

Maxilla fracture: Medical therapy and surgical therapy by case report

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Abstract

Maxillofacial injuries, particularly maxilla fractures, can have significant implications for an individual's overall health and well-being, especially when they occur as a result of a work-related accident. In this study, we will explore the medical and surgical therapies available for maxilla fractures resulting from work-related accidents. The medical therapy options may include pain management, antibiotics to prevent infection, and possibly the use of nasal decongestants to ease breathing. On the other hand, surgical therapy may involve open reduction and internal fixation of the fractured bones, which aims to align the bone fragments and stabilize them with the use of specialized hardware. Furthermore, we will analyze the outcomes of these therapies, considering factors such as recovery time, functional and aesthetic results, and potential complications. This research aims to provide a comprehensive understanding of the available treatment options for maxilla fractures, ultimately contributing to the improvement of patient care and outcomes in the context of work-related injuries.

Keywords: Maxilla Fracture; Symptoms of Maxilla Fracture; Pain Management; Medical Treatment; Post-Treatment

1. Introduction

The maxilla, being a central part of the facial structure, plays a crucial role in supporting the surrounding facial bones and teeth. Fractures to this area can lead to not only physical discomfort but also emotional distress due to changes in facial appearance (Facial Reconstruction Austin, Texas, Facial Fractures Austin, TX, 2022). Common causes of maxillary fractures in work accidents include direct impact to the face from falling objects or machinery, as well as falls from heights. maxillary fracture may include pain and tenderness in the affected area, difficulty breathing through the nose, swelling, and even numbness in the upper lip or palate. It's essential to seek immediate medical attention if a maxillary fracture is suspected, as delay in treatment can result in complications such as breathing problems, infection, or improper healing leading to long-term issues with facial function. Treatment for a maxillary fracture typically involves realigning the fractured bones through manual manipulation or surgery, depending on the severity of the injury. Pain management and close monitoring for any signs of infection are also crucial aspects of the recovery process. (Frontal Sinus Fractures: Practice Essentials, Epidemiology, Etiology, 2022) Physical therapy may be recommended to restore normal function to the jaw and surrounding areas post-injury.

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Recovery from a maxillary fracture can be a challenging and lengthy process, often requiring ongoing medical care and support. Seeking guidance from a specialized healthcare provider and following their recommendations for treatment

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and rehabilitation is crucial for achieving the best possible outcome. (Relapse in orthognathic surgery - Instituto Maxilofacial, 2020) Additionally, individuals may also benefit from seeking legal advice to explore their options for compensation and support following a work-related maxillary fracture. Fractures to the maxilla, or upper jaw, can be a serious and painful consequence of a work accident. This type of injury can impact various functions such as breathing, speaking, and chewing, and often requires prompt medical attention. (Jenzer, 2023) In this article, we will explore the causes, symptoms, and treatment options for a maxillary fracture resulting from a work-related incident. Understanding the nature of the injury and the available treatment methods can help individuals make informed decisions about their recovery and overall well-being. (Orthognathic Surgery in Palo, Alto, CA, 2022).

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A maxillary fracture resulting from a work accident can have significant implications for an individual's physical, emotional, and financial well-being. By being informed about the causes, symptoms, and treatment options for this type of injury, individuals can take proactive steps towards their recovery and overall health. (Serene Workplace Safety - Why Workplace Safety Is Considered So Significant? Know Here!, 2023). Facial trauma is a common occurrence in the modern world, with motor vehicle accidents, sports-related injuries, and interpersonal violence being the leading causes.

Maxillofacial fractures, which involve the bones of the face and jaw, are a significant subset of these injuries. (Maxillofacial Injuries: Maxillofacial Trauma, 2022). The biomechanical factors that influence the tolerance of the maxillofacial region to trauma include the thickness of the bones, the direction and force of the impact, and the pneumatization of the paranasal sinuses. Fractures of the maxilla in adults can lead to significant functional and aesthetic concerns. The management of these fractures requires a thorough understanding of the anatomy, biomechanics, and treatment options available. In this article, we will explore the common causes of maxillary fractures, the clinical presentation, diagnostic methods, and the current principles of management. (Initial Evaluation and Management of Maxillofacial Injuries: Overview, Clinical Presentation and Approach for Patients with Facial Trauma, Relevant Anatomy and Contraindications, 2021) Additionally, we will discuss the potential complications and the importance of a multidisciplinary approach in the successful treatment of maxillary fractures.

