

MAXILLARY FRACTURES



FIFTH STAGE

Dr. Ahmed Jassam Alnaqeeb

Oral and maxillofacial surgeon

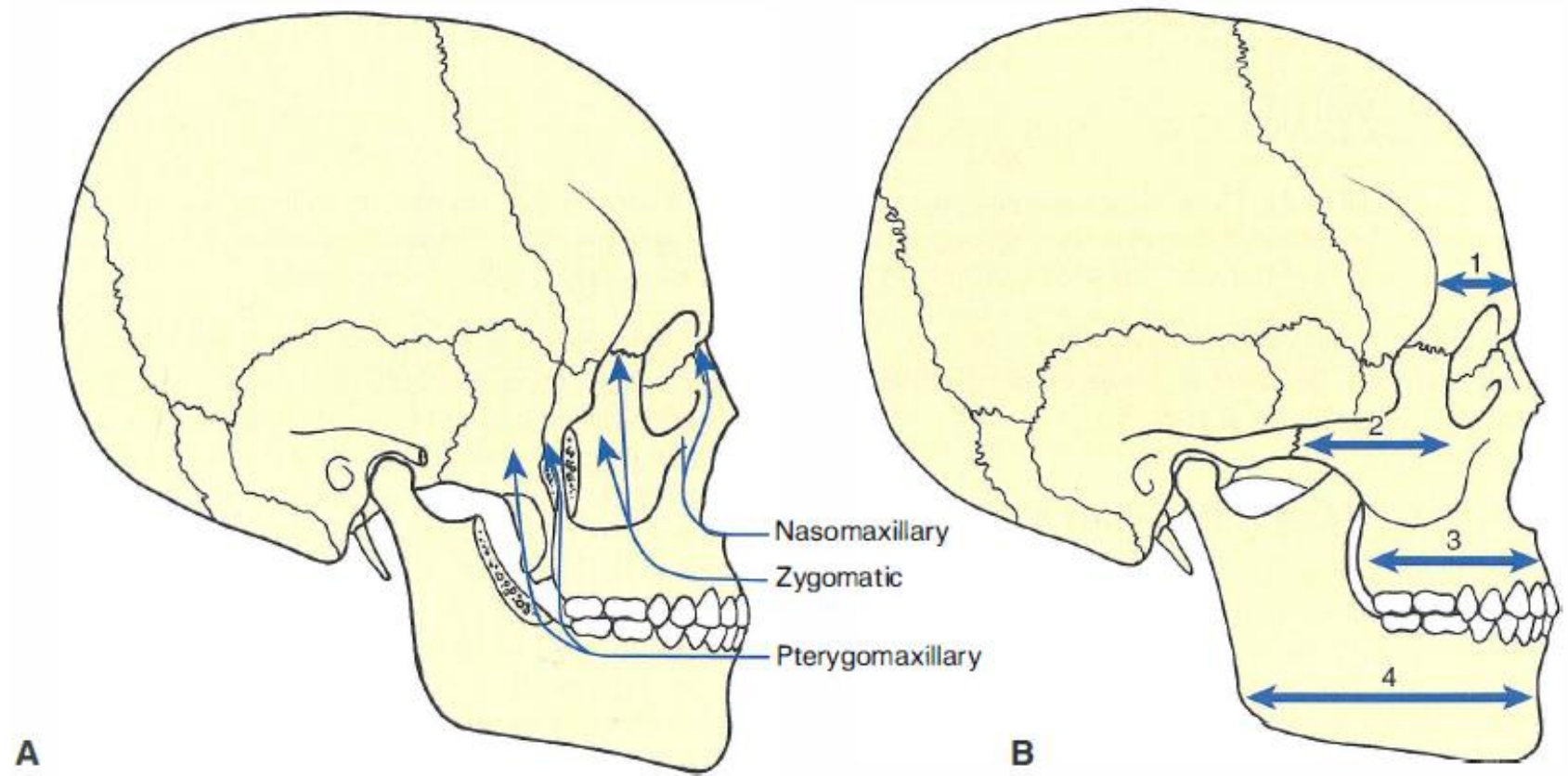
Anbar university / college of dentistry

Surgical Anatomy

- Mid face – area bet. Horizontal line of supraorbital ridge and maxillary occlusal plane
- Mid face consist of the following bones:

