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Case Report: Panfacial Fracture

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ABSTRACT

This is case of abrasive multiple facial fractures of a 70 year old male who had met with a road traffic accident in November 2025 He got admitted to the MGM Hospital for medical management and was seen in the SICU (Surgical Intensive Care Unit). His medical diagnosis was blunt trauma to face with panfacial fracture . He had gone through a plastic surgery and referred for Neuro and Chest physiotherapy in the SICU.

KEYWORDS: Panfacial fracture , Road Traffic Accident , Open Reduction Internal Fixation (ORIF) , Tracheostomy , Maxiofacial trauma , SICU Management, Postoperative Physiotherapy .

INTRODUCTION

Pan-facial fractures involve the simultaneous disruption of the upper, middle, and lower facial skeleton, usually resulting from high-velocity trauma. These injuries compromise structural integrity across the frontal bone, midface, and mandible, necessitating urgent intervention for airway and ocular protection. Clinical management focuses on restoring the facial buttresses to correct "dish-face" deformities and facial widening. Surgical reconstruction often follows a "bottom-up" approach, prioritizing the restoration of dental occlusion to provide a stable foundation. Ultimately, multidisciplinary care is essential to address the complex functional deficits in mastication, speech, and neurological health.[1]Panfacial fractures are relatively rare but complex injuries, typically accounting for 4%–10% of all facial fractures. Regional data from Korea reflects this trend, with a reported incidence of 6.59%.[2]

This panfacial fracture presenting a reconstructive challenge, as the conventional concept of maxillomandibular fixation (MMF) may not be feasible due to the absence of a stable skeletal reference in either the mandible or the maxilla. In such cases, a bottom-up approach to facial reconstruction is commonly employed. This strategy involves anatomical reduction and fixation of the mandible first, thereby re-establishing mandibular continuity and occlusal relationships. Once stabilized, the mandible serves as a reliable reference framework for the subsequent reconstruction of the midface and upper facial skeleton. .[3]

Pan-facial fractures arise from high-energy mechanisms like motor vehicle accidents or gunshot wounds, often resulting in severe bone shattering and significant soft-tissue loss. Due to the massive force involved, these injuries frequently present alongside life-threatening conditions such as traumatic brain injuries or carotid artery damage. Special vigilance is required for elderly patients, as they face a higher risk of postoperative complications and require more delicate surgical handling.[4] Consequently, immediate management necessitates a comprehensive trauma assessment and a multidisciplinary approach to stabilize the patient. This integrated care ensures that both the complex skeletal disruption and any systemic comorbidities are addressed simultaneously for the best functional outcome.[5]

Following surgery, the patient was shifted to the Surgical Intensive Care Unit (SICU) for close monitoring. The patient was conscious and oriented with a GCS [Glasgow Coma Scale] score of 10. Patient was advised Nil By Mouth (NBM) Diet while the tracheostomy tube was in situ . After decannulation, the patient was advised a soft diet for a few days

PRESENT MEDICAL MANAGEMENT

The following medications were administered postoperatively:

- Injection EMSET
- Injection Tramadol – analgesic
- Neumonol
- Injection Dexamethasone (Dexa) – anti-inflammatory
- Duolin nebulization – bronchodilator therapy
- Injection Amikacin – antibiotic
- Injection Supacef (Cefoperazone–Sulbactam) – broad-spectrum antibiotic

Airway Management

- Early tracheostomy tube suctioning was performed for effective removal of secretions
- Regular suctioning was done to maintain airway patency and prevent respiratory complications.

Management of panfacial fractures is complex and demands an individualized, well-planned treatment approach. A thorough understanding of the principles governing the management of each individual facial fracture is essential before undertaking reconstruction in patients with panfacial injuries. Historically, such fractures were managed conservatively; however, this approach was associated with significant postoperative complications, including severe malocclusion, increased facial width, and reduced facial projection.[6] Secondary deformities resulting from inadequate primary management were—and continue to be—extremely challenging to correct surgically. Recent advances in rigid internal fixation, improved surgical exposure, primary bone grafting, and meticulous soft-tissue reattachment have markedly enhanced both functional and aesthetic outcomes in the management of panfacial fractures.[7]

A structured postoperative rehabilitation protocol is essential to minimize complications and facilitate a complete functional recovery.

