

**Facial Trauma Emergencies
in Sports:**
Recognition and Management

CENTRAL CONNECTICUT STATE UNIVERSITY SPORTS MEDICINE SYMPOSIUM
MARCH 5, 2019

MARK C. FLETCHER, DMD, MD, FACS
CLINICAL ASSISTANT PROFESSOR, DIV. OF ORAL AND MAXILLOFACIAL SURGERY, UNIV. OF CT
SECTION HEAD, DIV. OF ORAL AND MAXILLOFACIAL SURGERY, HARTFORD HOSPITAL
PRIVATE PRACTICE: AVON ORAL, FACIAL, AND DENTAL IMPLANT SURGERY, LLP, AVON, CT
MARKCFLETCHER@ATT.NET

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.)
- ▶ 75% 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/DMF surgeon

Tooth re-implantation and semi-rigid splint application.



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



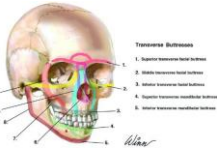
Source: Montreal Childrens Hosp.

Facial Fractures in sports:

Rupp, T.J., et. al. <https://emedicine.medscape.com/article/84613-overview>

- ▶ **Mechanism of injury:**
 - ▶ Contact between players (most common)
 - ▶ Contact with equipment (balls, pucks, handlebars, etc.)
 - ▶ Contact with environment, obstacles, or playing surface (mat, 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



Schematic obtained from Pocketdentistry.com

- ▶ **Fracture treatment goals:**
 - ▶ Fixate fractures to reestablish structural support of the facial skeleton
 - ▶ Rigid internal fixation is applied at affected vertical and transverse 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 (feral)
- ▶ Assess nasal septum!
 - ▶ Septal hematoma is an emergency!

Nasal Fracture

Clinical signs:

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

Nasal fractures

Assess for hematoma

Fracture of the nasal septum

Septal hematoma

Nasal septum

Internal support and tamponade with packs

Merocel Surgical Products Corp.
Medtronic Xomed Inc.

External splinting

Denver Aquaplast PS
Thermoplastic Nasal Splint

Nasal fracture management: Closed reduction

Schematic from www.entfacialsurg.org

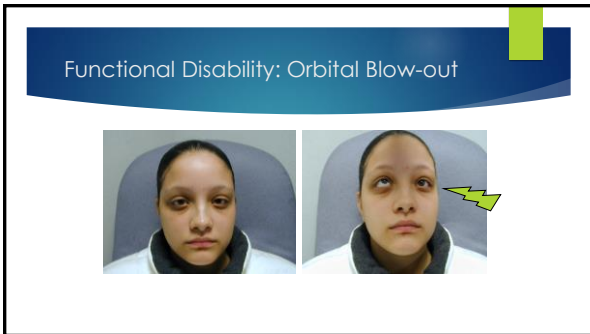
Comminuted nasal fracture reduction and splint

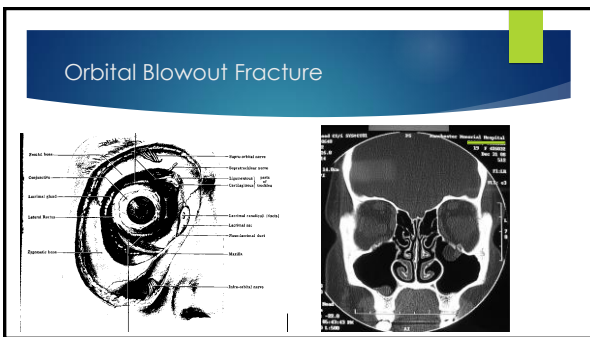
Denver Aquaplast FS
Thermoplastic Nasal Splint

Eye injuries

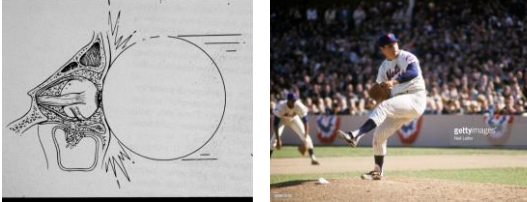
- ▶ Soft tissue injuries:
 - ▶ Eyelid lacerations, superficial or deep globe injuries
- ▶ Bony injuries:
 - ▶ Orbit rim fractures
 - ▶ Orbit blowout fractures
 - ▶ Zygomatico-maxillary complex (ZMC) fractures
- ▶ Brief clinical exam:
 - ▶ Visual acuity, EOM, pupil shape and reaction, retinal symptoms?
 - ▶ Palpation of bony landmarks
 - ▶ **Visual acuity changes, pupillary changes, retinal symptoms require urgent referral to ophthalmologist**








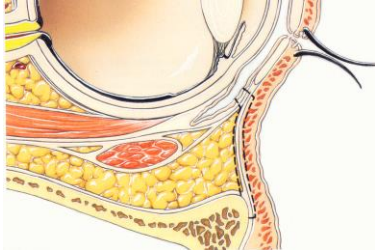
Blowout Fracture



The image contains two side-by-side panels. The left panel is a black and white anatomical diagram of the human face in profile, showing the orbital and maxillary regions. It illustrates a blowout fracture where the floor of the orbit is broken, allowing the orbital contents to herniate into the maxillary sinus. The right panel is a color photograph of a baseball player in a white uniform, captured in the middle of a pitching motion on a baseball field. A crowd of spectators is visible in the background.