Maxillae (2)	inferior conchae (2)
zygomas (2)	pterygoid plates (2)
palatine (2)	vomer
nasal (2)	ethmoid
lacrimal (2)	

Fracture dynamics of midface

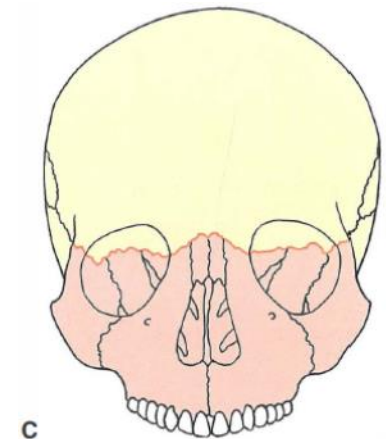
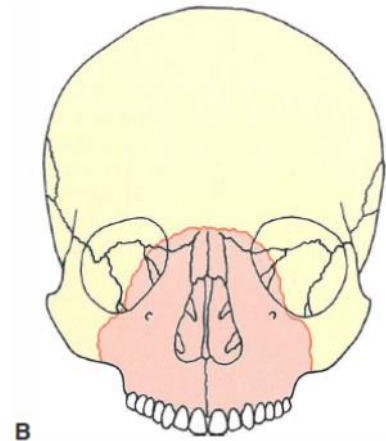
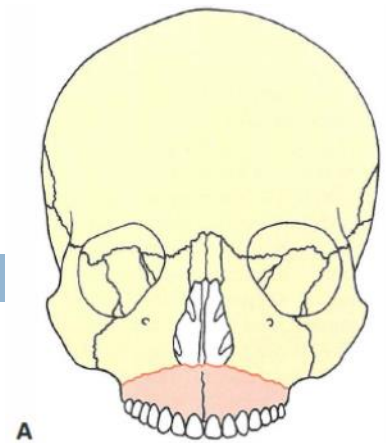


Fracture dynamics of midface

- With severe impact the mid third of face shear of the cranial base and forced downward and backwards
- Clinical features of this displacement
 1. Trismus – posterior occlusal gag
 2. Midface lengthening
 3. Airway obstruction
 4. Anterior open bite
 5. Dishface deformity

Classifications

- **Le Fort classification (1901)**
- **Le Fort I** separating inferior portion of maxilla in horizontal fashion, extending from piriform aperture of nose to pterygoid maxillary suture area
- **Le Fort II** involving separation of maxilla and nasal complex from cranial base, zygomatic orbital rim area, and pterygoid maxillary suture area
- **Le Fort III** (i.e., craniofacial separation) is complete separation of midface at level of nasoorbital-ethmoid complex and zygomaticofrontal suture area. Fracture also extends through orbits bilaterally.



Classifications

□ **Rowe and Williams classification (1985)**

□ **Fracture not involving occlusion**

1. Central region
 - a. Nose and /or nasal septum
 - b. Frontal process of maxilla
 - c. Nasoethmoidal
 - d. Fronto-orbito-nasal
2. Lateral region – zygomatic complex

