OCULAR TRAUMA and SPORTS INJURIES

First Line Therapy for Sports Injuries and Blunt Trauma

General Trauma

Take care of the obvious
ABC’s
  Airway
  Breathing
  Circulation
Radiology
Concussion evaluation
Mental status of patient

History
Take your time with the history.
Inquire about angle of impact
Nature of insulting object
  Sharp, dull, big, small
Prior treatments
What was your vision before the injury?

Vision
Must Check VISION
Paramount Duty both legally and medically
Start with the most serious

Open globe
Major orbital trauma
Intraocular foreign body
Head/Neck trauma

CT
If you suspect any of the previous, a CT scan is indicated
Axial and Coronal sections (3mm) needed for suspected blow out
No MRI for fear of metallic foreign body

Open Globe
Check VA - reduced
Seidel’s sign
  Fl stain
Displaced pupil/expelled contents
Non-reactive pupil
Low IOP
Poor reflex
Hyphema

Open Globe
Do not patch
Shield Eye
Send to ER
Disproportionate conjunctival edema could be a possible indication of scleral rupture

Blunt Trauma
Check VA
Proptosis from retrobulbar hemorrhage
Contusion/sub-conj hemorrhage
Retinal detachment
Commotio Retinae
Traumatic uveitis or hyphema
Traumatic cataract
Blow out fracture
**Contusion**

**Need to get eye open**
**Will dictate urgency of consult**

Asses lids and globe for debris or lacerations
Check pupil response (round pupil)
Red Reflex?

**Contusion**

Do eyes move well together
Instill Fl to check for abrasions
Check IOP if all else is clear
Palpate bony orbital rim checking for tightness or crepitus (orbital emphysema)

**Black Eyes**

Severe
Palpate orbital rim

**Blow out fracture**

Check VA
Base and medial walls of orbit are very thin
Does not need to be a major trauma
Look for trapped extra-ocular muscles (reduced versions) - strabismus

**Sunken Eye - hypo-ophthalmos**
Infraorbital hypoesthesia
Diplopia
Pain on eye movement or nausea

**Need coronal cuts**

**Repair?**

Within 2 weeks
Symptomatic diplopia within 30º of primary gaze
Muscle entrapment (prevent ischemia and necrosis)
Fracture greater than 50% of orbit floor
Displaced orbital rim fracture
> 3mm of enophthamos, significant hypo-ophthalmos

**Monitor**
Diplopia outside central 30º
Modest isolated fractures
Improvement over first 2 weeks

**Orbital Trauma in Children**

Trap door orbital floor fractures are very common.
More elastic orbits
More common to get muscle entrapment

**Evaluation for repair typically in 5-7 days vs 2 weeks for adults**

**Lid lacerations**
Check VA
Difficult to suture because of tarsal plate and margin function
Refer to ophtho
Tetanus prophylaxis
Upper lid skin has no subcutaneous fat
Upper Lip
Must consider levator/aponeurosis
NO subcutaneous fat

Lower lid
Lacerated canthus
Lacrimal drainage system
Quality reconstruction necessary

Wound closure can be delayed for up to 3 days with satisfactory surgical outcomes in adults and 12-36 hours in children
   Can be beneficial to allow swelling to go down, leading to better visualization of tissue re-approximation

MRSA
Treat all athletes and healthcare workers as though they have MRSA

Periocular Infection
Any antibiotic regimen should have adequate central nervous system penetration to minimize the risk of meningitis and cavernous sinus thrombosis

Systemic steroid use is controversial and should only be used after sufficient antibiotic loading and on immunocompetent patients

Conjunctival Lacerations
Conjunctival Lacerations

Treatment?

NEVER PATCH !!!

Patching creates a great anaerobic environment
Patient can not tell if things are getting worse
Oxygen speeds healing
If a patch is needed let an eye doc make the decision
   Patch for pain until they get into your office?