Initial Evaluation

A comprehensive initial evaluation is essential in patients with panfacial fractures. Early management should prioritize stabilization, including securing the airway, controlling hemorrhage, and obtaining timely multidisciplinary consultations. Detailed facial examination may be limited due to intubation, cervical immobilization, or poor patient cooperation; therefore, assessment should be systematic and focused on life-threatening concerns before definitive reconstruction.[8]

Reconstructing pan-facial fractures requires a systematic approach to balance structural integrity with aesthetic outcomes:

Sequencing: Surgeons traditionally prioritize the **occlusal unit** (the bite) first, as it serves as the foundational reference for restoring facial height and width.

Hard Tissue: Disimpacting displaced midfacial segments is technically challenging and carries a high risk of **major hemorrhage** from the internal maxillary artery, requiring precise surgical control.
Soft Tissue: Maintaining the "soft tissue envelope" is vital; failure to properly re-suspend tissues after extensive exposure can lead to sagging, scarring, and functional impairment.
Staged Intervention: Because these patients often have systemic trauma or brain injuries, surgery is frequently staged to match the patient's clinical stability and anesthetic tolerance.[9]
Efficient management thus relies on limiting surgical exposure where possible and using soft tissue augmentation to prevent long-term asymmetry and contracture.[10]

CASE PRESENTATION

This is a case of a 70 year old patient , a resident of Sultanpur, Aurangabad; who is a farmer by occupation . He had met with a road traffic accident on 12/11/25 at around 2 PM in Sultanpur ,Auranagabad. The History was narrated by the patient's son Mr. Raghnath Jadhav. The patient sustained a road traffic accident involving a two-wheeler, resulting in a blunt trauma to the nose ,face and head. He was brought to the casualty department with multiple facial bruises and complaints of headache. There was no history of loss of consciousness, seizures, vomiting, chest trauma, or abdominal trauma. No history of ENT bleed was initially reported; however, epistaxis was noted following facial injury.
The patient had a personal historyof tobacco addiction. There was no past medical history but a surgical history of cataract done bilaterally . On observation the patient was seen in SICU conscious and orientated . Tracheostomy was done on 25 /11/25
Lines of attachment were Intravenous line , Spo2 probe , BP cuff and folleys catheter .

ON OBSERVATION

VITALS

Blood Pressure	170/94 mmHg
Spo2	95%
Respiratory Rate	13 breaths/min
Pulse Rate	113beats/min

On Examination

The assessment of the patient's Higher Mental Functions (HMF) using the **Glasgow Coma Scale (GCS)** yielded a total score of **10**, providing key insights into their neurological status. The finding of **E4** indicates that the patient's eyes open spontaneously, suggesting intact arousal and brainstem function. While the verbal response was not testable (**VT**) due to the presence of a tracheostomy tube, the patient achieved a **M6** motor score by consistently obeying commands. This represents the best possible motor response, indicating a high level of functional integration despite the physical limitations imposed by the airway management.

Cranial Nerve Examination

Optic Nerve was intact bilaterally.
Opthalmic division of Trigeminal Nerve was intact bilaterally.

Sensory Examination

Pain, temperature and light touch were successfully processed .This indicates that the peripheral nerves, spinal cord tracts, and the primary somatosensory cortex (Brodmann)areas 1,2 and 3 were receiving basic inputs .

Proprioception and kinesthesia were not assessable , it was due to the inability of the patient to follow the commands due lack of proper conscious .

Cortical sensations like graphesthesia , stereognosis , barognosis and two point discrimination were also not assessable due to lack of consciousness.