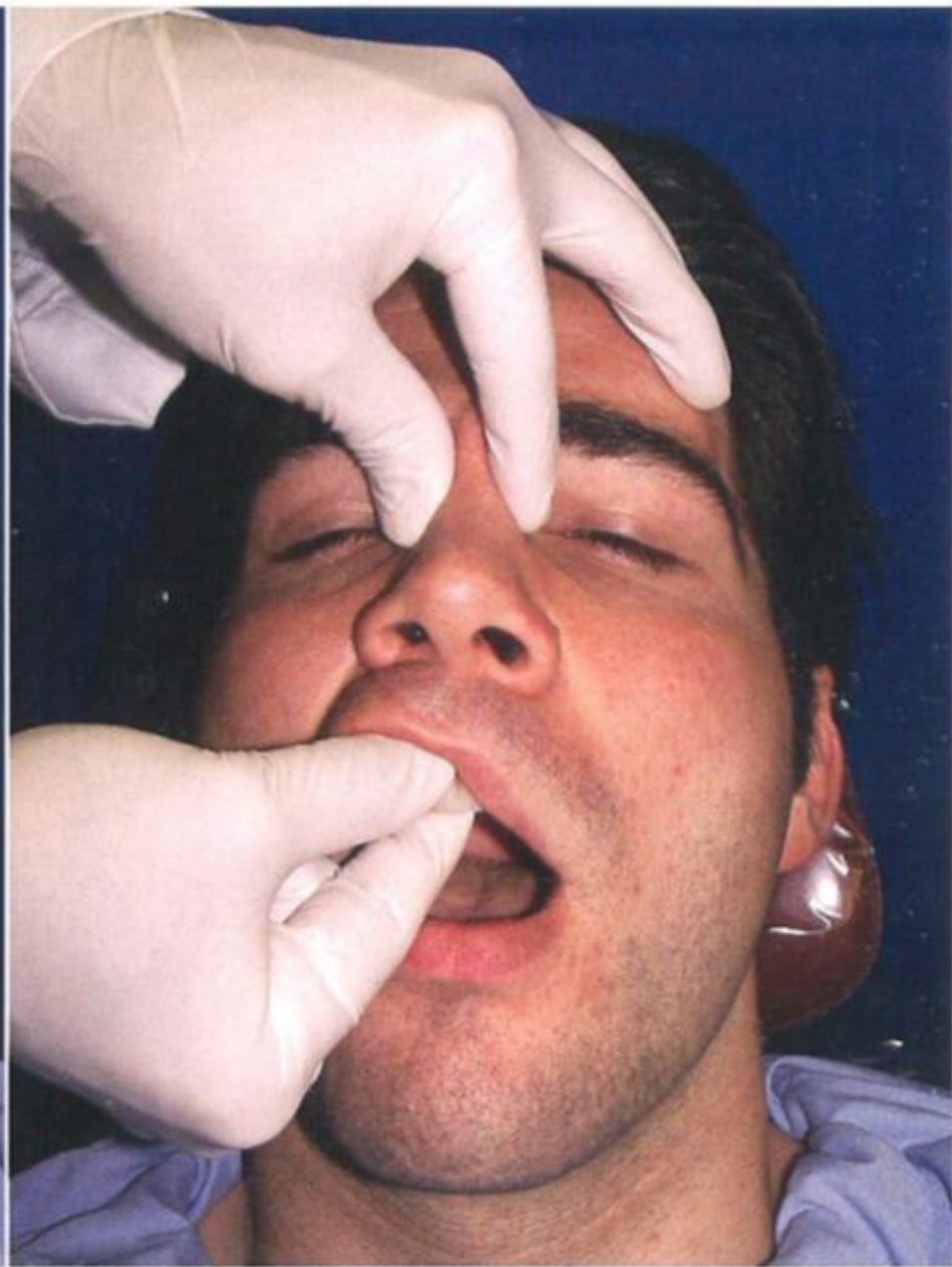