Fractures of the maxilla in adults can be caused by a variety of factors, including motor vehicle accidents, falls, sports-related injuries, and physical assaults. The presentation of a maxillary fracture often includes pain, swelling, bruising, and difficulty with jaw movement. Diagnosis typically involves a thorough physical examination, imaging studies such as X-rays and CT scans, and potentially, a dental occlusion evaluation.

Treatment options for maxillary fractures depend on the severity and location of the fracture, as well as the patient's overall health. In some cases, conservative management with pain control and a soft diet may be sufficient, while in more complex fractures, surgical intervention including open reduction and internal fixation may be necessary. (Mandibular Angle Fractures Treatment & Management: Medical Therapy, Surgical Therapy, Preoperative Details, 2022). While maxillary fractures resulting from work accidents can indeed be severe and require prompt medical attention, it is important to consider the potential factors that may have contributed to the incident. Workplace safety regulations and protocols are designed to prevent such accidents, and in some cases, the responsibility for the injury may not solely lie with the workplace.

It's essential to recognize that workplace accidents are often the result of a combination of factors, including employee behavior and adherence to safety procedures. In some instances, individuals may inadvertently contribute to their own injuries by not following safety guidelines or using equipment improperly. Therefore, it's crucial to thoroughly investigate the circumstances surrounding the accident to determine all contributing factors. Additionally, seeking legal

advice immediately after a work-related maxillary fracture may not always be the best course of action. (Kanno et al., 2016) While it's understandable to seek compensation and support following such a traumatic event, it's important to consider the potential impact on workplace relationships and one's professional reputation. Opting for legal action without a comprehensive understanding of the incident and its contributing factors could lead to strained relationships and long-term consequences in the workplace.

Furthermore, it's important to acknowledge that while seeking compensation is important, it should not be the sole focus of the recovery process. Prioritizing physical and emotional healing, as well as comprehensive medical care, should take precedence over legal actions. By working closely with healthcare providers and focusing on rehabilitation, individuals can improve their chances of a successful recovery and overall well-being. (Grim & Grim, 2019).

While the seriousness of a maxillary fracture resulting from a work accident cannot be understated, it's essential to approach the situation with a balanced perspective. Considering all contributing factors and prioritizing comprehensive recovery over immediate legal action can lead to a more beneficial long-term outcome for individuals dealing with such injuries. Complications of untreated or improperly managed maxillary fractures can include malocclusion, chronic pain, and aesthetic deformities. Therefore, a comprehensive approach involving coordination between oral and maxillofacial surgeons, otolaryngologists, ophthalmologists, and other specialists is crucial for ensuring optimal outcomes for patients with maxillary fracture. (Maxillofacial Surgery West Up, Maxillofacial Surgeon in Haryana, Punjab, Delhi, 2016) (Donaldson et al., 2021).

2. Materials and Methods

The study was conducted in Meuraxa Disstric of Aceh Province in Indonesia. We took one case in Maxilla Fracture that selected for this study. This type of research is based on case report on Department of Surgery Meuraxa Regional Public Hospital on April 2024. This reasearch also based on littelature review about Maxiofacial Fracture by discussing cases that we took as research material on healing therapy methods, pain management, dan surgery method dan post-therapy method.

