibular part destroyed.



Fig 2: Before repair maxillofacial and mandibular part

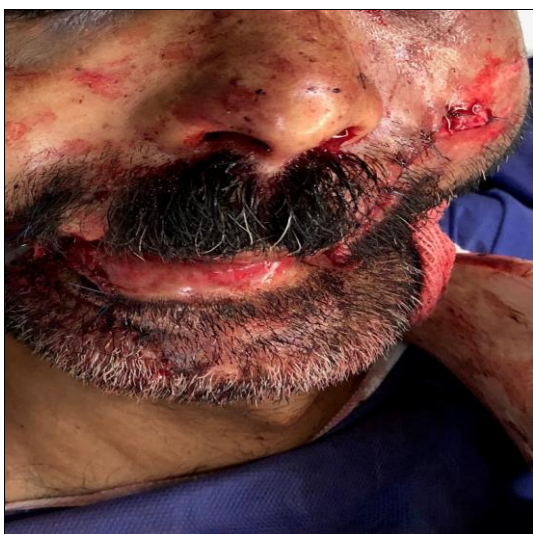


Fig 3: After maxillofacial and mandibular part repair

We reconstruct and repair the laceration.

Case3:

A 51 years old female with car accident and maxilloorbital defect.



Fig 4: Maxilloorbital defect

We reconstruct and repair the laceration.



Fig 5: After maxilloorbital defect repair

All these cases discharged with normal function of craniomaxial and facial parts.

Conclusion

Craniomaxillofacial trauma reconstruction developed into a highly specialized field of treatment options following advanced diagnostic modalities in the past 15 years. Therefore, it plays a prominent role in patient care in several disciplines and necessitates close collaboration of specialists such as Craniomaxillofacial/facial surgeons, neurosurgeons, ophthalmologists, trauma surgeons, and others [9, 10, 11, 12, 13, 14, 15, 16]. And the amount of CMF trauma in developing countries continues to rise; the incidence and etiology of CMF injuries varies strongly from one country to another due to social, cultural, and environmental factors [9]. We reported the management and further oral rehabilitation of a case suffering severe midface trauma following a motor vehicle accident where the patient was hit by a lorry. After reconstruction of midface fractures in the first stage, oral rehabilitation was successfully accomplished in three stages for the patient with satisfactory outcomes [17]. An appropriate splint guided the correct remodeling of the condyles and

allowed restoration of the normal shape and height of the fractured process. Although nonsurgical management should be considered as primary preferred method in children with mandibular fractures, each case should be evaluated individually [18]. Penetrating maxillofacial injury as a result of industrial accidents can be life-threatening and disfiguring. Initial management of any facial trauma patient begins with primary survey of ATLS, followed by secondary and tertiary surveys after patient is initially stabilized. Each of these surveys are conducted as a part of a concise algorithm designed to diagnose and manage injuries sequentially in order to mitigate morbidity and mortality [19, 20].

When faced with maxillofacial impalement as a result of an industrial accident, the retained object must only be removed after thorough clinical and radiological assessment. The patient must be first adequately resuscitated and medically stabilized. The airway must be secured and the bleeding should be diligently controlled. Only then, should the removal of the retained object be performed following the original direction of the injury. The affected wound should be cleared of debris such as bone particles, teeth, non-vital mucosa and any other foreign body fragments. The site of injury must be copiously irrigated with sterile normal saline and necrotic tissue removed from the wound.

Anatomic reduction and reconstruction of fractured bone segments with internal rigid/semi-rigid fixation should take place. If required, immediate bone grafting should be performed. Finally, the overlying soft tissue is repaired by layered closure of deep and superficial layers [21, 22, 23]. In conclusion, early management of penetrating maxillofacial trauma in an injured patient as a result of an industrial accident begins with standard and accepted protocols of ATLS. Timely intervention, which includes early wound exploration and debridement, anatomic fixation and repair of fractured bone fragments, early definitive management of soft tissue, and appropriate antimicrobial coverage including tetanus prophylaxis, is critical in achieving favorable outcomes with penetrating maxillofacial injury as a result of an industrial accident.

Declarations

Ethical Approval and Consent to Participate

The content of this manuscript are in accordance with the declaration of Helsinki for Ethics. No committee approval was required. Oral and written consent to participate was granted by the families.

Consent for Publication

“Written informed consent was obtained from the patient's legal guardian for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.”

Availability of supporting data

It is available.

Competing interests

The author declares that they have no competing financial interests and nothing to disclose.

Funding

There is no funding.

Authors' Contributions

Ahmad Reza Shahraki is the surgeon of patient and writes this paper. Reza Abaee collects data's and Elham Shahraki reviews paper.

The author declares that they have no competing financial interests and nothing to disclose.