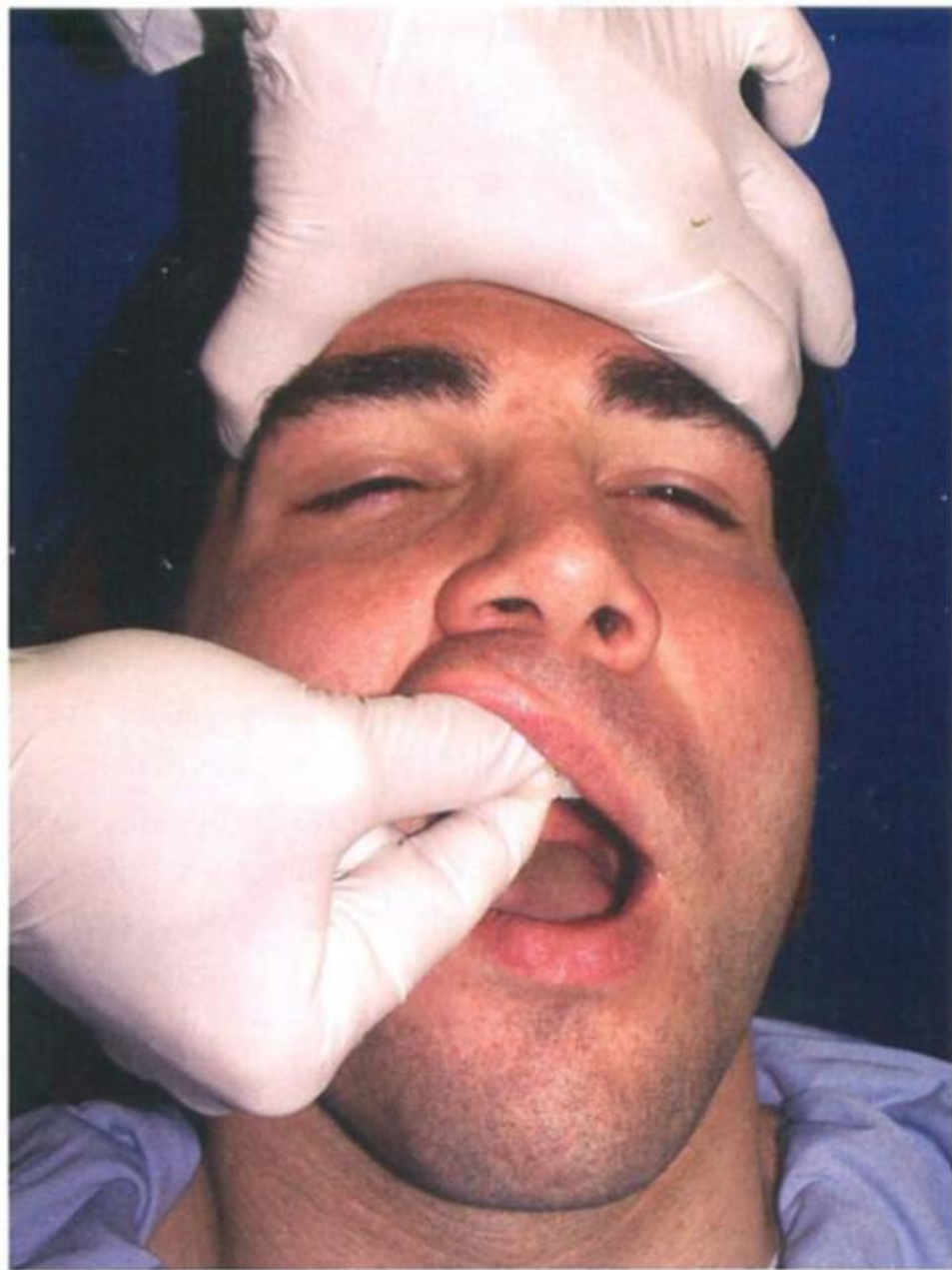
□ **Fracture involving occlusion**

