



KOSOVA JOURNAL OF SURGERY

Volume 10, Issue 1, Part I
Focused Issue: Trauma and
Surgical Critical Care
January 2026
ISSN: 3027-5008 (Online)
ISSN: 3027-5016 (Print)

MICHEL ABOUTANOS, OMAR ROKAYAK, SAYURI P. JINADASA, ALAN P. ROSSI, JOSHUA A. COLE, KYLE J. ALEXANDER, BETH BROERING, JAMES F. WHELAN, EDGAR RODAS: Establishment of Trauma and Critical Care System in Post-Conflict and Low Resource Countries

ELLIOT HAUT, LISA KODADEK: Improving Trauma Care via Evidence-Based Medicine: Guidance, Guidelines, and Global Impact

BELINDA DE SIMONE, FAUSTO CATENA: Management of Trauma in Elderly and Frail Patients: A Master Summary of the 2023 WSES Guidelines

BLEDI BRAHIMAJ, MAREN RUKA, AURORA MUÇA, EMAL LESHA: Current Management of Traumatic Brain Injury: Time is Brain

KYLE J. ALEXANDER, EDGAR RODAS: Early Tracheostomy in Trauma and Surgically Ill Patients: Have We Made Any Progress in Identifying the Right Patients?



Dento-Alveolar Trauma – A multidisciplinary Approach

Lumnije Kqiku¹, O. Fakheran², Kurt Alois Ebeleseder¹, Wolfgang Zemmann³

¹Department of Dental Medicine and Oral Health, Division of Restorative Dentistry, Periodontology and Prosthodontics, Medical University of Graz, Austria

²Division of Oral Surgery and Orthodontics, Department of Dental Medicine and Oral Health, Medical University of Graz, Graz, Austria

³Department of Oral and Maxillofacial Surgery, Medical University Graz, Austria

Corresponding Author:

LUMNIJE KQIKU DDS, MS, PHD

Department of Dental Medicine and Oral Health, Division of Restorative Dentistry,
Periodontology and Prosthodontics
Medical University of Graz, Austria; Billrothgasse 4; A-8010 Graz
Tel.: ++43-316-385-12213; Fax: ++43-316-385-13375
Email: lumnije.kqiku@medunigraz.at

Abstract

Maxillofacial and dentoalveolar trauma can result from various facial or bodily injuries such as traffic accidents, falls, interpersonal violence and sports-related incidents. Prompt and effective management of these injuries in the emergency room is critical. Without timely intervention, such injuries may lead to airway obstruction, severe bleeding and functional impairment.

A multidisciplinary approach is essential in the emergency setting, with immediate interventions performed prior to the arrival of specialists. Early coordination among emergency physicians, maxillofacial and dental trauma specialists as well as anesthesiologists ensures optimal outcomes and minimizes the risk of complications.

The aim of this article is to highlight the importance of a timely and multidisciplinary management of oral and maxillofacial injuries in the emergency department.

Keywords: emergency care, maxillofacial trauma, dentoalveolar trauma, multidisciplinary approach, airway management

Introduction

Maxillofacial trauma is a significant global health issue because the face is one of the least protected areas of the body. Such injuries can affect skeletal, dental, and soft tissue structures, with approximately one billion people affected worldwide ¹. The main causes of oral and maxillofacial injuries include falls, traffic accidents, sports injuries and interpersonal violence with males showing higher rates than females. The most affected age group is adolescents between 7–14 years ^{2,3,4}.

Besides jaw fractures, these injuries often exhibit fractured, loosened or missing teeth, as well as bone fragments, dentures, blood, debris or shrapnel. All of these

substances may obstruct the airway in the oropharynx or larynx, posing a serious risk ⁵.

Therefore, such materials must be promptly located and removed employing clinical assessment and imaging to prevent aspiration or swallowing ⁶.

Facial injuries involving fractures of the maxillofacial skeleton are frequently a challenge in emergency medicine. They can result in significant functional, aesthetic and psychosocial impairments, placing a substantial burden on those affected and on society as a whole ^{7,8}.

Qualified maxillofacial and oral surgeons as well as dental traumatologists are responsible for definitively diagnosing and initially treating these injuries. Therefore, it is essential that the emergency room personnel is trained in life- and function-saving measures, as well as trained in recognising the signs and symptoms, ranging from minor dentoalveolar injuries to extensive facial and jaw injuries ⁹.

