Facial Injuries in the Athlete

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Skull Fracture!
• Usually d/t blunt trauma to the head
• Palpate for step-offs/deformities, look for bleeding in scalp
• Red flags suggesting skull fx:
  - hemotympanum (blood behind tympanic membrane) - battle sign (bruising behind ear auricle d/t basilar fx) - raccoon eyes (periorbital ecchymosis)
  - clear otorrhea (CSF fluid)
  - clear rhinorrhea (CSF fluid)
• Diagnosis is made by CT scan of skull/face
• Complications include infection/meningitis, wound contamination, communication with underlying brain or CSF
• Ask for headache, nausea/vomiting, AMS to r/o intra-cranial trauma....
May need to rule out with brain CT or MRI
I have no disclosures to report
Outline

• Objectives
• Introduction
• Epidemiology
• Anatomy
• On-Field Assessment
Outline

• Injuries
  – Nose
  – Ear
  – Mouth and Teeth

• Prevention

• References
Introduction

• The face is frequently exposed to injury during sports that involve body or implement contact

• Direct contact with
  – Opponent: head, fist, elbow
  – Equipment: ball, puck, racquet
  – Stationary objects: goalpost, mat, tree limb
Introduction

• General Classification
  – Soft tissue injury without damage to underlying structures
• Most common type
• Usually bruises and lacerations Often from low speed trauma
• Fist or elbow
Introduction

• General Classification (cont.)
• Soft tissue injury with damage to underlying structures
• Underlying structures include bone, cartilage, teeth, blood vessels, nerves or muscle
• Usually from high speed trauma – balls, pucks, sticks
Introduction

- Facial injuries can result in both functional and cosmetic deficits if not managed properly
Epidemiology

- Facial injury rates are difficult to quantify since they are so common
  - Occur in many settings (playground, practice field, backyard)
  - Majority are minor and not reported
Epidemiology

- 3-29% of facial injuries occur from participation in sports
- 60-90% occur in males age 10-29 yrs
- Mechanism of injury is usually known and is usually direct impact
Epidemiology

- Recent study showed 23% incidence rate (incidence/total players) of head and face injuries over two regular seasons of NCAA field hockey in Big Ten conference
Epidemiology

• Most injuries were from contact with ball (56%), followed by stick contact (33%), then contact with another player (11%)

• Types of injuries:
  – lacerations (32%)
  – bruises & hematomas (26%)
  – concussions (18%)
  – facial fractures (13%)
  – dental injuries (6%)
  – other (5%)
Anatomy

- Facial bones are subcutaneous and easily palpated
Anatomy

- Zygomatic arch forms the prominence of the cheek
Anatomy

- Mandible forms the lower jaw
- Horseshoe shaped
- Body, angle, ramus easily palpated
- Coronoid process – palpated by direct intra-oral approach
- Alveolar ridge
On Field Assessment

- Airway, Breathing, Circulation
  - Blood, mouth guard, dislodged tooth may obstruct airway

- Cervical spine precautions if c-spine tenderness, unexplained neurologic symptoms or unconsciousness
On-Field Assessment

• **History**
  - Ask if loss of consciousness
  - Look for mental status change

• **Ascertain mechanism of injury**
  - Ask if associated injuries
  - Consider concussion
On Field Assessment

- **Exam**
- Observe for facial asymmetry or structural depressions
- **Inspect face from two planes - AP and inferior positions**
- Allows for visualization of subtle changes suspect underlying fracture
- **Identify areas of bruising or bleeding**
On Field Assessment

• Inspection should be done as soon after injury as possible as facial swelling will quickly mask abnormal contours

• Systematically palpate the orbital bones, nasal bone, maxilla, mandible, TMJ looking for pain, numbness, crepitus, step-off

• Palpate intra-orally as well
On Field Assessment

- Look for sunken eye globe
- Abnormalities in extra-ocular eye movements (CN III, IV, & VI)
- Reduced sensation of skin below the eye (infra-orbital nerve)
- All suggestive of orbital blowout fracture with nerve or muscle entrapment
On Field Assessment

- Inspect mastoid process for ecchymosis ("battle sign")
- May signify a basilar skull fracture - rare
  - Often associated with vertigo, headache or hearing changes
- Change
  - Assess for flattening of the cheek
- May indicate fracture of zygomatic arch - common
On Field Assessment

- **Maxilla** - assess stability by grasping central incisors and attempting to move jaw
- **Mobility of hard palate indicates maxilla fracture**
- **Mandible** – look for malocclusion Fx – teeth won’t feel right
On Field Assessment

- Inspect nares and auditory canals for obstruction, hematoma or CSF leak – CSF leak – rare, but emergency; meningitis risk
- CSF will be positive for glucose on a urinary dipstick
- Differentiates CSF from normal rhinorrhea
- CSF leaking into mouth will give salty taste
On Field Assessment

- Consider diagnostic imaging – X-rays may be useful
- Facial series
  Panorex views of mandible
- Nasal views usually not helpful!
- CT scan if fracture is suspected
On Field Assessment

