

# Panfacial fractures

## Sequencing of repair



Version 2 (December 12, 2018)

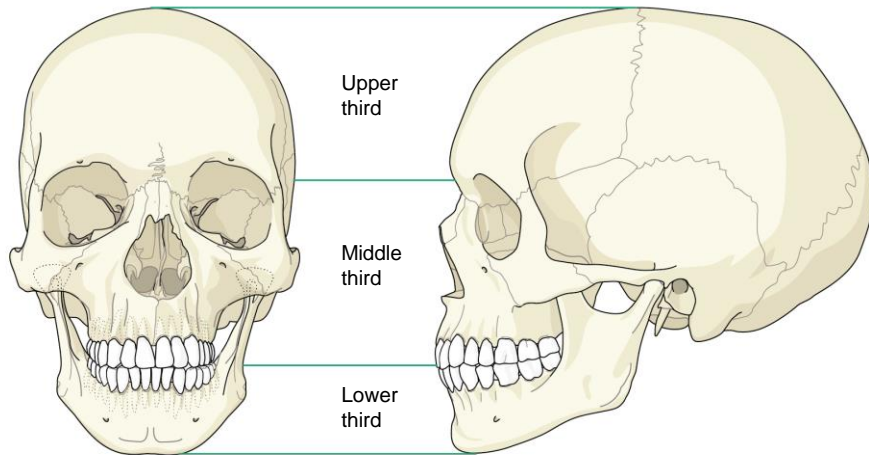
Faculty can add a clinical or imaging picture

## Learning objectives

- Apply the principles of fixation in clinical cases
- Describe the sequence of repair
- Prioritize management of injuries in the polytrauma patient

## Panfacial fracture

- A fracture of two or more of the facial units



## Facial buttresses

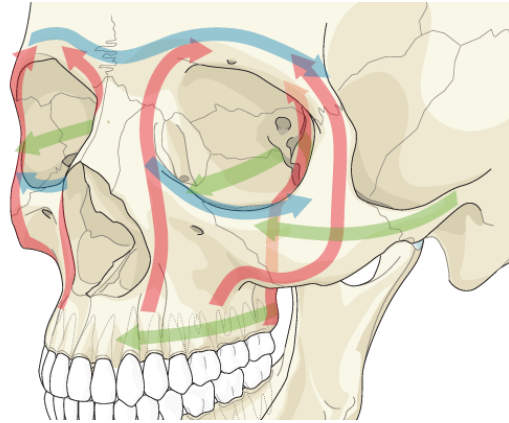
- Extensively disrupted in panfacial fractures
- Overlying soft-tissue forces lead to a less angular shape

***Round and flat***



## Goals of treatment

- Restoration of facial form and function
- Achieved through:
  - 3-D repair of facial buttresses
  - Restores proper facial width, height, and projection



## Sequence of fracture repair

- Repair component fractures as per basic principles for that fracture

### However

- Panfacial fractures characterized by:
  - Multiple component fractures at multiple levels
  - Disruption of multiple buttresses
  - Fracture displacement and comminution

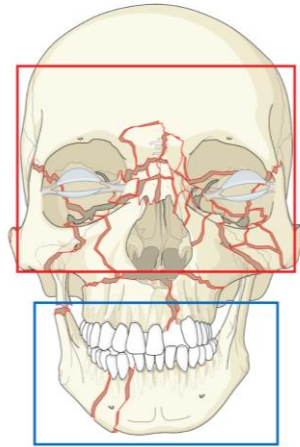
### Where do you start?