Motor Examination

All muscles in the upper limb and lower limb were normotonic. The deep tendon reflexes in the upper limb and lower limb were normal and intact . The range of motion for upper limb and lower limb was complete and painfree bilaterally.

Manual Muscle Testing (MMT)

UPPER LIMB	Right	Interpretation	Left	Interpretation
Shoulder flexors	Grade 3+	These muscles complete full range of motion against gravity with minimal resistance	Grade 3	These muscles complete full range of motion against gravity without resistance
extensors	Grade 3+		Grade 3	
abductors	Grade 3+		Grade 3	
Elbow flexors	Grade 3+		Grade 3	
Extensors	Grade 3+		Grade 3	
Wrist Flexors	Grade 3+		Grade 3	
Extensors	Grade 3+		Grade 3	

LOWER LIMB	Right	Left	Interpretation
Hip flexors	Grade 3	Grade 3	These muscles complete full range of motion against
Hip extensors	Grade 3	Grade 3	
Hip abductors	Grade 3	Grade 3	

Knee flexors	Grade 3	Grade 3	gravity without resistance
Knee extensors	Grade 3	Grade 3	
Ankle Dorsiflexors	Grade 3	Grade 3	
Plantarflexors	Grade 3	Grade 3	

Respiratory Assessment

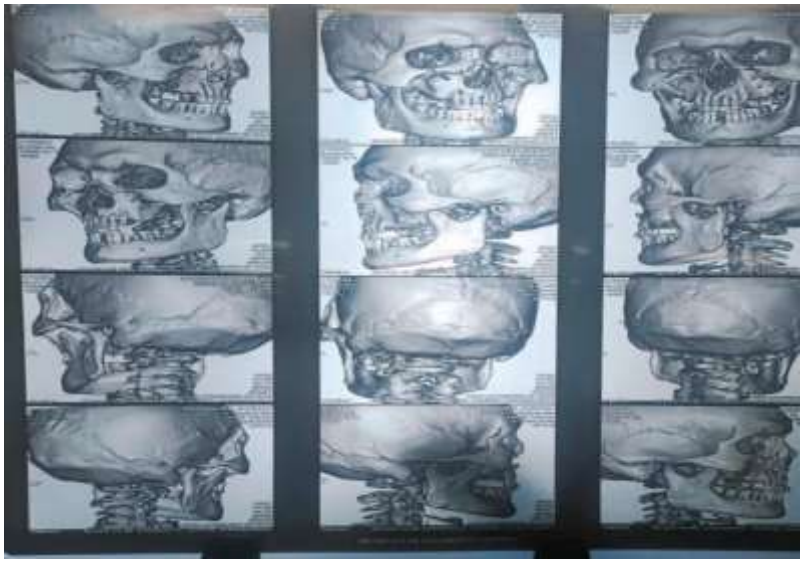
On auscultation, bilaterally the air entry was reduced.

The maxillofacial examination revealed a mobile maxillary arch and a mid-palatal fracture involving the hard palate, which has resulted in significantly deranged occlusion. Neurological and ophthalmic assessments noted the presence of bilateral periorbital edema, though pupillary and corneal reflexes remained normal. Crucially, the evaluation showed no evidence of intracranial involvement, suggesting the trauma is localized to the facial skeleton. This clinical picture emphasizes the need to prioritize stabilizing the dental foundation while monitoring for potential secondary ocular or soft-tissue complications.

INTERPRETATION OF THE CT SCAN

This image is the 3D CT reconstruction of the skull (CT head with 3-dimensional rendering), commonly used for trauma evaluation.

Multiple views of the skull are shown (anterior, posterior, lateral, and oblique angles), which helps in identifying bony abnormalities. There is irregularity and discontinuity of the cranial bones, suggestive of skull fractures.The fracture lines seem to involve the facial bones and cranial vault (exact bones depend on the original CT slices, but commonly include frontal, zygomatic, maxillary, or temporal bones in such reconstructions).