Corneal abrasions

Check VA
Important to know what abraded the cornea – Organic vs Inorganic
Did the patient put anything into their eye afterwards?
Grade the level of pain/light sensativity
NEVER PATCH unless lid immobilization is necessary

Fl

LASIK
Any corneal abrasion on a flap is serious.
Microkeratome flaps can easily come off years after surgery

Femtosecond flaps incredibly stable, but can still have issues

Fluorescein

Always instill Fl for a suspected corneal abrasion
Need to use a cobalt blue light to excite the Fl
Be careful with the use of topical anesthetics

Abrasion Treatment
Minor abrasion require only prophylactic antibiotic and ocular lubricants (topical NSAIDS?)
Moderate to severe – cycloplegic, oral analgesic, bandage contact lens, Fluoroquinolone
   Clean up margins?
   Doxy?
Photokeratitis/Snow blindness

Check VA
Caused by UVB(C) exposure to the cornea – 320-290nm
Painful !!!!!
Superficial punctate keratopathy about 6 hours after exposure (corneal sun burn)
Typically self limiting
Welders flash, tanning beds, skiing, desert, sailing

UV keratitis treatment

Artificial tears
Oral analgesics
Antibiotic if infection is suspected
No topical anesthetics
cyclo

Radiation and Chemicals

Ultraviolet/Infrared
Chemicals involved
- Acids
- Bases
Duration of chemical contact

Chemical Burns

Check VA
Alkali Burn is way worse than Acid
Check pH if possible
Immediate irrigation
Do not wait until they are at your office
Absolute Emergency – 1 day consult at most for minor cases

Corneal Foreign Body

Remove if visible and not completely penetrating
Always document depth of FB
Stain cornea with Fl to look for tract marks from upper lid – invert upper lid
Anesthetize eye for patient comfort and to allow a better view.

Rust Ring

Traumatic Hyphema

Sports Injuries account for 60% of hyphemas (usually Pediatric)
Complications
- Elevated IOP
- Posterior Synechiae
- Peripheral anterior synechiae
- Corneal blood staining
- Optic atrophy
- Angle recession glaucoma (usually >180°)

Traumatic Hyphema

Draw the level of the clot and record the level of free cells

Tear usually occurs at the anterior aspect of the ciliary body in the angle

Uncomplicated hyphemas usually last 5-6 days

Traumatic Hyphema Treatments

Elevate head and shield the eye
Pain – acetaminophen (no Asprin)
Cycloplegics – decrease risk of posterior synechiae
Miotics – increase surface area for iris reabsorption
Traumatic Hyphema Treatments

Steroids – immediate use is debatable
Use after 4-5 days likely helpful to reduce risk of scarring

Traumatic Hyphema Treatments
Aminocaproic (antifibrinolytic) acid may be used for larger hyphemas or with increased risk of re-bleeds
Oral osmotic agents can be used to control IOP
Debatable whether any topical medications have a therapeutic advantage in the acute phase

Greater than 75% hyphema should be referred

Traumatic Hyphema Treatments
Aminocaproic Acid
May require inpatient care due to side effects
Syncope
Nausea
Vomiting
Hypotension

Purpose of Hyphema Treatments
Prevent IOP increase
Prevent Secondary Hemorrhage
Prevent Corneal blood Staining
Sickle Cell Anemia complicates things

Angle recession
Traumatic Cataract
Black Eyes

Mild
Traumatic Uveitis

Check VA
Light sensitive
Ciliary flush
Decreased VA
Decreased pupil response
Sub-conj hemorrhage

Traumatic Iritis
Traumatic uveitis
Commotio Retinae

Energy is transferred to the opposite side of the globe.
Inflammation will usually be on posterior nasal retina

At the macula Berlin’s Edema

Retinal Hemorrhage
Valsalva Retinopathy
High Altitude Retinopathy
Retrobulbar hemorrhage

Symptoms
Eye pain
Diplopia
Vision loss
Reduced ocular motility
Proptosis

Retrobulbar Hemorrhage

Signs
Proptosis
Increases IOP
Ecchymosis
Ophthalmoplegia
APD
Papilledema
Central retinal artery pulsation

Acute orbital compartmen syndrome
Build up of volume is only held back by medial and lateral canthal tendons

Lateral Canthotomy
Cantholysis
Neuro-ophthalmologic Trauma

Third, fourth and sixth nerve palsies can all happen
Third nerve palsies associated with worst outcome
Sixth nerve palsies associated with best outcomes
Neuro-ophthalmologic Trauma

Note
It has been shown that multiple cranial neuropathies were associated with less severe head injury and more significant extremity injury.
Dhaliwal et al.

Traumatic Optic Neuropathy
Can often be the only ophthalmic injury after significant head trauma

Believed to happen in the canalicular portion of the nerve
Traumatic Optic Neuropathy

Visual outcome is poor
Regardless of treatment (high dose corticosteroids, optic nerve sheath fenestration, or optic canal decompression), outcome is poor

RAPD presence is the most useful diagnostic test