IMAGING OF FACIAL SKELETAL TRAUMA

Anesa Čengić
General Hospital Sarajevo
FACIAL FRACTURES

Facial fractures are commonly caused by blunt or penetrating trauma due to motor vehicle accidents, work and sport related injuries, assaults, and falls.

Analysis of the fractured face requires a knowledge of not only normal anatomy, but also of common fracture patterns in the face.
FACIAL TRAUMA EVALUATION

• X-ray overrated
• Isolated nasal or zygomatic arch fx
• Hazzy sinuses, lines of Dolan

• CT imaging modality of choice

• Easier to perform in multitrauma patients and non-cooperative patients
• If you think of injury other than simple nasal fracture
Examination technique

- 0.6 mm axial multi-detector scan acquisition
- Axial scanning from above the frontal sinus down to below hard palate, can include mandible if there is a clinical suspicion for fracture
- Coronal 1 mm reformats
- Bone and soft tissue window, 3D imaging
Aim of imaging

• Fracture lines, Bony displacements
• Soft tissue injuries
• Organize by compartments or butresses
• Categorize the fracture type
• Intracranial complication
Facial anatomy

Transverse buttresses
- Frontal bar
- Upper transverse (inferior orbital rim)
- Lower transverse maxillary (hard palate)
- Upper transverse mandibular
- Lower transverse mandibular

Vertical Buttresses
- Lateral maxillary (zygomaticomaxillary)
- Medial maxillary (nasomaxillary)
- Posterior maxillary (pterygomaxillary)
- Posterior vertical (vertical mandible)
• Buttresses are all linked either directly or through another buttress to the cranium or cranial base as a stable reference point.

• Buttresses have sufficient bone thickness to accommodate metal screw fixation.

• Transverse buttress reduction restores facial profile and width; vertical buttress reduction restores facial height.

• Buttress reduction establishes a functional support for the teeth and globes.
Frontal sinus

- Anterior wall, Posterior wall, Both
- Displacement and comminution

Posterior wall fracture
- Pneumocephalus
- Dural violation
- Degree of bone lose
Nasal bone fractures

• Most common facial fracture

• Blunt force applied from anterior or lateral direction

• Fracture extension into the nasal cartilage may disrupt the perichondrium causing septal hematoma
Nasal bone fractures
Fractures of the naso-orbitoethmoid (NOE) complex

- High-impact force applied anteriorly to nose
- Severe comminution of both medial maxillary buttresses (nasal bones and septum, ethmoid sinuses, medial orbital wall)
- Spares lateral butresses
Markowitz / Manson classification
Zygomaticomaxillary complex fracture

- quadripod fx
- Direct traumatic blow to malar eminence
- Dissociation of zygomatic bone from calvaria
- Associated orbital injuries 33% of cases
Medial or lateral rotation of zygomatic bone?
Le Fort fractures
Le Fort fractures

1. Pterygoid plates (intact of fractured)
2. Pterygomaxillary disjunction

Classify the fractures

I. Lateral piriform aperture
II. Inferior orbital rim and zygomaticomaxillary suture
III. Zygomatic arch+lateral orbital wall
Orbital „blowout“ fractures

• Trauma caused by large object that cannot enter the orbit
• Orbital rim remains intact
• Orbital wall is fractured

• Complication: muscle herniation and entrapment, globe injury, infraorbital nerve injury
Mandibular fractures

- Symphysis
- Parasympysis
- Body
- Angle
- Ramus
- Coronoid Process
- Subcondylar
- Condylar

Mental Foramen
Mandibular fractures

- Fractures occur in multiple locations
- Ring-like structure typically produces at least two discrete fractures
- Plain orthopantogram should not be used as a single modality for mandibular fractures
Mandibular fractures
Summary

- CT imaging modality of choice
- Group facial fractures into clinically relevant patterns
- Provide clinically relevant radiology report
- Cooperate and discuss with surgeon