## Sequence of fracture repair

- **Reduction strategies**
  - Accurate anatomical reduction and stabilization in appropriate sequence is critical
  - “Bottom-to-top” ? “Top-to-bottom” ?
  - “Inside-out”? “Outside-in”?
- **Subunit principle**

## Subunit principle

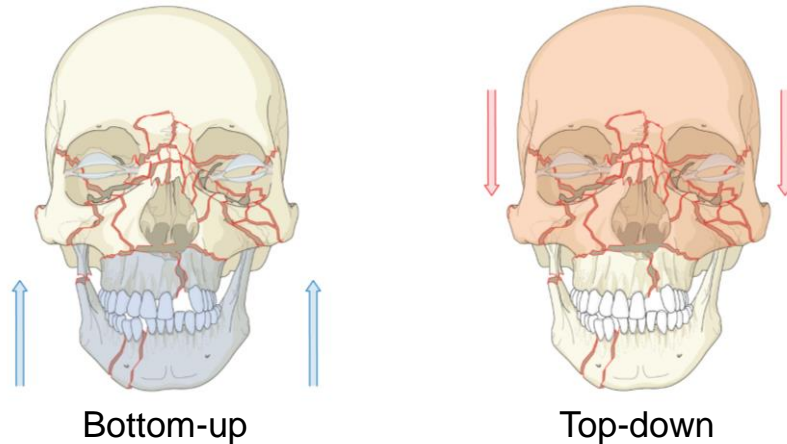
- **Cranio-orbito-zygomatic subunit**
- **Maxillomandibular subunit**
  - Repaired independent of one another
  - Stable to unstable in each subunit
  - Complex fracture patterns simplified to Le Fort I level, which is repaired last





## Sequence of repair

- Work **toward** the Le Fort I level from above **and** below
- **Cannot** work straight through from either direction
- Two strategies based on starting point



AOCMF

## Sequence of fracture repair

### Reduction strategies

Accurate anatomical reduction and stabilization in correct sequence

“Bottom-to-top” ? “Top-to-bottom” ?

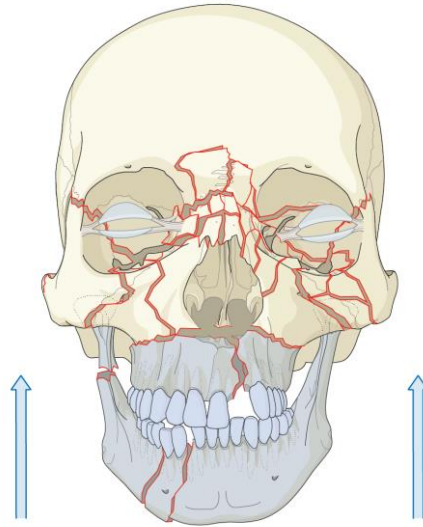
Work towards the Le Fort I level from **TOP AND BOTTOM**

*Cannot* work straight through from top to bottom or vice versa

# Subunit principle

## Bottom-up sequencing

- Re-establish maxillomandibular subunit first



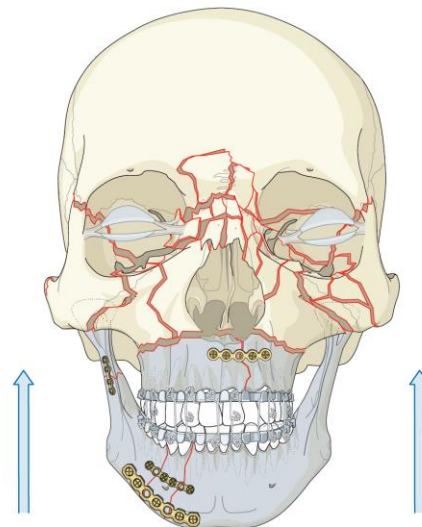
Bottom-up



Note: If the mandible is going to be used to position the maxilla through MMF, the mandible must be completely reconstructed from one condyle to the other.

