Facial Injuries
Every facial injury is a potential airway problem!
Morbidity & Mortality

- Mortality:
  - Facial injury is primarily associated with brain and spine injury.
  - Severe facial fractures may interfere with airway, breathing, and oxygenation.
  - Bleeding can compromise the airway.

- Morbidity:
  - Disability concerns.
  - Cosmetic concerns.
Maxillofacial Trauma

- Most commonly due to:
  - MVCs
  - Home accidents
  - Athletic injuries
  - Animal bites
  - Domestic violence
  - Industrial accidents
Maxillofacial Trauma

- Soft tissue injury
  - Lacerations, abrasions, avulsions.
  - Bleed profusely.
  - Very vascular area supplied by internal and external carotids.
Maxillofacial Trauma

- **Management:**
  - Facial trauma is seldom life-threatening unless the airway is involved.
  - Consider spinal precautions.
  - Have suction available.
  - Control bleeding.
Cranial nerves may be affected by facial trauma, particularly the Facial (CN VII) and Trigeminal (CN V) nerves.
Anatomy & Physiology Review

- Trigeminal (CN V)
- Facial (CN VII)

**Figure 13-1.** Branches and distribution of the facial nerve.

**Figure 18-8.**
Three sensory divisions of the trigeminal nerve: ophthalmic (I), maxillary (II), and mandibular (III).
Facial Fractures

- Fractures occur to the mandible, maxilla, nasal bones, zygoma and rarely the frontal bone.

- Signs and symptoms include:
  - Pain, swelling, deep lacerations, limited ocular movement, facial asymmetry, crepitus, deviated nasal septum, bleeding, depression on palpation, malocclusion, blurred vision, diplopia, broken or missing teeth.
Facial Fractures

Mandibular fx -

- Numbness, inability to open or close the mouth, excessive salivation, malocclusion.
Mandibular Fractures

Body 30 - 40 %, Angle 25 - 31 %, Condyle 15 - 17 %, Symphysis 7 - 15 %, Ramus 3 - 9 %, Alveolar 2 - 4 %, Coronoid process 1 - 2 %.
TMJ Dislocation

Anterior dislocation of the TM joint.

- May be caused by extensive dental work, yawning.
- Condylar heads move forward and muscles spasm.
LeFort Fractures

- Specially named facial fractures.
- Usually requires significant forces especially for LeFort II and III.
  - LeFort I - Maxillary fracture with “free-floating” maxilla.
  - LeFort II - Maxilla, zygoma, floor of orbit and nose.
  - LeFort III - Lower 2/3 of the face.
LeFort Fractures
LeFort Fractures
Signs and Symptoms

- Often associated with orbital fractures:
  - Risk of serious airway compromise due to bleeding and edema.
  - Contraindication to NG tube or nasotracheal intubation.

- The patient may present with:
  - Edema, epistaxis, numb upper teeth.
  - Unstable maxilla, CSF rhinorrhea.
  - Unusual facial appearance.
    - “Donkey face” (lengthening).
    - “Pumpkin face” (edema).
    - Nasal flattening.
Management

- Spinal motion restriction.
- Airway is the most difficult and most critical priority.
- Consider early intubation.
- Surgical airway may be the only alternative but NEVER the first consideration.
- Suction and control bleeding.
- Critical trauma patient - transport accordingly.
Facial Fractures

- Placing an NG tube or nasal intubation may be dangerous.
Ear Trauma

- **External injuries:**
  - Lacerations, avulsions, amputations, frostbite.
  - Control bleeding with direct pressure.

- **Internal injuries:**
  - Spontaneous rupture of eardrum will usually heal spontaneously.
  - Penetrating objects should be stabilized, not removed.
    - Removal may cause deafness or facial paralysis.
    - Hearing loss may be result of otic nerve damage in basilar skull fracture.
**Ear Injuries**

- **Separation of ear cartilage:**
  - Treat as an avulsion.
  - Dress and bandage.
  - Consider disability and cosmetic concerns.

- **Bleeding from ear canal:**
  - Cover with loose dressing only.
Barotitis

- Changes in pressure cause pressure buildup and/or rupture of tympanic membrane.
- Boyle’s Law, at constant temperature, the volume of gas is inversely proportionate to the pressure.
- Signs and symptoms include pain and blocked feeling in ears.
- Equalize pressure by yawning, chewing, moving mandible, swallowing (opens the Eustachian tubes allowing gas to release).
Vertigo

- Caused by viral or bacterial infection of the vestibular nerve (neuritis) or labyrinthitis.
- Feeling of dizziness, vertigo, disequilibrium, imbalance, and nausea.
- Precipitated by sudden movement.
Eye Injuries

- Penetrating injuries:
  - Abrasions
  - Foreign bodies (deep, superficial, or impaled)
  - Lacerations (deep or superficial, or lac of the eyelid)
Eye Injuries

- **Blunt trauma:**
  - Swelling.
  - Conjunctival hemorrhage.
  - Hyphema.
  - Ruptured globe.
  - Blow-out fracture of orbit.
  - Retinal detachment.
Eye Injuries

- Burns
  - flash
  - acid/alkali

Alkali burn of the eye.
Eye Injuries

- Acid Burn
- Fireworks
Blow-out Orbital Fracture

- Usually result of a direct blow to the eye.
  - S/S - flatness, numbness.
  - Epistaxis, altered vision.
  - Periorbital swelling.
  - Diplopia.
  - Inophthalmos
  - Impaired ocular movement
Foreign Bodies

- S/S - sensation of something in eye, excessive tearing, burning
- Inspect inner surface of upper lid as well as sclera
- With non-penetrating objects and/or injuries, flush with copious normal saline away from opposite eye.
Foreign Bodies and Penetrating Eye Injuries