It is therefore crucial for the emergency room personnel to know how to manage these patients initially, and for emergency staff to be able to identify all dentoalveolar injuries and provide immediate care.

Principles of Management in Maxillofacial Trauma Including Complicated Dentoalveolar Injuries

Airway Management

The initial management of patients with oral, dental, and maxillofacial injuries is guided by the Advanced Trauma Life Support (ATLS) protocol ABCDE which ensures early identification and immediate treatment of life-threatening conditions ^{10,11,12}. Trauma to oral and dental structures may significantly compromise the airway. Fractured or avulsed teeth can obstruct the upper airway, while blood, soft tissue edema, and debris may accumulate in the oropharynx. As a result, both mask ventilation and endotracheal intubation may be technically challenging in these patients. Prompt airway clearance, either manually or with suction, is therefore essential.

All missing teeth or dental fragments should be identified and accounted for (avulsed teeth as well as tooth and bone fragments, should be placed in a tooth-saving box) since aspirated or ingested material may further compromise the airway or lead to pulmonary complications ^{13,14}. Radiographic evaluation, including chest radiography or computed tomography when indicated, provides imaging of missing fragments and support safe airway management ¹⁵.

Once airway, breathing, and circulation have been secured and the patient is hemodynamically stable,

prevention of neurological and ophthalmic complications take absolute precedence over definitive management of facial injuries ^{16,17,18,19}.

Dento-alveolar and Maxillofacial Injuries

Maxillofacial and dento-alveolar management are carried out after patient stabilization and identification of all injuries. Ideally, a specialist in maxillofacial or dental trauma performs a detailed clinical and radiological assessment.

If no specialist is available, the attending medical officer should examine the oral and facial region and perform basic procedures to preserve vision, function, and appearance. This may include preliminary reduction of bone fragments, replantation of avulsed teeth, splinting (preliminary splinting does not work) and finally suturing (suturing lips reduces access for dental treatment, “from inside to outside”) of soft tissue injuries.

Avulsed, displaced, or luxated teeth require immediate attention. The socket and tooth should be gently rinsed with saline, the tooth replanted without touching the root, and stabilized with a splint. These procedures are best performed by an experienced oral and maxillofacial surgeon. After the bone surgeon has finished, the tooth surgeon takes over. Ideally, oral surgeon is already assisting during bone surgeon treatment.

Prompt and effective multidisciplinary management in the emergency department is crucial for outcomes in maxillofacial trauma, with collaboration among anesthesiologists, radiologists, maxillofacial surgeons, dental traumatologists, otolaryngologists, ophthalmologists, plastic surgeons, pediatricians and psychologists ensuring comprehensive care.

Long-Term Outcomes

Timely and coordinated management of dentoalveolar and maxillofacial injuries is crucial for preserving airway integrity, dentition, and facial function while minimizing long-term functional and aesthetic deficits. Delayed or inadequate treatment may result in complications such as malocclusion, tooth loss, chronic pain, infection, or facial deformity, which are often difficult to correct at later stages ^{20,21,22}. Early diagnosis, appropriate imaging, and multidisciplinary treatment have been shown to significantly improve prognosis and reduce long-term morbidity ^{23,24,25,26,27,28}. Prompt intervention is therefore a key determinant of favorable functional and cosmetic outcomes.

Clinical Scenarios in Polytrauma Patients with Complicated Dentoalveolar Trauma

Clinical Case Medical History and Clinical Features

A 24-year-old male patient presented to the emergency department of the Medical University of Graz in March 2025 following a work-related accident (a spring-loaded tailgate hit the patient in the face, causing multiple facial injuries). The patient sustained facial and head trauma. On admission, he was alert, oriented and hemodynamically stable.

Clinical examination revealed lacerations of the upper and lower lips, epistaxis, multiple fractured teeth and a concomitant injury to the left ankle. No signs of airway compromise or visual disturbances were noted.

Imaging Findings Computed tomography (CT) of the brain showed no evidence of intracranial hemorrhage or infarction. CT image of the facial skeleton revealed a nasal bone fracture, a fracture of the anterior nasal spine, and intrusion of left maxillary lateral incisor tooth with the root apex displaced approximately 4 mm into the inferior nasal cavity and extending into the left maxillary sinus (Figure 1). The orbits were intact, with mild left-sided perinasal soft tissue swelling.

CT of the cervical spine and abdominal ultrasonography showed no pathological findings.

