MAXILLARY FRACTURES

FIFTH STAGE

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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. Suprazygmoatic (Le Fort III)
Clinical features

- Swelling – oedema
- Bilat circumorbital echymosis – panda face or raccoon eyes
- Bilat subconjunctival echymosis
- Face lengthening
- Abnormal midface mobility
- Pain
- Malocclusion
- Diplopia
- Anesthesia
- CSF rhinorria
Surgical treatment planning

- Timing of surgical procedures
  - Emergency Rx
    1. Stabilize mobile fracture to maintain airway
    2. Arrest hemorrhage
    3. Monitor vital signs
  - Within 24 hrs
    1. Repair deep laceration
    2. Impression of teeth
    3. Treat less severe maxillary fractures
  - Definitive Rx (2-8 days)
    Optimal time to allow for:
    1. Improvement medical condition
    2. Careful assessment and planning
    3. Decrease odema
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 (suspention 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
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)
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

Take a Break