MAXILLOFACIAL TRAUMA: SIDELINE TO ER

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ORAL AND MAXILLOFACIAL SURGERY

- Specialty of dentistry
- 4 – 6 year residency following dental school
  - 6 year residencies provide formal medical education awarding either DO or MD degrees
ATLS PRIMARY SURVEY

• Airway maintenance with cervical spine protection
• Breathing and ventilation
• Circulation with hemorrhage control
  • Scalp
  • Nose
  • Oral cavity
• Disability/Neurologic status
• Exposure and environmental control
MAXILLOFACIAL PHYSICAL EXAM

- Neurosensory exam
- Soft tissue evaluation
- Skeletal exam
- Dentition
- Occlusion
- Joint Function
TRIGEMINAL NERVE

- Three major branches
  - Ophthalmic
  - Maxillary
  - Mandibular
- Anesthesia/Paresthesia a clinical sign to possible fracture
FACIAL NERVE

• Five branches
  • Temporal, Zygomatic, Buccal, Marginal Mandibular, and Cervical

• Rare to see deficit with facial fractures

• Potential to be injured with lacerations or penetrating trauma
  • Injuries proximal to a vertical line drawn from the lateral canthus should have repair attempted prior to closure of laceration
DENTOALVEOLAR INJURIES

Teeth
Periodontium
Supporting bone
Gingiva and oral mucosa
TRAUMATIC INJURIES TO THE TEETH

- Ellis Classification system
- Dentin exposure likely to have sensitivity
- Pulpal exposure likely to have severe pain
INJURIES TO THE PERIODONTIUM

• Concussion, Subluxation, Luxation, Avulsion
• Check occlusion
• Avulsed tooth should be replanted as soon as possible
• If unable to replant tooth should be transported in hanks balanced salt solution or viaspan solution to a professional capable of replantation and splinting
  • Milk or saline are other options for transporting solution
• Avulsed teeth must be accounted for
ALVEOLAR FRACTURES

- Fracture of the bone supporting the dentition
- Assess occlusion
- Digital reduction if possible to place patient into interference free occlusion
- Will require reduction and splinting of associated and adjacent teeth
When do you need a mouth guard?

yes

yes

definitely

probably

absolutely

yes

yes

absolutely

yes

hopefully not

yes

yes

Save face = Wear a Mouth Guard.

April is National Facial Protection Month. Mouth guards are a good idea all year long.
MANDIBULAR FRACTURES

- First described by Egyptians in 1650 BC
  - Described but not understood often led to demise of the patient
- Hippocrates discussed the importance of reduction of the fracture with a “bridal wire”
- 1180 Texts from Italy discussed the importance of reestablishing the occlusion
- 1500 first description of maxillomandibular fixation
PHYSICAL EXAMINATION

- Pain at site of fracture
- Paresthesia of lower lip/chin
  - Inferior alveolar nerve/Mental nerve injury
- Trismus
- Malocclusion
- Ecchymosis of the floor of mouth
- Gingival laceration
TREATMENT

• Favorable fractures require 6 weeks of maxillomandibular fixation
• Unfavorable fractures require open reduction with internal fixation
• Condylar head fractures generally require less MMF time due to possibility of ankylosis of temporomandibular joint
• Very few mandible fractures require no intervention
ZYGOMATIC COMPLEX
AND ARCH FRACTURES

• Responsible for anterior and lateral projection of the midface
• "Tripod fracture" actually a misnomer
• Articulates with maxilla, sphenoid, temporal, and frontal bones
• Zygomatic prominence 10 mm lateral and 20 mm inferior to lateral canthus
• Globe should be 1 mm anterior to the most prominent portion
PHYSICAL EXAMINATION

- Periorbital ecchymosis
- Periorbital edema
- Maxillary vestibular ecchymosis
- Paresthesia of the infraorbital nerve
- Flattened malar arch or prominence
- Trismus
- Subconjunctival hemorrhage
- Enophthalmos
- Exophthalmos
- Chemosis
- Diplopia
- Soft tissue air ephysema
EVALUATION OF THE EYE

• Visual acuity
• Ocular movements
• Light response
• Hyphema
• Globe position
• Retrobulbar hematoma
INDICATIONS FOR OPERATIVE TREATMENT

- Depressed arch
  - Cosmetic
  - Functional-resulting in trismus
- Depressed zygomatic eminence
- Diplopia
- Enophthalmos
- Infraorbital nerve paresthesia
TREATMENT

• Generally allow edema to resolve prior to operative intervention
• Patient placed on sinus precautions
  • No nose blowing
  • Sneeze through mouth
• Consider vision in other eye prior to surgery
• ORIF can be performed through intraoral, transconjunctival, lateral brow, lower eyelid, and coronal approaches
ORBITAL FRACTURES

- Generally from concentrated blunt trauma
- Orbital growth complete at age 7
- Four sided pyramid
- Consists of seven bones: maxillary, zygomatic, frontal, ethmoidal, lacrimal, palatine, and sphenoid
- Medial and inferior walls prone to fracture
PHYSICAL EXAM

- Enophthalmos
- Subconjunctival hemorrhage
- Diplopia
- Infraorbital paresthesia
- Entrapment of the inferior rectus muscle
EVALUATION OF THE EYE

- Visual acuity
- Ocular movements
- Light response
- Hyphema
- Globe position
- Retrobulbar hematoma
ORBITAL FLOOR

- Entrapment of the inferior rectus muscle is an indication for urgent surgery
- If no entrapment defects greater than half the surface area of the floor generally require reconstruction due to onset of enophthalmos as edema resolves
- Smaller defects can be followed clinically
MIDFACE FRACTURES

- Rene LeFort classified midface fractures in 1901
  - Experiments consisted of dropping cadaver skulls from buildings and striking them with wooden clubs.
  - Described three patterns of fracture
PHYSICAL EXAM

• Malocclusion - possible apertognathia due to pull of the medial pterygoids on the pterygoid plates
• Air emphysema
• Ecchymosis at fracture sites
  • LeFort I – maxillary vestibule
  • Lefort II/III – raccoon eyes/peri orbital ecchymosis/subconjunctival hemorrhage
• CSF leak
TREATMENT

- Reestablishment of occlusion with maxillomandibular fixation
- Inside-out and bottom-up approach
- Most fractures are unique and require a case by case plan for repair
NOE FRACTURES

- Naso-Orbital-Ethmoid
- One of the most challenging fractures to treat
- Classification is based off of the bony area surrounding the attachment of the medial canthal tendon
PHYSICAL EXAM

- Periorbital edema/ecchymosis
- Loss of nasal projection/flattened dorsum
- Traumatic telecanthus
  - Upper limit of normal 33 for women and 34 for men
- Epiphora
- Subconjunctival hemorrhage
- CSF leak
TREATMENT

- Reestablishment of medial canthal tendon
- Medial orbital wall reconstruction
- Nasolacrimal apparatus repair
- Nasal reconstruction
FRONTAL SINUS FRACTURES

- Single or paired paranasal sinus(es) located within the frontal bar
- Drain through the nasofrontal duct-posterior medial floor of sinus
- Radiographically evident at age 6 completely developed at puberty
TREATMENT

- Anterior table fracture
  - Repair for cosmesis
- Involvement of NFD
  - Obliteration of sinus and duct
- Posterior table involvement with CSF leak will require cranialization of sinus