Acknowledgements

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References

1. Chowdhury SR. Survey of Injuries Involving Stationary Saws: Table and Bench Saws, 2007-2008. US Consumer Product Safety Commission.
2. Peled M, Leiser Y, Emodi O. Treatment protocol for high velocity/high energy gunshot injuries to the face. *Craniofacial Trauma Reconstr.* 2012; 5(1):31-40.
3. Steven JR, Brennan J. Management of battlefield injuries to the skull base. *J Neurol Surg B Skull Base.* 2016; 77(5):430-438.
4. Bahouth H, Ghantous Y, Rachmiel A, Amodi O, Abu-Elnaaj Maxillofacial injuries related to the Syrian war in the civilian population. *J Oral Maxillofac Surg.* 2017; 75(5):995-1003.
5. Bagheri S, Dimassi M, Shahriari A, Khan HA, Jo C, Steed MB. Facial trauma among level-1 trauma centers of the United States. *J Oral Maxillofac Surg.* 2008; 66(5):963-967.
6. Lanigan DT, West RA. Major vascular complications of orthognathic surgery: Hemorrhage associated with Le Fort I osteotomies. *J Oral Maxillofac Surg.* 1990; 48(6):561-573.
7. Bell RB, Osborn T, Dierks EJ, Potter BE, Long WB. Management of penetrating neck injuries: A new paradigm for civilian trauma. *J Oral Maxillofac Surg.* 2007; 65(4):691-705.
8. Ali Payami, Andre Montazem H. Management of Penetrating Maxillofacial Trauma as a Result of Industrial Accident: Report of an Unusual Case. *Craniofacial Trauma & Reconstruction Open.* 2020; 5:1-6. The Author (s) 2020 Article reuse guidelines: Sagepub.com/journals- permissions\Doi: 10.1177/2472751220949413.
9. Anna Kraft, Elisabeth Abermann, Robert Stigler, Clemens Zsifkovits, Florian Pedross, Frank Kloss, Robert Gassner. *Craniofacial Trauma: Synopsis of 14,654 Cases with 35,129 Injuries in 15 Years.* Doi: <http://dx.doi.org/10.1055/s-0031-1293520>. ISSN 1943-3875.
10. Pappachan B, Alexander M. Correlating facial fractures and cranial injuries. *J Oral Maxillofac Surg.* 2006; 64:1023-1029.
11. Kloss FR, Tuli T, Hächl O, *et al.* The impact of ageing on craniomaxillofacial trauma-a comparative investigation. *Int J Oral Maxillofac Surg.* 2007; 36:1158-1163.
12. Wheeler J, Phillips J. Pediatric facial fractures and

- potential longterm growth disturbances. *J Craniomaxillofac Trauma*. 2011; 4:43-52.
13. Pereira FL, Gealh WC, Barbosa CEB, Filho LI. Different surgical approaches for multiple fractured atrophic mandibles. *J Craniomaxillofac Trauma* 2011; 4:19-24.
 14. Bossert RP, Giroto JA. Blindness following facial fracture: Treatment modalities and outcomes. *J Craniomaxillofac Trauma*. 2009; 2:117-124.
 15. Haug RH, Serafin BL. Mandibular angle fractures: A clinical and biomechanical comparison-the works of Ellis and Haug. *J Craniomaxillofac Trauma*. 2008; 1:31-38.
 16. Kellman RM, Losquadro WD. Comprehensive air way management of patients with maxillofacial trauma. *J Craniomaxillofac Trauma*. 2008; 1:39-48.
 17. Alireza Pournabi, Hamidreza Moslemi, Shervin Shafiei, Ramtin Dastgir, Kamyar Abbasi, Mostafa Alam. Conferred with a new life: A case report of management of a severe midface trauma and subsequent oral rehabilitation. 2021; 9(8). Doi: 10.1002/ccr3.4620
 18. Yeliz Guven, Sevgi Zorlu, Abdulkadir Burak Cankaya, Oya Aktoren, Koray Gencay. A Complex Facial Trauma Case with Multiple Mandibular Fractures and Dentoalveolar Injuries. *Hindawi Publishing Corporation Case Reports in Dentistry*, 2015, Article ID 301013, 6p. Doi: <http://dx.doi.org/10.1155/2015/301013>
 19. Ray JM, Cestero RF. Initial management of the trauma patient. *Atlas Oral Maxillofac Surg Clin N Am*. 2013; 21(1):1-7.
 20. Lanigan DT, West RA. Major vascular complications of orthognathic surgery: Hemorrhage associated with Le Fort I osteotomies. *J Oral Maxillofac Surg*. 1990; 48(6): 561-573.
 21. Motamedi MHK. Primary treatment of penetrating injuries to the face. *J Oral Maxillofac Surg*. 2007; 65(6):1215-1218.
 22. Laza CO, Acxinte L. Penetrating facial injuries from angle grinder use-cases report, experience. *Glob J Otolaryngol*. 2018; 16(3):p555937.
 23. Ochs M, Chung W, Powers D. Trauma surgery. *J Oral Maxillofac Surg*. 2017; 75(8):e151-e194.