- Return to Play
- Decision based on above exam – Precluded by
  - Airway obstruction
  - Altered mental status
  - Suspected fracture
  - Active bleeding
  - Visual difficulty
Nose Injuries

• Epistaxis-Nosebleed
• Usually arises from plexus of vessels in anterior septum (95%) called Kiesselbach’s area
• Bleeding site often visualized
• Posterior bleeds are rare (5%) not directly visualized
• Anterior bleeds drip from the nostrils, posterior bleeds drain into the throat
Nose Injuries

• Epistaxis
  – Initial treatment of most nosebleeds is prolonged direct pressure *(up to 20 minutes)* to lower nose which compresses vessels on the septum
• Cold compress to nasal bridge and back of neck may encourage vasoconstriction
• If bleeding continues may apply epinephrine 1:1,000,000 to the septum
• If bleeding still continues, consider referral since you need great lighting and suction
Epistaxis

- If bleeding site is localized may cauterize with silver nitrate applicators
- Consider packing
- If emergency hemostasis needed, may place Foley catheter in nose, inflate and pull back until snug to tamponade bleeding
- Use Vaseline BID to septal mucosa for prophylaxis of recurrent nosebleeds
Nose Injuries

- Nasal Fractures
- Patients may report feeling a crack, severe pain, nosebleed, inability to breathe through nose, deformity, crepitus, and mobility
- Lateral blow: simple fracture with deviation to one side
- End-on blow: may result in comminution
Nasal Fractures

- Evaluate for deformity, crepitus, mobility
- Look for septal hematoma, CSF leak – Swelling often precludes adequate assessment of deformity
- X-rays seldom helpful with diagnosis or treatment decisions
Nasal Fractures

• Reduction indicated for nasal obstruction or cosmetic deformity

• Successful reduction is usually possible if done immediately after injury (< 1 hour)
Nasal Fractures

- A soft probe placed inside the nares can sometimes move the depressed or deviated septum back into anatomical position

- There is risk of arterial injury and severe hemorrhage with immediate reduction of nasal fractures
Nasal Fractures

- Delayed reduction is preferable with referral to ENT within 7 days of injury
- Delayed reduction is often under general anesthesia
- Displaced nasal fractures in young athletes are frequently reduced due to smaller nasal passages and tendency for increased sinus infections if not reduced
Nasal Fractures

- Avoid return to play for at least a week after nasal fracture (debatable)

- External protection devices usually worn for four weeks

- Some athletes have delayed reduction until after the end of the season
Nose Injuries

- Septal Hematoma
- A TRUE EMERGENCY
- Caused by hemorrhage between septal cartilage and mucosa
- Often associated with nasal fractures but can be from minor trauma
- Prone to abscess formation and may cause pressure necrosis to underlying cartilage
Septal Hematoma

- If bilateral, cartilage can die in 24 hours
- Saddle nose deformity or chronic nasal obstruction may result
- Patients present with nasal obstruction, pain, fever
- Exam reveals a dull blue to red, cherry-like structure occluding the nasal passage
Septal Hematoma

- Treatment is immediate evacuation by needle aspiration or small incision followed by packing for several days.
- Prophylactic antibiotics to prevent septal abscess and subsequent cartilage necrosis.
Ear Injuries

- Auricular Hematoma
- Collection of blood between the skin and auricular cartilage
- Secondary to contusion or shearing trauma to the pinna (external ear)
- Presents with throbbing pain and swelling in fossa
- Treat with ice, aspiration with sterile technique and compression
Auricular Hematoma

- Monitor daily
- May develop into chronic swelling known as "cauliflower ear"
- Return to sport can be immediate if ear protection is worn
- Repeat contact without ear protection increases chance of poor cosmetic result
Splinting
Ear Injuries

- Auricular Injuries
- Always inspect for lacerations after ear trauma
- Lacerations between scalp and ear are easily missed
- Can lead to cosmetic deformity or loss of ear if they involve the cartilage
- Refer to ENT
Ear Lacerations

• Suspect if history of ear being pulled forward
• Analgesia of ear gained by raising a wheel of lidocaine around entire base of ear
• Tears of cartilage should be carefully aligned and sutured with 5.0 absorbable suture
• Prophylactic antibiotics are recommended to prevent infections
Ear Injuries

- **Tympanic Membrane Rupture**
- Occurs from a blow to the side of the head – hard object or hitting water at high speed
- Usually presents with painful pop and often bleeding, unilateral hearing loss, vertigo, nausea
- Hole in TM seen on otoscopic exam – may have blood in external canal
Tympanic Membrane Rupture

- Usually heal spontaneously (90% in 8 weeks)
- No treatment necessary usually except for frequent re-examination
- Antibiotics can be given if infection develops or if contamination suspected (Cortisporin Otic drops or amoxicillin orally)
- Keep water out! –silly putty
Tympanic Membrane Rupture

- Advise patient to sneeze with mouth open and avoid blowing nose for a few weeks
- If vertigo present with TMR then should be seen by ENT
- Possible fistula with drainage of perilymph and permanent hearing loss
- Return to play after vertigo has resolved and depends on type of sport
Tympanic Membrane Rupture