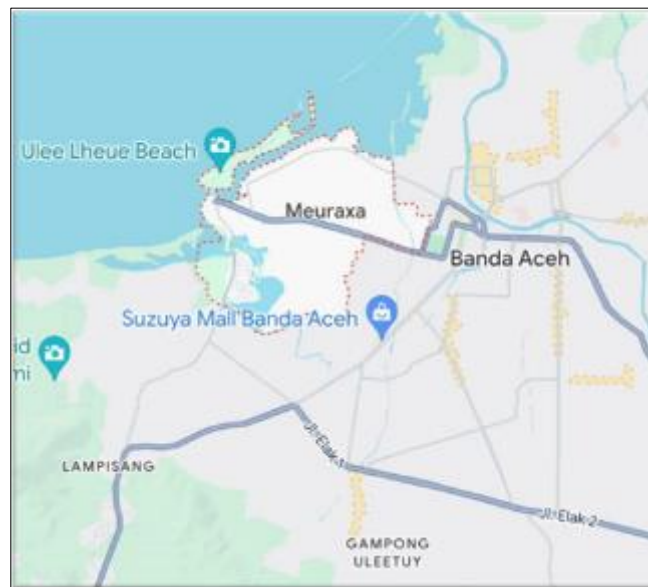


Figure 1 Map of Meuraxa Distric of Aceh in Indonesia

3. Results and Discussions

In order to illustrate the successful management of maxillary fractures and the impact of advanced treatment options, it is valuable to examine case studies that highlight the outcomes achieved through innovative approaches. This case studies can provide insights into the application of patient-specific surgical planning, and emerging therapies, shedding light on their efficacy and the resulting patient satisfaction. In this case we attach the report of Maxilla Fracture 3D CT Scan in Figure 2 until figure 4.