1. Dentoalveolar
2. Subzygomatic (Le Fort I & II)
3. Suprazygomatic (Le Fort III)

Clinical features

- Swelling – oedema
- Bilat circumorbital echymosis – panda face or raccon eyes
- Bilat subconjunctival echymosis
- Face lengthening
- Abnormal midface mobility
- Pain
- malocclusion
- Diplopia
- Anesthesia
- CSF rhinorrhea





Surgical treatment planning

- Timing of surgical procedures
 - A. Emergency Rx
 1. Stabilize mobile fracture to maintain airway
 2. Arrest hemorrhage
 3. Monitor vital signs
 - B. Within 24 hrs
 1. Repair deep laceration
 2. Impression of teeth
 3. Treat less severe maxillary fractures
 - C. Definitive Rx (2-8 days)

Optimal time to allow for:

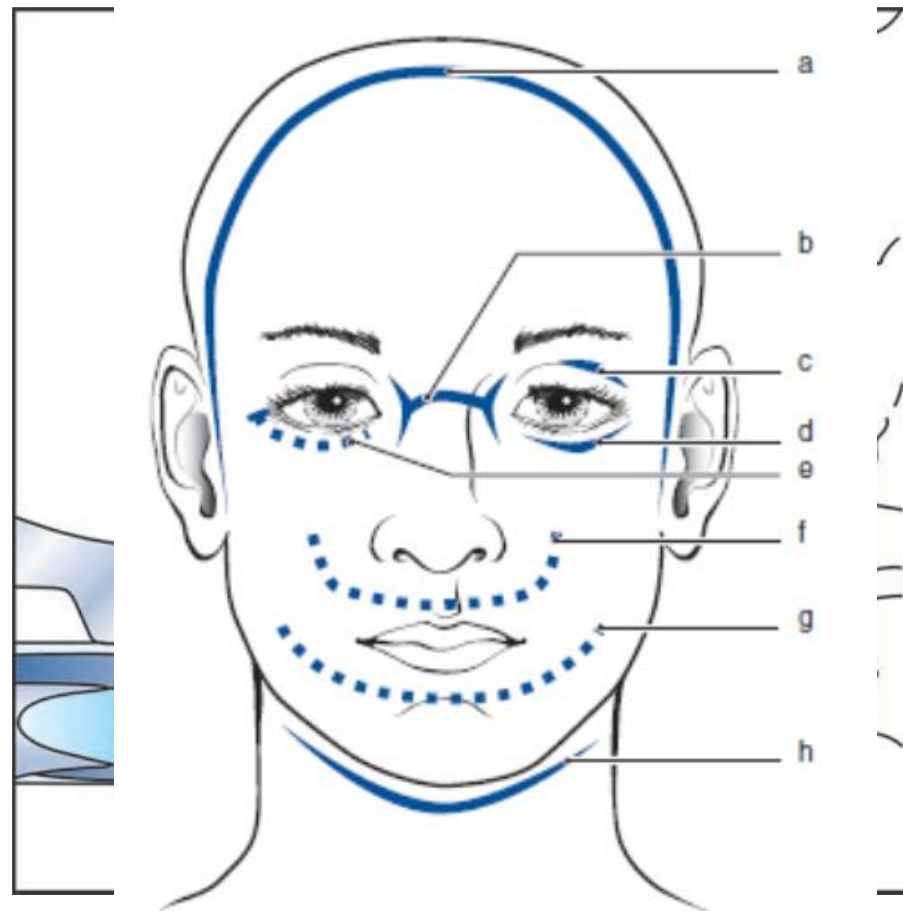
 1. Improvement medical condition
 2. Careful assessment and planning
 3. Decrease edema

Stages of surgery in multiple facial injuries

1. Tracheostomy
2. Dentoalveolar #
 - a. Extraction of unrepairable teeth
 - b. Reduction & fixation
3. Reduction of mand. # - guide for max. position
4. Zygomatic # - great disimpaction of max.
5. Disimpaction & reduction of maxillae
 - a. open
 - b. closed
6. Skeletal fixation
 - a) Internal
 - i. Non rigid (suspension wiring, pins, transosseous wiring)
 - ii. Rigid (adaptational plates, monocortical screws)
 - b) External pin fixation via frame or halo
7. Reduction & fixation of nasal #
8. Facial laceration
 - a. Clean & repair
 - b. Care of facial N., lacrimal apparatus or parotid duct

Treatment of maxillary fractures

□ Disimpaction and reduction



Treatment of maxillary fractures

□ Fixation

1. Internal

- a. Rigid
- b. Wire suspension
- c. Transfixation – K wires
- d. Transosseous wires

2. External

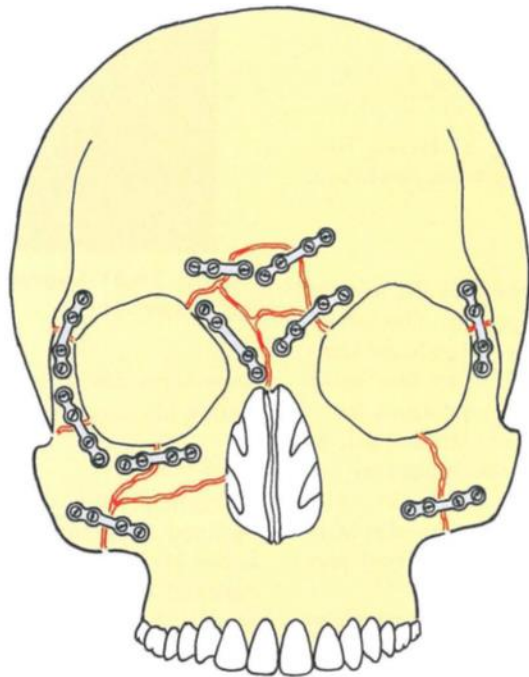
- a. Halo frame
- b. Levant frame
- c. Box frame