- If the impaled or penetrating object cannot be removed with irrigation, cover both eyes without applying pressure to the object.
- Transport to a Trauma Center.
Morgan Lens

1. Inspect for injury and possible embedded objects. Remove contact lens if present.

2. Instill 2 drops of a topical anesthetic in each eye and repeat every 10 minutes during irrigation.
3. Attach the lens to the delivery set and connect to a bag of warmed LR and flush the system. If LR is not available, 0.9% NS is an acceptable substitute.
4. Start the flow at a slow rate and insert the lens having the patient look down and inserting the lens under the upper eyelid. Then have the patient look up, retract the lower eyelid and drop the lens in place.
5. Adjust the flow to 1 – 2 liters per hour and provide continuous irrigation to the receiving facility. Do not allow the system to run dry.
6. Secure the tubing to the forehead with tape to prevent accidental removal and absorb excess run-off.
Corneal Abrasion

- Caused by foreign body objects, eye rubbing, contact lenses.
- S/S - pain, feeling of something in eye, photophobia, tearing, decreased visual acuity.
- Irrigate, patch both eyes.
- Usually heals in 24 to 48 hours if not infected or toxic from antibiotics.
Other Globe Injuries

- Contusion, laceration, hyphema, globe or scleral rupture
- S/S - Loss of visual acuity, blood in anterior chamber, dilation or constriction of pupil, pain, soft eye, pupil irregularity
Other Globe Injuries

Management:
- Consider C-spine precautions due to forces required for injury.
- No pressure to globe for dressing, cover both eyes.
- Avoid activities that increase intra-ocular pressure.
Hyphema
Subconjunctival Hemorrhage
Mouth Injuries

- Usually result from:
  - MVCs.
  - Blunt injury to the mouth or chin.
  - Penetrating injury due to GSW, lacerations, or punctures.
Mouth Injuries

Primary concerns:

- Airway compromise secondary to bleeding.
- FBAO secondary to broken or avulsed teeth.
- Impaled object.
Mouth Injuries

- **Management:**
  - ABCs.
    - Suction prn.
  - Stabilize impaled object.
    - Remember the impaled object in the cheek. . .this is the one you can remove because you can control bleeding from both sides.
  - Collect tissue, tongue, or teeth.
Dental Trauma

- 32 teeth in normal adult.
- Associated with facial fractures.
- May aspirate broken tooth.
- Avulsed teeth can be replaced so try to find them!
- Early hospital notification to find dentist.
- < 15 minutes, may be asked to replace the tooth in socket.
- Do not rinse or scrub (removes periodontal membrane and ligament).
- Preserve in fresh, whole milk or use saline for a short timeframe (less than 1 hour).
Dental Trauma
Nasal Injuries

- Variety of mechanisms including blunt or penetrating trauma.
- Most common injury:
  - Adults – Epistaxis.
  - Children - Foreign bodies.
Nasal bone

Septal cartilage
Maxillary bone (frontal process)

Lateral cartilage
Lesser alar cartilage
Greater alar cartilages

Dense fibrous connective tissue
Nasal Injuries

Epistaxis

- Anterior bleeding from septum.
  - Usually venous.
- Posterior bleeding.
  - More difficult to control.
  - Often drains into airway.
  - May be associated with:
    - Sphenoid and/or ethmoid fractures.
    - Basilar skull fracture.
Nasal Injuries

Foreign Bodies in the Nose:

- Variety of objects.
  - Food.
  - Toys.
- Many creative ways to remove objects (including the use of superglue).
- Often can be left alone and removed later.
Nasal Injury Management

- **Epistaxis**
  - Direct pressure over septum.
  - Upright position, leaning forward or in lateral recumbent position.
  - Guaze under upper lip.
  - Foley catheter can be used for posterior bleed.
- If CSF is present, do not apply direct pressure, allow to drain.
Neck Trauma

- Trauma to the neck is divided into 3 zones.
  - Zone 1 = sternal notch to top of clavicles (highest mortality).
  - Zone 2 = clavicles or cricoid cartilage to angle of the mandible (contains major vasculature and airway).
  - Zone 3 = above angle of mandible (distal carotid, salivary, pharynx).
Neck Trauma

- **Transected Trachea:**
  - Larynx separated from trachea or fractured. May present with:
    - Vocal cord and soft tissue swelling of the airway.
    - Altered airway landmarks.
    - Subcutaneous emphysema.

- **Major vessel lacerated or torn:**
  - Severe bleeding (large vessels).
  - Airway compromise.
  - Risk of air emboli, hypoxia, or ischemia.
Neck Trauma

- **Signs and symptoms:**
  - Pale or cyanotic face.
  - Obvious external injury.
  - Frothy blood or sputum from wound.
  - Subcutaneous air.
  - Voice change, vocal fremitus.
  - Feeling of fullness in throat.
  - Signs and symptoms of stroke secondary to an air emboli.
Esophageal Injury

- Especially common in penetrating trauma.
  - S/S may include subcutaneous emphysema, neck hematoma, blood in the NG tube or posterior nasopharynx.
- High mortality rate from mediastinal infection secondary to gastric reflux through the perforation.
- Consider semi-fowler’s vs. supine position unless contraindicated by mechanism of injury and spinal immobilization.
Neck Trauma Management

- **ABCs:**
  - Suction.
  - Intubate as soon as possible. Consider RSI.
  - May require cricothyrotomy.
  - Stop the bleeding if possible.
    - Occlude large blood vessels quickly.
    - Left lateral position with occlusive dressing to wound.
    - Use smooth hemostats if required to clamp off vessel.
- Consider spinal motion restriction.
- Stabilize impaled objects.
- Transport to a trauma center.
Questions?