The image contains two side-by-side panels. The left panel is a close-up photograph of a human eye that is significantly red and swollen, with a white, cloudy appearance, suggesting a serious ocular injury. The right panel is a coronal CT scan of the facial bones, showing a clear fracture of the orbital floor, which is a characteristic finding in a blowout fracture.



The image is a detailed anatomical diagram of the eye and its surrounding structures. It shows a cross-section of the eye, including the cornea, iris, lens, and retina. The diagram also depicts the orbital fat, extraocular muscles, and the bony orbit. A red, oval-shaped structure is highlighted within the orbital fat, possibly representing a herniated orbital fat or a specific anatomical feature.

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

Schematic obtained from Pocketdentistry.com

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 maxillo-mandibular fixation (MMF)

- ▶ Anatomic reduction




Stabilization (rigid internal fixation)

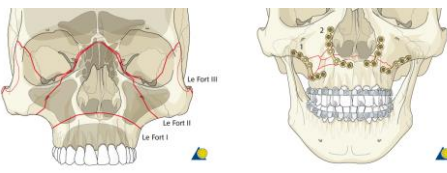
Post-op reduction

Mandibular midline symphysis fracture

L. Mandibular angle fracture



Maxillary Fractures




Le Fort III

Le Fort II

Le Fort I

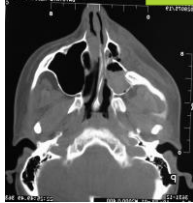
Schematics courtesy of AO Foundation

Midface (ZMC) fracture treatment



Schematic courtesy of AO Foundation

Zygomatic-Orbital Maxillary Fractures: 3 Point Approach



ZMC fracture – vertical and transverse buttresses

Zygomatiko-frontal Zygomatic buttress Orbit rim/floor

ZMC fracture reduction

Pre-op

Post-op

Return to play after facial fractures:

Rupp, T.J., et al. <https://emedicine.medscape.com/article/84613-overview>

- ▶ 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 visors, 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 shield, modified batting helmet, extended hockey eye visors, larger football face masks
 - Technology has improved the work-flow 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:

- Viozzi, CF. Maxillofacial and Mandibular Fractures in Sports. *Clin Sports Medicine*. 2017 April; 36(2):355-368
- Rupp, T.J., et. al. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4368163/> Updated Jan 31, 2014
- <https://www.ncaa.org/sportscare/2015/05/01/face-protect> NCAA Division I Consumer Trends and a Review of Over-the-Counter Faceguards. *Contemporary Sports Medicine*. 2015 May; 18(4): 104-108
- Hoffman, JF. An algorithm for the Initial Management of Nasal Trauma. *Facial Plast Surg* 2015; 31(3): 183-193
- Shaw, M, Collins, MP. Surgical Treatment of Orbital Boneball Fractures: Complications and Postoperative Care Patterns. *Ophthalmic Plastic Reconstruct*. 2014 Nov; 19(2): 219-224
- <https://pubmed.ncbi.nlm.nih.gov/2009059/> **Heung, K, You SH, Lee HS. Outcome analysis of sports-related multiple facial fractures. J Craniofac Surg. 2009 May; 20(5):825-9 [Medline]**
- Raafel P. Facial injury in sport. *Curr Sports Med Rep*. 2010 Jan-Feb; 9(1):27-34 [Medline]
- Roccio F, Diapero A, Naji A, Bertone S. Management of sport related maxillofacial injuries. *J Craniofac Surg*. 2009 Mar; 19(2):37-42. [Medline]
- <https://pubmed.ncbi.nlm.nih.gov/2009059/> **Forano S, Hickey C, Barnes GW, Barnes JF. Facial injuries in sports: a team physician's guide to diagnosis and treatment. Phys Sportsmed. 2004 Apr; 32(4):33-38 [Medline] [Full text]**
- Teich DA, Soporowski NJ. Epidemiology of orofacial sports related injuries. *Dent Clin North Am*. 2000 Jan; 44(1):1-18. v. [Medline]
- Lustin DM. Protecting the faces of America. *J Oral Maxillofac Surg*. 2000 Apr; 58(4):363 [Medline]