Rigid internal fixation

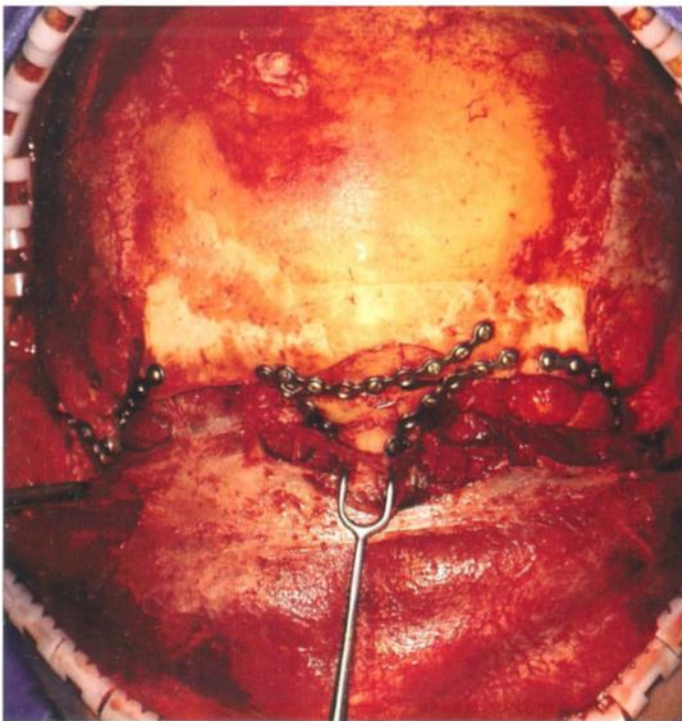
- Developed in last two decades with advent of miniplates and screws
- Operative complications decreased with improvement of plates design & operative techniques
- Authors advise plating of periphery (ZF suture & mandible) before plating of central midface (NOE areas)

Principles of plating midface

- Must restore supporting pillars that take up masticatory forces
- Miniplates must lie in longitudinal direction of these pillars
 1. Microplates (orbit, nasoethmoidal areas)
 2. Miniplates (malar and maxillary #s)
 3. Compression plates (on mandible)