Management and Outcome: After detailed explanation

of the treatment plan, surgical management was performed under local infiltration anesthesia (Ultracain D-S, Sanofi-Aventis, Frankfurt, Germany). Wound care included thorough cleansing, adaptation, and primary closure of the lip lacerations using absorbable sutures (Aesculap AG, Tuttlingen, Germany).

Postoperatively, the patient received oral antibiotic therapy with cephalosporin (Ospexin 1000 mg, Sandoz GmbH, Austria) for four days and was instructed to use a 0.1% chlorhexidine mouth rinse (Chlorhexamed, GlaxoSmithKline Pharma GmbH, Vienna, Austria) for two weeks. On the following day, the intruded tooth was surgically repositioned and stabilized using a Titanium Trauma Splint -TTS (Medartis, Switzerland) by a dental trauma specialist (Figure 2). The exposed dentin was covered with a bacteria-tight seal using dentin bonding and flowable composite employing the acid-etch technique.

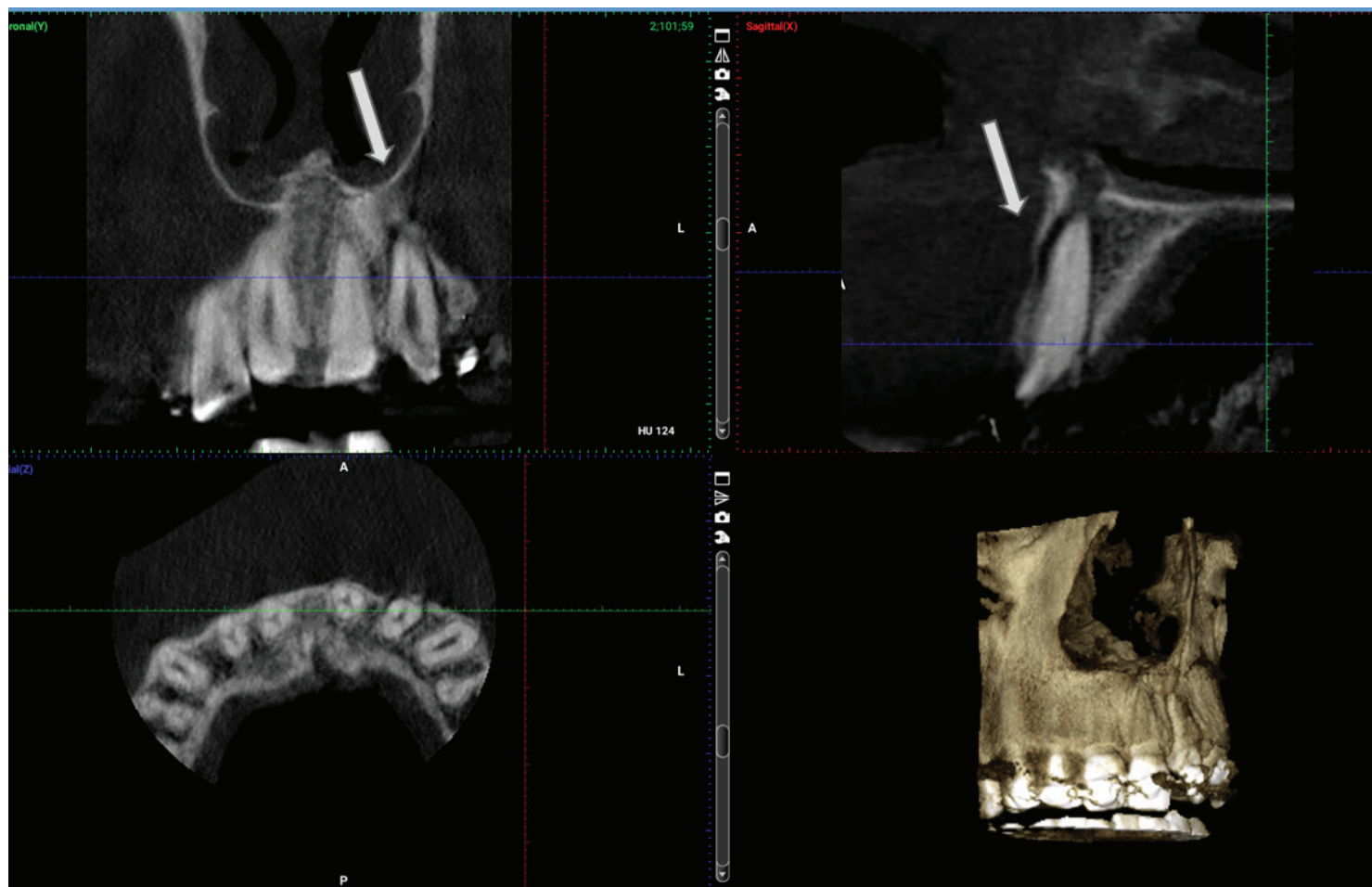
The patient remained clinically stable throughout hospitalization, with no evidence of airway compromise, infection, or visual impairment. At the one-week follow-up, the patient was asymptomatic, lip swelling had been resolved, and the sutures were removed.