If sport with significant pressure changes (platform diving, scuba, high altitude mountain climbing) then no return until TM healed

• If water sport without significant pressure changes then athlete can return with custom fabricated earplug before TM is healed (debatable)

• If dry land sport without pressure changes, athlete may return before TM is healed as long as ear protection is worn
Mouth and Teeth Injuries

- Lip Lacerations
- Result from traumatic compression of lip onto the teeth
- Bleed profusely
- Look for associated dental injury
- Most superficial lacerations of the lips (and those involving the tongue) heal without suture repair
Lip Lacerations

- Deep lacerations of the lip should be repaired but require good anatomical approximation for the outside.

- If vermilion border involved, place first suture at mucocutaneous junction to insure accurate alignment.
Mouth and Teeth Injuries

- TMJ Dislocation
- Mandible dislocates anteriorly and then muscle spasm pulls it superiorly
- May occur when athlete whose mouth is open is struck in the mandible
- May also occur atraumatically if mouth is opened too wide during a yawn or shout
- Presents with inability to close mouth and moderate pain
Mouth and Teeth Injuries

- TMJ Dislocation
  - Usually dislocated mandible head is palpable anterior to articular eminence of glenoid fossa
TMJ Dislocation

• Relocation performed by placing thumbs on line of lower teeth as posterior as possible and applying downward and slightly posterior force – wrap your thumbs

• May need mild sedation (benzodiazepines)

• Longstanding dislocations may require general anesthesia
TMJ Dislocation

- 10 days of mouth rest with minimal opening, soft diet, analgesics

- Contact sports should be avoided for 2 weeks; boxers should not spar for at least 6 weeks
Mouth and Teeth Injuries

- Tooth Fracture
- Occur from direct trauma
- Tooth fragment should be retained in best medium available (descending order)
  - Hank's Balanced Salt Solution (H.B.S.S.)
  - Milk
  - Saline
  - Saliva (buccal vestibule)
  - Water
Tooth Fractures

- **Enamel chip fractures**
  - Painless
  - Enamel at fracture site is uniform in color
  - Non-urgent dental follow-up
  - Only requires smoothing of rough edges

- **Fractures of the dentin**
  - Moderately painful
  - Sensitivity to air at the fracture site
  - Yellow dentin visible at the fracture site
  - Should be seen by a dentist within 24 hours
Tooth Fractures

- Pulp Fractures
  - Severe pain
  - Pink or red pulp at the fracture site
  - Require immediate dental evaluation
  - Treatment with root canal and cap
Tooth Avulsion

• Results from direct trauma
• Quick and appropriate action may save the tooth
• Handle the tooth by the crown only
• Rinse debris off with HBSS, milk, saline or suck clean under the tongue
Tooth Avulsion

- Do not scrape debris off the root – Get to dentist immediately

- If patient is conscious and alert, then re-implant the tooth and splint by biting gauze or wet tea bag

- If patient unconscious then store in best available medium, and transport for emergency dental care
Tooth Avulsion

- With appropriate storage, a tooth can often be successfully re-implanted up to 2 hours after the injury.
- Likely no chance of salvage after 6 hours.
- Prophylactic antibiotics along with tetanus booster are usually given.
- If a tooth or fragment is missing, then consider chest and abdominal x-rays to help locate it.
Luxation of Tooth

- Tooth still in socket, but abnormal position
  - Reposition tooth in socket
  - Stabilize tooth by gently biting on towel or gauze
Luxation

- Athlete may require local anesthetic to reposition tooth
- Stabilize tooth by gently biting on towel or gauze
  Transport to dentist
Extruded

Tooth partially pulled out
Gentle reduction attempt and transport
Intruded

Tooth pushed into gum - appears short
Do nothing (don’t reposition and transport)
Prevention

- Facemasks, face shields, eye shields, mouth-guards, helmets available for many sports
- Equipment is designed to protect the athlete without interfering with sporting activity
- It should fit comfortably and allow the athlete to speak and breathe during play
Prevention

- Customized equipment is preferred
- May provide a psychological benefit by
  - Increasing athlete’s confidence
- Remove oral jewelry
Prevention

• Numerous studies show face protection reduces incidence of facial injuries
• Few sports mandate their use
  Face masks and mouth-guards have dramatically
  reduced facial injuries in football since they became mandatory in 1962
• – Still inadequate face protection in baseball
• Mouth-guards specifically reduce dental and mandible injuries –even with braces
• No strong evidence that mouth-guards protect against concussion
Summary

- Nasal fxs - no X-rays
- Septal hematomas – refer to ENT
- Ear lacerations – refer to ENT
- Tympanic membrane ruptures – keep water out
- Dental avulsions, luxations, fractures (except chip) – refer to Dentist
References

- Academy for Sports Dentistry. Farmersville, IL 62533. 800-273-1788
- Cassisi, Nicholas J. ENT, UFCOM. personal interview 3/25/09
References