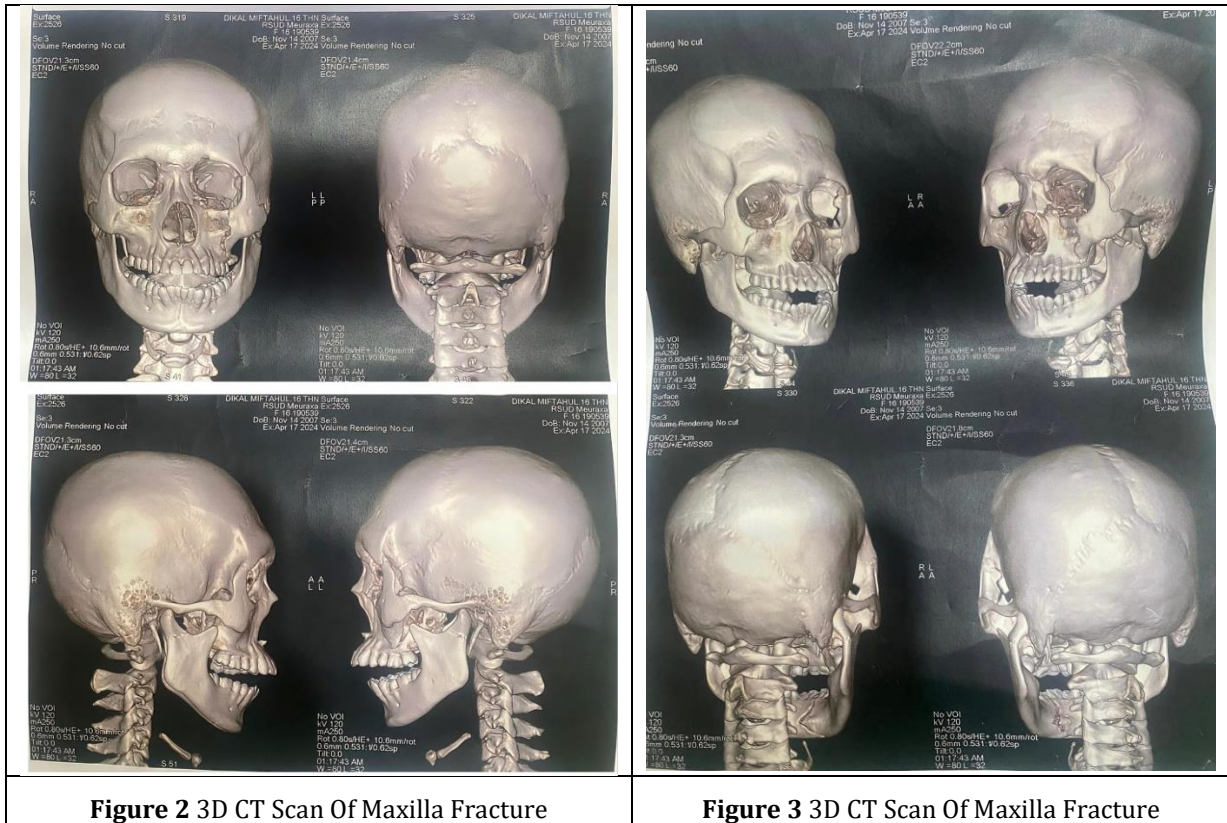


Figure 2 3D CT Scan Of Maxilla Fracture

Figure 3 3D CT Scan Of Maxilla Fracture



Figure 4 Clinical Photo of Patient

The patient is a boy 16 years old came to the ER of RSUD Meuraxa Banda Aceh complaining of feeling weak and also experiencing left-sided headache. The patient is one of the construction workers at a project; previously, the patient was hit by a piece of iron while working, resulting in an injury to the mouth area with active bleeding around it and difficulty in moving the mouth. There is no history of vomiting or loss of consciousness (-), but there is nosebleed (+), no blackening around eye area (-) no ear bleeding (-).

3.1. General condition: appears moderately ill

- Conscious: compos mentis
 - Blood pressure: 110/80
 - Respiratory rate: 24
 - SpO2: 98% room air Temperature: 36.8°C
- General status:
- Head: no jaundice and anemia in eyes, deformity found in the left maxillary region.

- Neck: lymph nodes not enlarged (-)
- Chest: symmetric, no retractions or deformities Heart sounds I/II regular murmur (-) gallop (-)
- Lungs: vesicular breath sounds (+/+) rhonchi (-/-) wheezing (-/-)
- Abdomen: non-distended (+), soft (+), bowel sounds (+)
- Extremities: warm extremities, capillary refill time <2 seconds.

3.2. Medical Therapy

- Three-dimensional CT scan revealed a fracture on the left maxilla on May 17th, 2024. Refracture and reconstruction were performed on the maxilla bone involving mini plate placement secured with screws followed by wound closure.
- After surgery, the patient received treatment at surgical ward including ampicillin-sulbactam (3x1.5 grams), ketorolac (3x30 mg), liquid diet and daily wound care using gentamicin ointment covered with sterile gauze.
- During hospitalization at surgical ward, patient's condition improved, supported with eventual transition to diet comprising solid foods. Patient was discharged on day five receiving cefixime (2x200mg), mefenamic acid (3x500mg) and methylprednisolone (2x tablets). A follow-up appointment with plastic surgery clinic was scheduled for next week.

After a thorough physical examination and review of the patient's medical history, imaging studies CT scans are commonly used to confirm the diagnosis of a maxillary fracture. (Maxillary and Le Fort Fractures: Practice Essentials, Epidemiology, Etiology, 2022) These imaging modalities not only help in identifying the location and extent of the fracture but also aid in assessing any associated injuries to the surrounding structures such as the sinuses and adjacent bones.

3.3. Management Approaches

The management of a maxillary fracture depends on various factors including the severity of the fracture and the patient's overall health. Conservative approaches, such as pain management and a soft diet, are often suitable for less severe fractures, whereas complex fractures may require surgical intervention. (Maxillary and Le Fort Fractures: Practice Essentials, Epidemiology, Etiology, 2022) Open reduction and internal fixation is a common surgical approach that involves repositioning the fractured bones and securing them in place with specialized hardware.

In some cases, where the fracture has led to malocclusion or disruption of dental occlusion, coordination with a dental specialist for occlusal evaluation and potential dental realignment is necessary for a comprehensive treatment approach.

3.4. Complications and Follow-Up

Untreated or improperly managed maxillary fractures can lead to complications such as malocclusion, chronic pain, and aesthetic deformities. It is essential for patients to undergo regular follow-up visits to monitor their healing progress and address any potential complications that may arise during the recovery period. (McLaughlin, 2018).

3.5. Specific Treatment Modalities

When it comes to the treatment of maxillary fractures, the specific approach varies depending on the location and severity of the fracture. Fractures in the upper portion of the maxilla, for example, may require different management strategies compared to fractures in the lower or mid-portion. (Initial Evaluation and Management of Maxillofacial Injuries: Overview, Clinical Presentation and Approach for Patients with Facial Trauma, Relevant Anatomy and Contraindications, 2021).

