No Conflict

The views expressed in these slides and in today’s discussion are mine.

My views may not be the same as the views of my colleagues.

Participants must use discretion when using the information contained in this presentation.

I have no corporate or financial conflicts of interest regarding the content of this lecture.

Objectives:

- Discuss facial trauma exposure and frequency in the athletic population.
- Recognize different facial injury patterns and assess the need for urgent treatment referral in the facial trauma population.
- Discuss return to play and the utility of protective devices.
Facial injuries in Sports:

- Sports activities account for 3-29% of facial injuries (Viozzi, CF).
- Sports activities account for 10-42% of all facial fractures (Romeo, et. al.).
- Facial fractures account for 4-18% of all sports injuries (Reehal, P.)
- 70% of facial fractures occur in the mandible, zygoma, and nose (Iida, et. al.)
- Sports most commonly associated with facial fractures:
  - Soccer (38.1%), baseball (16.1%), basketball (12.7%), martial arts (6.4%), skiing/snowboarding (4.7%) (Huang K, et. al.)

Facial injuries:

- Head
- Eyes
- Ears
- Nose
- Mouth, teeth, and Jaws

Head trauma

- ABC’s
- C-spine precautions
- Mechanism of injury
- Brief history of event
Facial injuries:
How do we assess risk of returning to play?

- Mental status exam
- Visible deformity
- Asymmetry
- Localized swelling
- Active bleeding
- Leakage of fluid
- Ecchymosis
- Dysfunction

Secondary facial exam - off the field of play

- Palpation of bony landmarks
- Assess the nasal septum
- Assess nose for hemorrhage or fluid leakage
- Assess ear canals for hemorrhage or fluid leakage
- Assess mouth and teeth
  - Fractured teeth
  - Lip and tongue lacerations
  - Malocclusion

Mouth injuries:

- Soft tissue injuries:
  - Lip and tongue lacerations
  - Mucosal lacerations don’t always need repair
  - Check for foreign bodies
  - “Inside out” repair
- Hard tissue injuries:
  - Tooth fractures (enamel, dentin, pulp)
  - Tooth displacement or avulsion
    - “30 minute rule”, store in milk or cheek vestibule, physiologic saline, handle enamel only
    - Gently reduce displaced teeth/fragments into arch, use gauze or towel for hemostasis, ice
  - Refer to emergency department or dentist/O.M.F. surgeon
Tooth re-implantation and semi-rigid splint application.

Splint for 7-10 days
Root canal treatment >/= 2 weeks after re-implantation

Facial Fractures in sports:

Mechanism of injury:
- Contact (between players [head, nose, etc.])
- Contact with equipment (balls, pucks, handlebars, etc.)
- Contact with environment, obstacles, or playing surface (real, gymnastic equipment, goalposts, trees)

Forces required to produce a fracture:
- Nasal fracture – 30 g
- Zygomatic fracture – 50 g
- Mandibular angle fracture – 70 g
- Frontal region – 80 g
- Maxillary (midline) fracture – 100 g
- Mandibular (midline) fracture – 100 g
- Supraorbital rim fractures – 200 g

Facial fractures – treatment paradigm
Fracture treatment goals:
- Fixate fractures to reestablish structural support of the facial skeleton
- Rigid internal fixation is applied at affected vertical and horizontal buttresses
- Closed reduction may be appropriate in some cases
Nasal injuries

- Most common sports related facial injuries
- External deformities (pre-morbid?)
- Epistaxis
  - Anterior bleed – squeeze and pack, ice
  - Associated with nasal fracture?
  - Reduction and pack (external)
- Assess nasal septum!
  - Septal hematoma is an emergency!

Nasal Fracture

Clinical signs:

- Nasal deformity/deviation
- Crepitation/mobility
- Epistaxis
- Swelling/ecchymosis
- Pain
- Nasal airway obstruction

Nasal fractures

Assess for hematoma

Internal support and tamponade with packs

External splinting
Nasal fracture management:
Closed reduction

Comminuted nasal fracture reduction and splint

Eye injuries
- Soft tissue injuries
- Eyelid lacerations, superficial or deep globe injuries
- Bony injuries
  - Orbital fractures
  - Orbit blowout fractures
  - Zygomaticomaxillary complex (ZMC) fractures
- Brief clinical exam:
  - Visual acuity, EOM, pupil shape and reaction, retinal symptoms?
  - Palpation of bony landmarks
  - Visual acuity changes, pupillary changes, retinal symptoms require urgent referral to ophthalmologist.
Trans-conjunctival pre-septal approach to orbit rim and floor

Orbit Blow-out (trap door)

Orbit floor blow-out exploration and implant
Mandible fractures:

- Brief clinical exam:
  - Malocclusion, numbness, asymmetry
- Most frequent locations:
  - Subcondylar, body/angle, parasymphysis,
- Look for bilateral fractures
- Imaging:
  - Panoramic x-ray
  - Mandible series x-rays
  - CT scan

Mandible fracture: Patient Examination

- Change in occlusion
- False point of motion

Mandible fracture: Change in Occlusion
Mandible fracture: Patient Examination

- Sensory nerve changes and mobile fracture

Principles of Fracture Treatment

- Exposure
- Reduction
- Stabilization

Application of maxilla-mandibular fixation (MMF)

- Anatomic reduction
Stabilization (rigid internal fixation)

- Post-op reduction
- Mandibular midline symphysis fracture
- L. Mandibular angle fracture

Maxillary Fractures

Schematics courtesy of AO Foundation

Midface (ZMC) fracture treatment

Schematic courtesy of AO Foundation
Zygomatic-Orbital Maxillary Fractures: 3 Point Approach

ZMC fracture – vertical and transverse buttresses

Zygomatico-frontal  Zygomatic buttress  Orbit rim/floor

ZMC fracture reduction

Pre-op  Post-op
Evidence based research is limited
Bone healing timeline used as guideline for recovery period
Combat sports – no sooner than 3 months following fracture
Any athlete returning to competition before complete bone healing needs facial protection
Full face shield, modified batting helmet, extended hockey eye visor, larger football face masks
Role of sports psychologist
Dento-alveolar trauma
Use discretion, stabilize teeth, protective mouth-guard

Bone healing and athlete timeline after facial fractures:

Bone healing timeline:
- 0-5 days: inflammatory reaction/hematoma stage
- 4-40 days: callus formation stage
- 25-50 days: remodeling stage

Athlete timeline:
- No sports activities for the first 20 days
- Light activity – days 21-30
- Non-contact drills – days 31-40
- Full contact and game play – after day 41

Facial Protection devices
Facial protection devices:

- Any athlete returning to competition before complete bone healing needs facial protection
- Full face shields, modified batting helmet, extended hockey eye visors, larger football face masks
- Technology has improved the workflow for custom mask fabrication
- 3-D photogrammetry or 3-D graphic imaging vs. conventional facial molds
- Use of facial guards by high profile athletes has reduced the stigma for young athletes
- Dental mouth guards do not prevent concussions
- Athlete compliance and coach/trainer education is paramount

References: