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Case report

Emergency Management of Complex Maxillofacial Lacerations and Segmented Dentoalveolar Fractures Following High-Velocity Trauma: A Case Report

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Abstract:

Purpose: This report describes the emergency and definitive management of a 44-year-old female who sustained extensive facial soft tissue injuries and a segmented dentoalveolar fracture following a high-velocity motor vehicle accident.

Methods: Clinical evaluation revealed extensive lacerations across the nose, left cheek, and vestibular regions, alongside a segmented fracture of teeth 21 and 22. Initial hemorrhage control was achieved via situational suturing at a primary center, followed by referral for definitive care. Treatment included meticulous layered extraoral suturing and interdental wiring for dentoalveolar stabilization.

Results: Post-operative monitoring through day 22 demonstrated excellent scar maturation, resolution of systemic stress responses, and maintenance of stable dental occlusion without secondary infection.

Conclusion: Optimal functional and aesthetic outcomes in polytrauma cases depend on rapid assessment, tailored pharmacological management, meticulous soft tissue handling, and prompt semi-rigid stabilization of dentoalveolar segments.

INTRODUCTION

Maxillofacial trauma resulting from high-velocity impact frequently presents a complex combination of hard and soft tissue injuries. Approximately 48% of facial injuries involve the oral cavity, underscoring the necessity for a comprehensive approach to concurrent dentoalveolar trauma (6). In emergency settings, the primary Advanced Trauma Life Support (ATLS) survey is paramount to secure the airway and manage massive hemorrhage, which can arise from highly vascularized facial soft tissues (1, 6). Furthermore, modern emergency management of maxillofacial trauma requires a coordinated, multi-tiered referral system to ensure patients receive timely, definitive care following initial stabilization (7). Definitive surgical intervention aims to restore the functional integrity of the dentoalveolar complex, the aesthetic symmetry of the face, and ultimately the patient's psychosocial well-being (4, 10).

CASE PRESENTATION

A 44-year-old female patient presented to the Emergency Department of Hasan

Sadikin General Hospital with extensive facial bleeding. One day prior, she was a passenger in a motor vehicle collision where her head struck the dashboard at moderate speed.

- **Initial Assessment:** The patient was referred from a primary care hospital in Tasikmalaya where "situational suturing" had been performed to control immediate bleeding.
- **Clinical Findings:** Extraoral examination revealed extensive, complicated lacerated wounds at the nose and left cheek region. Intraorally, a lacerated wound was present at the vestibular area (teeth 11–23), complicated by a segmented dentoalveolar fracture involving teeth 21 and 22.
- **Systemic Status:** Vital signs were stable. Laboratory results indicated a systemic stress response with initial leukocytosis (WBC 12.55) and mild anemia (Hb 11.3) (8). The patient had a history of gastritis but no history of alcohol intoxication or regular medication use.

Figure 1. Pre-operative clinical photographs following high-velocity trauma. **(A)** Extraoral frontal view showing extensive, complicated lacerations on the nose and left cheek region. **(B,C)** Extraoral profile view. **(D)** Intraoral view revealing a lacerated vestibular area and a displaced, segmented dentoalveolar fracture involving teeth 21 and 22.

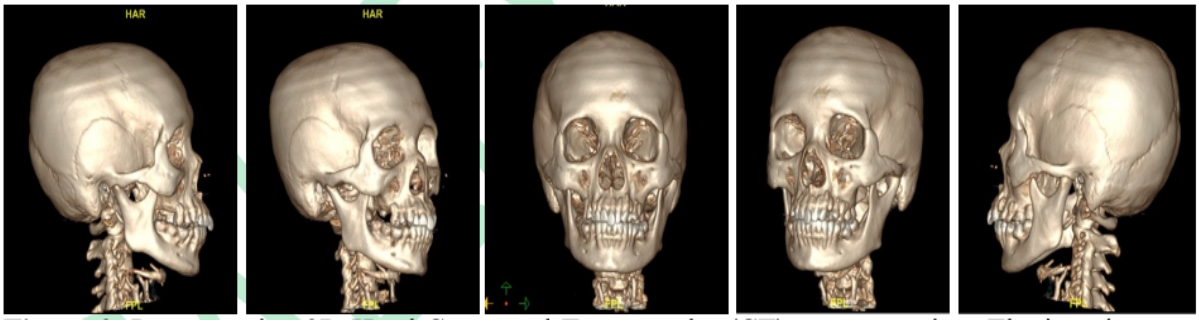

Figure 2. Pre-operative 3D Head Computed Tomography (CT) reconstruction. The imaging demonstrates the maxillofacial skeletal architecture and confirms the isolated segmented dentoalveolar fracture at the anterior maxilla prior to surgical reduction.

MANAGEMENT Intervention prioritized the simultaneous repair of soft tissue and the stabilization of hard tissue within a multidisciplinary framework:

1. **Soft Tissue Repair:** Definitive, meticulous suturing (ICD-9 86.5) of the extraoral lacerations was performed to correctly approximate the nasal and cheek tissue layers.
2. **Dentoalveolar Fixation:** Closed reduction and stabilization of the segmented fracture (teeth 21, 22) were achieved using interdental wiring at the upper jaw (ICD-9 93.55).
3. **Pharmacologic Support:** Intravenous electrolytes (ICD-9 99.18) and broad-spectrum antibiotics (ICD-9 99.21) were administered (9). Pain management was carefully tailored due to the patient's history of gastritis, utilizing non-ulcerogenic analgesics to mitigate gastrointestinal risks (11).

Figure 3. Intraoperative and postoperative photographs detailing the surgical repair and stabilization of the complex maxillofacial trauma. **(A)** Close-up view of the initial intraoperative wound, **(B)** Intraoral photograph taken during the surgical procedure, demonstrating the application of semi-rigid fixation via complex interdental wiring (Lynch et al., 2025). **(C, D)** Postoperative extraoral view, showing the meticulously layered closure of the extensive nasal and cheek lacerations. Fine, black interrupted sutures re-approximate the deep muscle and skin layers, minimizing future scar tension.

RESULTS

The patient exhibited progressive healing during her hospitalization. By Post-Operative Day (POD) VII, facial edema and ecchymosis had significantly resolved, and extraoral sutures were removed. Follow-up at POD XXII revealed excellent scar maturation on the nose and cheek. Intraorally, the interdental wiring remained intact, the gingival lacerations were fully mucosalized, and the fractured alveolar segment was stable with proper occlusal alignment.

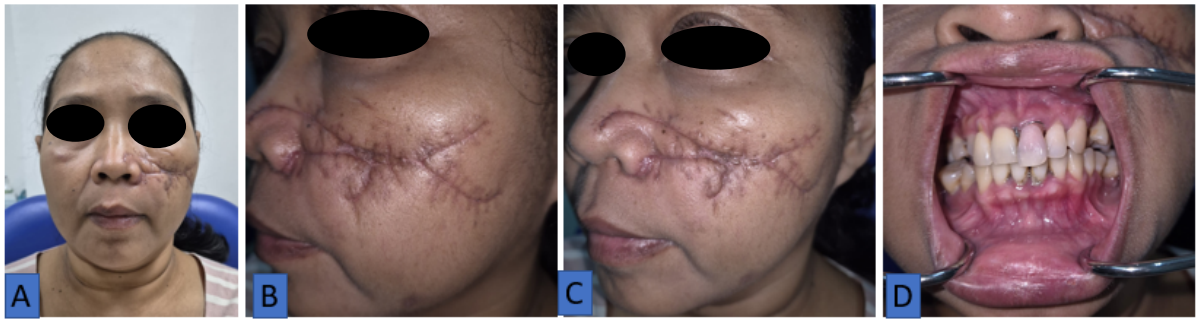

Figure 4. Post-operative clinical photographs at day 22. **(A,B,C)** Extraoral view demonstrating excellent soft tissue healing, resolution of facial edema, and favorable scar maturation following layered closure. **(D)** Intraoral view showing the maintenance of the interdental wiring, stable occlusion, and fully mucosalized gingival tissues without signs of secondary infection.

DISCUSSION

The management of this case highlights several critical principles in modern oral and maxillofacial traumatology, ranging from emergency referral protocols to long-term psychosocial considerations.

System of Care and Systemic Response: The prompt transfer of this patient from a regional center in Tasikmalaya to a tertiary academic center aligns with modern maxillofacial emergency protocols (7). High-velocity maxillofacial trauma frequently triggers systemic responses; admission laboratory tests often reveal leukocytosis and anemia secondary to acute stress and blood loss, a physiological cascade evident in this patient's initial presentation (8).

Soft Tissue Reconstruction and Psychosocial Outcomes: Facial lacerations in highly aesthetic zones

demand meticulous attention. While situational suturing in rural settings is an effective temporizing measure (2), definitive repair requires copious irrigation and accurate layered closure (3). Re-approximating the underlying musculature prior to epidermal closure reduces tension on skin margins, optimizing aesthetic recovery (2). This is vital not only for cosmesis but also for mental health, as facial disfigurement is deeply linked to depression, anxiety, and a lowered health-related quality of life (10). Meticulous repair is a direct intervention to preserve the patient's post-traumatic psychosocial integrity (10).

Dentoalveolar Stabilization: Dentoalveolar fractures occur concomitantly in up to 47.5% of maxillofacial trauma patients (6). While multitooth segmental alveolar fractures may necessitate rigid fixation (6), interdental wiring provided appropriate semi-rigid stabilization in this case. Semi-rigid fixation is highly advantageous for isolated segments as it allows for physiologic micro-mobility, promoting optimal periodontal ligament healing and preserving the vascular supply to the bone (5).

Pharmacological Considerations: The patient's comorbid gastritis necessitated modified post-operative pharmacological planning. Standard non-steroidal anti-inflammatory drugs (NSAIDs) carry gastrointestinal risks; therefore, pain management protocols must be carefully selected, potentially utilizing alternatives like intravenous acetaminophen or specific COX-2 inhibitors to achieve effective analgesia without exacerbating underlying gastric conditions (9, 11).

CONCLUSIONS The successful management of complex maxillofacial trauma relies on early airway and hemorrhage management followed by a coordinated surgical approach (1). Immediate, layered soft tissue closure prevents aesthetic deformities and protects psychological well-being (2, 10). Concurrently, prompt semi-rigid stabilization of dentoalveolar fractures preserves tooth vitality and occlusal function (5, 6), ensuring holistic patient recovery.

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