For fractures in the upper portion, particularly those involving the orbital floor or the zygomaticomaxillary complex, a thorough assessment of ocular function and potential for visual disturbances is crucial. (Esmaelinejad, 2018) Surgical intervention may be necessary to restore the orbital anatomy and ensure optimal visual outcomes.

On the other hand, fractures in the mid-portion of the maxilla, such as those involving the maxillary sinus, may require careful evaluation of potential sinonasal complications. In some cases, endoscopic sinus surgery may be indicated to address any resultant sinus pathologies and prevent long-term issues with sinus function and airflow.

3.6. Multidisciplinary Team Approach

The treatment of maxillary fractures greatly benefits from a multidisciplinary team approach. Collaboration between oral and maxillofacial surgeons, otolaryngologists, ophthalmologists, and dental specialists is instrumental in providing comprehensive care for patients with complex maxillary fractures. This interdisciplinary collaboration ensures that all aspects of the injury, from functional to aesthetic, are addressed effectively. (Bittencourt, 2019). Furthermore, the involvement of physical therapists and speech therapists in this case can also play a crucial role in the rehabilitation phase, especially for patients with concomitant soft tissue injuries or those requiring extensive maxillofacial reconstruction. (Head & Neck Microvascular & Reconstructive Surgery, 2023).

3.7. Advanced Treatment Options

In recent years, advancements in medical technology and surgical techniques have expanded the treatment options for maxillary fractures. One notable advancement is the use of 3D printing for patient-specific implant fabrication. This approach allows for the creation of custom-fitted implants tailored to the unique anatomy of the patient, resulting in improved outcomes and reduced risk of complications. (Tian et al., 2021)

Additionally, the incorporation of virtual surgical planning utilizing computer-aided design software has revolutionized the preoperative assessment and surgical approach for complex maxillary fractures. By simulating the surgical procedure on a digital model of the patient's maxillofacial anatomy, surgeons can better anticipate challenges and optimize the treatment plan, leading to enhanced precision and overall success. (General Principles of Mandible Fracture and Occlusion: Practice Essentials, History of the Procedure, Problem, 2022).

3.8. Post-Treatment Rehabilitation

Rehabilitation plays a crucial role in the recovery and functional restoration of patients with maxillary fractures. Physical therapists and speech therapists are essential members of the rehabilitation team, facilitating the recovery of jaw mobility, muscle strength, and speech articulation (Home Rehab cure Best Rehabilitation Center in Lahore, 2022). Moreover, early initiation of rehabilitation contributes to minimizing long-term functional deficits and optimizing overall patient satisfaction with the treatment outcome.

3.9. Surgical Considerations

The surgical management of maxilla fractures commonly involves the use of open reduction internal fixation techniques to precisely reposition the fractured segments and stabilize them with surgical hardware. This meticulous approach is essential for ensuring proper alignment of the maxilla fragments and restoring the patient's bite function.

3.10. Dental Occlusion and Functional Rehabilitation

Restoring the patient's dental occlusion and masticatory function is a fundamental goal in the management of complex maxilla fractures. Close collaboration between oral and maxillofacial surgeons and prosthodontists is often necessary to address any dental malocclusion resulting from the fracture and to facilitate comprehensive functional rehabilitation. However, in this case does not required collaboration with dental occlusion.

4. Conclusion

In conclusion, the management of maxillary fractures necessitates a comprehensive approach that integrates advanced treatments, multidisciplinary collaboration, and patient-centered rehabilitation. The utilization of 3D CT Scan printing for patient-specific surgical planning has revolutionized the precision and outcomes of surgical interventions for facial fractures. Ongoing research into tissue engineering and regenerative medicine offers promising potential for further enhancing the healing process and long-term outcomes.

Moreover, the involvement of physical therapists, speech therapists, and patient education initiatives contributes significantly to the functional restoration and holistic well-being of individuals recovering from these complex fractures. By continuing to explore innovative therapies and sharing successful case studies, the field of maxillofacial trauma management can further advance and improve the quality of care for patients with maxillary fracture.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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