Follow-up consisted of clinical and radiographic evaluation, with separate assessments of the endodontium, periodontium, and alveolar bone.

Figure 1: (A and B) Preoperative CT images showing nasal bone fracture of the anterior nasal spine and intrusion of the maxillary left central incisor tooth with the root apex displaced approximately 4 mm into the inferior nasal cavity



Figure 2: Postoperative clinical and CT image. Tooth # 22 was surgically repositioned and mobilized with TTS.



At the 6-week and 3-month follow-up visits, the patient remained symptom-free. Cone-beam computed tomography (CBCT) showed good adaptation of the fracture lines and no pathological changes.

At the 3-month follow-up, the intruded tooth demonstrated periapical radiolucency. Endodontic treatment was therefore initiated.

Conclusion

Polytrauma patients with dentoalveolar and maxillofacial injuries require systematic assessment and early intervention to prevent airway compromise, uncontrolled hemorrhage, vision-threatening complications, and long-term functional deficits. CT remains the imaging modality of choice for suspected facial injuries, and it is essential that the entire maxillofacial region is included in the scan. After stabilization of vital functions, early identification and management of orbital injuries, stabilization of jaw fractures, and immediate replantation and splinting of avulsed or luxated teeth are critical to minimize pain,

preserve function, and prevent disfigurement. Prompt and effective interdisciplinary management in the emergency department is crucial for achieving optimal outcomes, ensuring comprehensive care, and reducing the risk of complications. The clinical relevance of dentoalveolar and maxillofacial trauma in emergency settings lies in its high potential for life- and function-threatening consequences. Early recognition, airway protection, coordinated care among specialists, and timely diagnostic and therapeutic interventions are essential for improving patient outcomes and preventing long-term morbidity.

References:

1. Petti S, Glendor U, Andersson L. World traumatic dental injury prevalence and incidence, a meta-analysis-One billion living people have had traumatic dental injuries. *Dent Traumatol*. 2018; 34(2):71-86.
2. Noffze MJ, Tubbs RS. Rene le fort 1869-1951. *Clin Anat*. 2011; 24(3):278-81.
3. Kaul RP, Sagar S, Singhal M, Kumar A, Jaipuria J, Misra M.



Burden of maxillofacial trauma at level 1 trauma center. *Craniomaxillofac Trauma Reconstr.* 2014; 7(2):126-30.

4. Andreasen JO. Etiology and pathogenesis of traumatic dental injuries. A clinical study of 1298 cases. *Scand J Dent Res.* 2014; 78:329–342.

5. Andreasen JO, Andreasen FM, Andersson L. Textbook and Color Atlas of Traumatic Injuries to the Teeth, 5th edn. Oxford: Wiley Blackwell. 2018.

6. Hutchison I, Lawlor M, Skinner D. ABC of major trauma. Major maxillofacial injuries. *BMJ.* 1990; 301(6752):595-9.

7. Jose A, Nagori SA, Agarwal B, Bhutia O, Roychoudhury A. Management of maxillofacial trauma in emergency: An update of challenges and controversies. *J Emerg Trauma Shock.* 2016;9(2):73-80.

8. R. Peralta and W. E. Hurford, “Airway trauma,” *International Anesthesiology Clinics.* 2000; 38 (3): 111–127.

9. Li J. Emergency department management of dental trauma: recommendations for improved outcomes in pediatric patients. *Pediatr Emerg Med Pract.* 2024;26(S 12):1-42.

10. American College of Surgeons: Advanced Trauma Life Support Manual. 10th ed. Chicago: American College of Surgeons. 2018; p. 3-21.

11. Perry M, Morris C. Advanced trauma life support (ATLS) and facial trauma: can one size fit all? Part 2: ATLS, maxillofacial injuries and airway management dilemmas. *Int J Oral Maxillofac Surg.* 2008;37(4):309-20.