CT SCAN OF PANFACIAL FRACTURE

LEFT SIDE FACE ANALYSIS	RIGHT SIDE FACE ANALYSIS
1. Zygomaticomaxillary Complex (ZMC) Comminuted fracture of the left zygomatic body. Marked disruption of the zygomaticomaxillary and zygomaticofrontal regions. Greater displacement compared to the right, indicating more severe midface injury on this side. 2. Maxilla Fractures involving the left maxillary sinus walls with collapse. Loss of maxillary height and projection. Findings are consistent with a high-energy Le Fort–type midface fracture pattern (exact classification requires sectional CT). 3. Orbit Fracture of the left inferior and lateral orbital walls. Significant orbital wall disruption with increased orbital volume. High risk of: Enophthalmos Extraocular muscle entrapment Infraorbital nerve involvement 4. Nasal / NOE Region Fracture extension toward the nasal bones and medial orbital region. Suspicion of NOE complex injury, particularly if clinical telecanthus is present. 5. Mandible Fracture line extending into the left mandibular body/angle region. The mandible is bilaterally fractured, eliminating a stable occlusal reference	1. Zygomaticomaxillary Complex (ZMC) Fracture involving the right zygomatic body with disruption of the zygomaticomaxillary buttress. Loss of normal malar prominence indicating displacement of the zygoma. Likely involvement of the zygomatic arch, contributing to facial widening. 2. Maxilla Fracture of the right maxillary sinus walls (anterior and lateral). Disruption of the vertical and horizontal facial buttresses. Features suggest midface instability on the right side. 3. Orbit Fracture of the right inferior orbital rim and orbital floor. Inferior displacement of bony fragments, suggestive of a blow-out fracture. Increased orbital volume → risk of enophthalmos and diplopia. No obvious globe rupture seen on 3D view (requires axial confirmation). 4. Nasal / Central Midface Extension of fracture lines toward the nasal framework on the right. Possible partial involvement of the naso-orbito-ethmoid (NOE) region. 5. Mandible Fracture involving the right mandibular body/angle region with displacement. Loss of mandibular continuity, contributing to occlusal instability

Physiotherapy Management

Physiotherapy Goals

- Maintain airway clearance

- Reduce Facial Oedema
- Prevent Pulmonary Complications
- Protect surgical fixation (ORIF done).
- Maintain cervical and shoulder mobility

Treatment:

Airway & Chest Physiotherapy

Diaphragmatic breathing exrecises

Thoracic expansion exercises

Incentive spirometry

Gentle percussion/vibration (if indicated)

Tracheostomy care & suctioning

Edema Control

Head elevation (30–45°)

Cryotherapy

Gentle facial lymphatic drainage (avoid incision sites)

Pain Management

TENS only if surgeon's clearance and no interference with metal fixation.

Relaxation breathing technique .

cervical & Shoulder ROM

Active ROM of neck

Scapular mobility exercises

Upper limb mobility

Avoid excessive jaw movement as Maxillomandibular Fixation was present.

Neutral Cervical Alignment

Avoid excessive flexion/extension

Support with pillows

EARLY MOBILIZATION

Early mobilization mainly focuses on preventing odema and stiffness while protecting the operated site . According to the FITT Principle early mobilization given postoperatively has the following –

Sr No	Region	Intervention Stratergy	Parts covered	FITT
1.	Upper face & Periorbital Region	Manual lymphatic drainage (light circular stroking) towards the ears/neck	Frontal bone , supraorbital rims, and eyelids	Frequency: 5 times daily. Intensity: Submaximal; no stretching of skin staples or sutures Time:5 minutes per