## Maxillomandibular unit

- Anatomical reduction of the mandible and establishment of MMF restores occlusion and lower facial height, width and projection
- Caveats
  - Condylar fractures
  - Palatal split

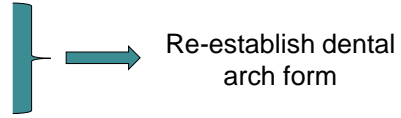


Bottom-up

Note: Adds considerable complexity to repair

## Maxillomandibular unit

- Align maxilla and mandible
  - Mandible vs maxilla as stable reference—use least injured
  - Repair palatal fractures
  - ORIF mandible
- Place into MMF



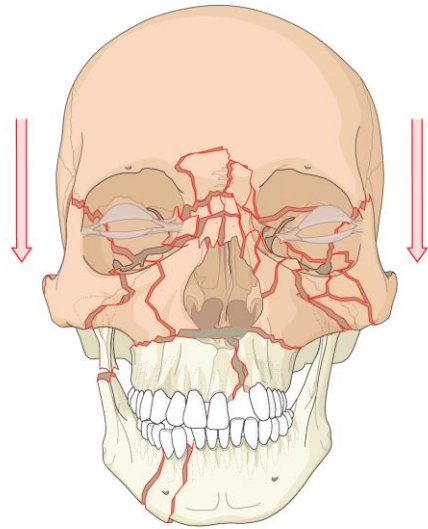
## Intraoperative MMF

- Re-establish occlusion
- Restores vertical lower facial height
- Restores horizontal lower facial width and projection



## Top-down sequencing

- Reduction and fixation of cranio-orbito-zygomatic subunit first

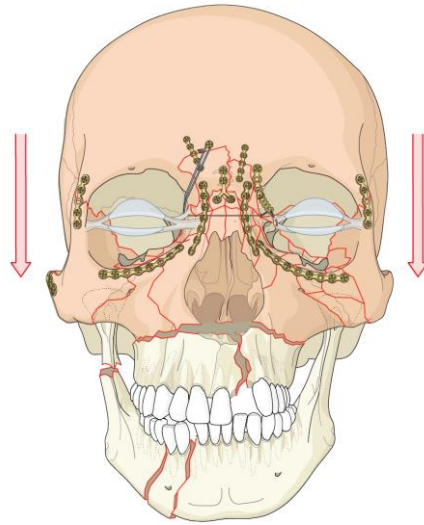


Top-down

Note: If the mandible is going to be used to position the maxilla through MMF, the mandible must be completely reconstructed from one condyle to the other.

## Top-down sequencing

- Anatomical reduction:
  - Zygoma—restores midfacial width and projection
  - NOE complex—restores central facial projection and intercanthal distance
- Start on side and region with least comminution

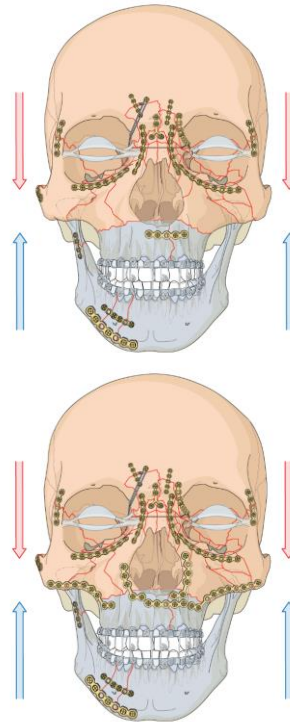


Top-down



## Le Fort I level repair

- Only after **cranio-orbital-zygomatic** and **maxillo-mandibular** subunit repairs are completed
- Plating of anterior maxillary buttresses
  - Nasomaxillary
  - Zygomaticomaxillary



ACU.F

## Bone grafting

- Consider with bone loss or gross comminution of buttresses
- Calvarial graft preferred
- Plates are not meant to replace midface buttresses but to support them

## Take-home messages

- Complex injuries involving fractures at multiple facial levels
- Goal of repair is to restore anatomical facial proportions and occlusion
- Correct sequence of repair critical to successful outcome
- Subunit principle
- Bottom-up or top-down approach
- Regardless of approach, Le Fort I level repair is last