12. Perry M, O’Hare J, Porter G. Advanced Trauma Life Support (ATLS) and facial trauma: can one size fit all? Part 3: Hypovolaemia and facial injuries in the multiply injured patient. *Int J Oral Maxillofac Surg.* 2008;37(5):405- 14.

13. Patel S, Brown J, Semper M, Abella F, Mannocci F. European Society of Endodontology position statement: Use of cone beam computed tomography in Endodontics: European Society of Endodontology (ESE) developed by. *Int Endod J.* 2019;52(12):1675-1678.

14. Krausz AA, El-Naaj IA, Barak M. Maxillofacial trauma patient: coping with the difficult airway. *World J Emerg Surg.* 2009; 27(4) :21.

15. Saini S, Singhal S, Prakash S. Airway management in maxillofacial trauma. *J Anaesthesiol Clin Pharmacol.* 2021;37(3):319-327.

16. Ehrenfeld M, Prein J. Symphyseal and Para symphyseal fractures. In: Ehrenfeld M, Manson PN, Prein J, eds. *Principles of Internal Fixation of the Craniomaxillofacial Skeleton - Trauma and Orthognathic Surgery*, 1st ed. New York: Thieme. 2012;137-146.

17. Kurogi AS, Oliveira e Cruz GA, Closs Ono MC, Maluf

J’uniór I, Gus IO, Freitas RS, et al. Bilateral para symphysis fracture obstructs the airway? *ACM Arq Catarin Med.* 2012; 41:24-26.

18. Barak M, Bahouth H, Leiser Y, Abu El-Naaj I. Airway Management of the Patient with Maxillofacial Trauma: Review of the Literature and Suggested Clinical Approach. *Biomed Res Int.* 2015;2015:724032.

19. Cogbill TH, Cothren CC, Ahearn MK, Cullinane DC, Kaups KL, Scalea TM, Maggio L, Brasel KJ, Harrison PB, Patel NY, Moore EE, Jurkovich GJ, Ross SE. Management of maxillofacial injuries with severe oronasal hemorrhage: a multicenter perspective. *J Trauma.* 2008;5(5):994-9.

20. H. Mohammadi, M. M. Roochi, H. Heidar, et al. A Meta-Analysis to Evaluate the Prevalence of Maxillofacial Trauma Caused by Various Etiologies Among Children and Adolescents. *Dental Traumatology* 2023; 39 (5): 403–417.

21. M. Ruslin, J. Wolff, P. Boffano, H. S. Brand, and T. Forouzanfar, Dental Trauma in Association with Maxillofacial Fractures: An Ep-idemiological Study. *Dental Traumatology.* 2015; 31 (4): 318–323.34.

22. S. Cabalag, J. Wasiak, N. E. Andrew, J. Tang, J. C. Kirby, and D.J. Morgan, “Epidemiology and Management of Maxillofacial Fractures in an Australian Trauma Centre,” *Journal of Plastic, Reconstructive & Aesthetic Surgery: JPRAS* 2014; 67 (2) :183–189.

23. M. Helm, A. Gries, and T. Mutzbauer. Surgical approach in difficult airway management. *Best Practice & Research: Clinical Anaesthesiology.* 2005; 19 (4): pp. 623–640.

24. P. A. Kearney, M. M. Griffen, J. B. Ochoa, B. R. Boulanger, B. J. Tseui, and R. M. Mentzer Jr. A single-center 8-year experience with percutaneous dilational tracheostomy. *Annals of Surgery.* 2000;231(5): pp. 701–709,

25. K. W. Altman, J. D. Waltonen, and R. C. Kern, Urgent surgical airway intervention: a 3 year county hospital experience. *Laryngoscope.* 2005;115 (12) :2101–2104.

26. S. Khanna and A. B. Dagum. A critical review of the literature and an evidence-based approach for life-threatening hemorrhage in maxillofacial surgery. *Annals of Plastic Surgery.* 2012 ; 69(4) :474–478.

27. de Gregorio C, Tewari N. Management of Complications in Dental Traumatology. *Dent Traumatol.* 2025 ;41(1):64-71.

28. Cantao AB, Levin L. What’s Next in Dental Trauma? Innovations, Preventive Strategies, and Future Treatment Paths. *Dent Traumatol.* 2025;41(3):241-245.