				session Type: Soft Tissue Glides: Gentle brow elevation and "squint- release" Technique
2.	Midface & Nasomaxillary Region	Controlled nasal airflow (if cleared) and "O" shape mouth forming to maintain midface length.	Maxilla , zygomatic arches and nasal bones	Frequency: 3-4 times daily Intensity: Extremely low; avoid any blowing pressure , sneezing with open mouth Time: 5-10 minutes Type: Neuromuscular re-education techniques- sniff huff breathing and lip puckering .
3.	Mandibular & Temporomandibular Joint (TMJ)	Controlled opening using –'tongue-to-roof-of mouth'as a guide to prevent deviation.	Mandible , condyles , TMJ	Frequency: 6 session daily (short frequent sessions) Intensity:Pain guided; increase opening by 1-2mm daily Time:10-15 repetitions per session Type: Active- assisted ROM- Vertical jaw opening and gentle protusion

Edema Management , Soft tissue mobilization and breathing exercises given according to FITT principle is as follows

Component	**Frequency**	**Intensity**	**Time**	**Type**
Edema Management	Continuous (24/7 during early recovery).	Low-stress passive drainage.	Elevated during all rest and sleep periods.	Passive Positioning: Head and upper body maintained at a 30° to 45° upright angle using a wedge pillow or recliner.
Soft Tissue	3 to 4 times	Gentle, non-		Active

Mobilization	daily.	painful active range of motion	5 to 10 repetitions per movement.	Neuromuscular Glides: Gentle puckering of the lips and slight elevation of the eyebrows to prevent muscle adhesion to underlying fixation hardware
Thromboembolism Prevention	4 to 6 times daily.	Low intensity; RPE (Rating of Perceived Exertion) less than 11 on the 6-20 Borg scale.	5 to 10 minutes per session.	Ambulation: Short, level-surface walks. Strictly avoid lifting, straining, or bending forward to prevent spikes in intracranial pressure

Component	Frequency	Intensity	Time	Type & Execution
Diaphragmatic Breathing	3 to 4 times daily.	Relaxed / Low effort	5 to 10 breaths per session.	Place one hand on the abdomen and the other on the chest. Inhale slowly through the nose for a 4-second count. The abdomen must expand outward while the chest remains entirely quiet. Prevents post-trauma neck tension.
Pursed-Lip Breathing	As needed for dyspnea or acute anxiety.	Controlled and steady	2 to 3 minutes.	Inhale slowly through the nose, pucker the lips as if preparing to blow out a candle, and exhale slowly/smoothly through the puckered lips. Calms the sympathetic nervous system during severe facial swelling
Sniff-Huff Technique	As needed for airway clearance	Extremely Gentle.	1 to 2 cycles.	Perform an extremely shallow, gentle sniff inward, immediately followed by a gentle, open-mouth (as if fogging a mirror). Translates secretions to the back of the throat to be swallowed or cleared

Facial Sensory Stimulation

Component	Frequency	Intensity	Time	Type & Clinical Execution
Tactile Discrimination	3 times daily.	Light, non-noxious touch.	2 minutes per distinct facial zone (forehead, cheek, chin).	**Sensory Re-education:** Grade the stroke direction by moving from the "numb" zone toward the "normal" sensation zone

				Ask the patient to close their eyes and actively **visualize** the specific texture being used Soft: Cotton ball or soft makeup brush. Medium: Dry washcloth or velvet. Rough: Soft-bristled toothbrush (using very light pressure).
Thermal Stimulation	2 to 3 times daily.	Distinct but safe temperature contrasts.	10-second hold per application, alternating inputs.	**Thermal Recalibration:** Direct, gentle contact applied against the affected dermatomes. Alternated between: *Cool:* A chilled (not freezing) metal spoon. *Warm:* A warm (not hot) damp cloth. This temperature variation helps to recalibrate damaged nerve endings.
Vibration Therapy	1 to 2 times daily (as tolerated).	Low-amplitude, high-frequency	1 to 2 minutes total over nerve distributions.	**Mechanoreceptor Stimulation:** Gentle application of a low-intensity electric toothbrush handle (or a facial massager) held against the bony prominences of the face. The high-frequency input helps to bypass "static" or aberrant nerve signals.

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