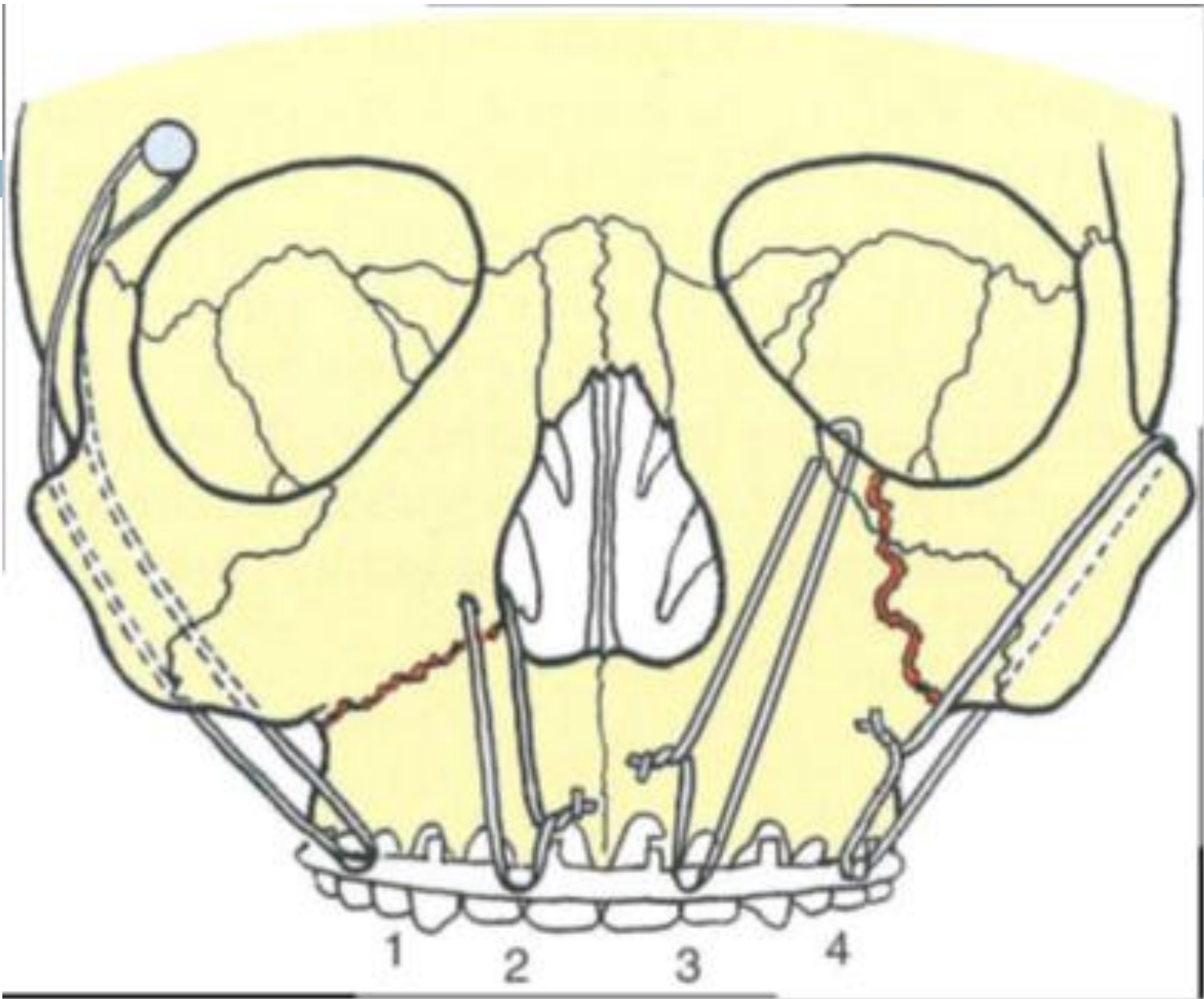


A



Wire suspension

- Used to reduce and suspend mobile fragment below to firm stable fragment above by wire
- Advantage
 1. Rapid
 2. Comfortable
- Disadvantage
 1. Non rigid
 2. Exert backward & upward pull – relapse of reduced maxilla
 3. Require IMF



External skeletal fixation

- The use of external rods & universal joints which link the cranium above the # to maxilla or mand.
- Provide ant. Traction to midface which is unstable anteroposteriorly
- Contraindication
 1. Severe scalp laceration
 2. Skull fracture
 3. Heavy cerebral irritation
 4. Epilepsy



□ Halo frame

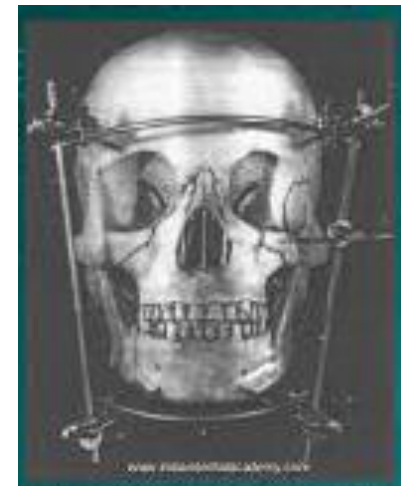
□ Levant frame

craniomaxillary fixation



□ Box frame

craniomandibular fixation



Complications of maxillary fractures

□ Preoperative

1. Airway compromise
2. Bleeding
3. Inhalation of tooth fragments

□ Postoperative

1. Excessive bleeding
2. Infection (i.e. meningitis if there is CSF leak)
3. Malocclusion
4. Facial scarring
5. Nonvital teeth

References

- Peterson, Larry J. Peterson's principles of oral and maxillofacial surgery. Vol. 1. PMPH-USA, 2012.
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- APADimitroulis, George, and Brian Avery. Maxillofacial injuries: a synopsis of basic principles, diagnosis and management. Butterworth-Heinemann Medical.

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