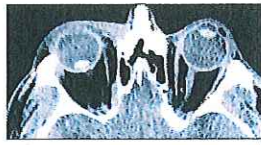


Ocular and Orbital Trauma



Patrick Sibony, MD

Eye Trauma: Incidence

- 1.3 million eye injuries in the US per year.
- 40,000 of these injuries lead to blindness in the US.

Ophthalmic Emergencies

	Minutes Count	Hours Count	Less Urgent
Trauma	Chemical burn Compartment syndrome (retrobulbar hemorrhage)	Ruptured globe Cranial penetration	Corneal abrasion Foreign body: <i>cornea, orbit, globe</i> Blunt closed eye injuries <i>HypHEMA, Traumatic iritis, Sphincter tear, Angle recession Vitreous hemorrhage, Choroidal rupture Retinal detachment Optic neuropathy</i> Orbital fractures Lid lacerations
<i>(Non traumatic) Ocular / Systemic Disorders*</i>	Angle closure CRAO	Orbital cellulitis Corneal ulcer	Conjunctivitis Non traumatic iritis Retinal detachments Vitreous hemorrhage

* Non traumatic emergencies were covered in the Red Eye and Sudden Vision Loss lectures.

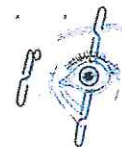
History

- Are one or both eyes affected ?
- Vision ? Vision prior to trauma ?
- Other symptoms ?
- Duration of symptoms?
- Any surgery prior to trauma?
- Circumstances surrounding the injury
e.g. work related, MVA etc .

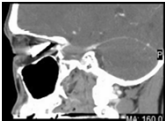
Evaluation

- Vision
- Inspection:
 - External exam (adnexae, globe)
 - Motility
 - Anterior segment (globe)
- Pupils (APD)
- Fundus, Intraocular Pressure,
- Confrontation VF
- Role of imaging in the evaluation

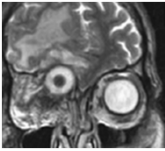
Examining the eye with a swollen lid



Imaging of Orbital Trauma



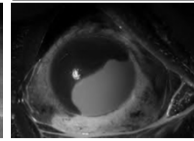
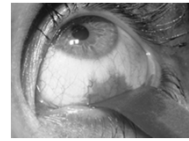
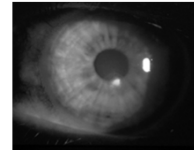
- CT scan is preferable to MRI
- Bone, Rapid, Easy to monitor patient
 - Foreign bodies, air, hemorrhage
 - Fractures
 - Cost
 - Needed for an MRI



- MRI
- Globe and intraocular injuries
 - Orbital
 - Foreign Bodies, hemorrhage
 - Traumatic Cranial Neuropathies

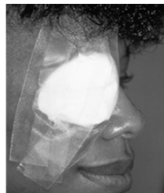
Corneal Abrasion

- FB sensation
- Pain
- Tearing
- Photophobia

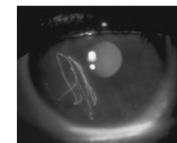
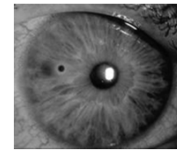


Corneal Abrasion: Treatment

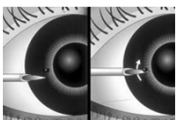
- Cyclogyl 1% BID
- Antibiotic qid
 - (Polytrim, Tobrex, Ocuflox)
- Pressure patch for large defects
- No patch:
 - contact lens, plant material
- Analgesic po or topical NSAID
- NOT ANESTHETICS



Corneal Foreign Body



Foreign Body: removal

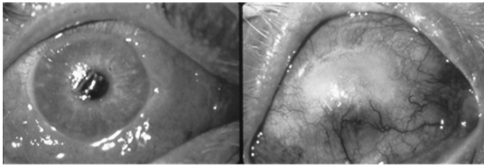


Chemical Burns



- Ocular emergency
- Alkali worse than acid
- **Immediate** irrigation !

Chemical Keratopathy



Chemical Burns: Initial ER Management

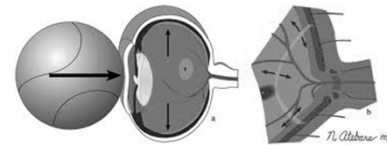


- Topical anesthesia
- Copious irrigation
- Check the fornix
- Check for foreign bodies

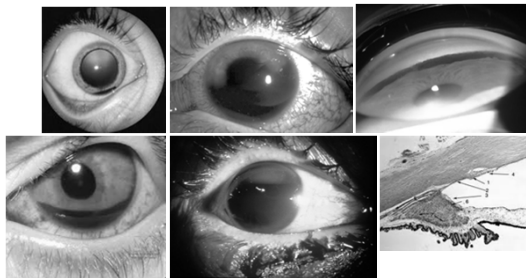
Chemical Burns: treatment after irrigation

- Topical cycloplegic
- Topical antibiotic
- Patch eye
- Prompt referral to ophthalmologist

Blunt Closed Eye Injuries



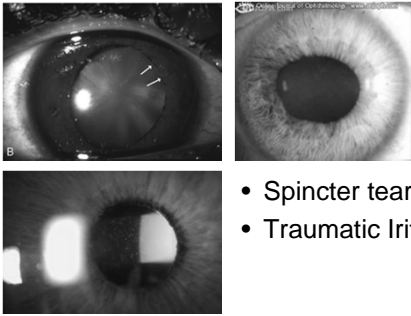
HypHEMA



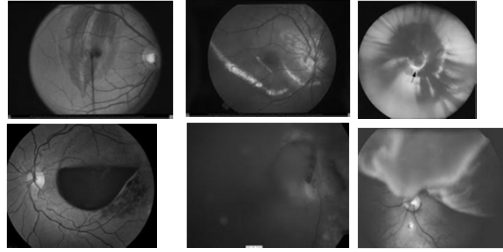
MANAGEMENT OF HYPHEMA

- Refer to an ophthalmologist
- Topical pred acetate 1%, and Atropine 1% BID
- Treat intraocular pressure if elevated
- No Aspirin
- Head elevation, bed rest
- Daily followups for days 1-5.

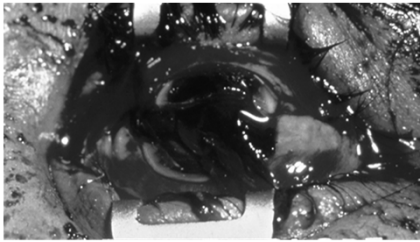
Closed eye injury: minor



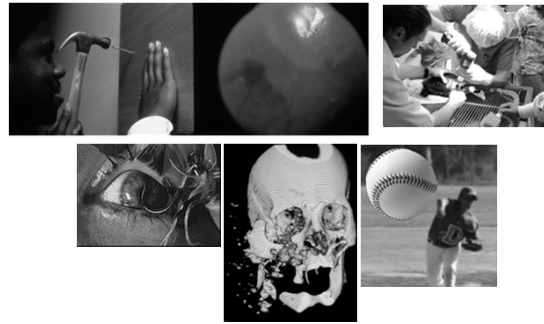
Closed eye injury : vision loss



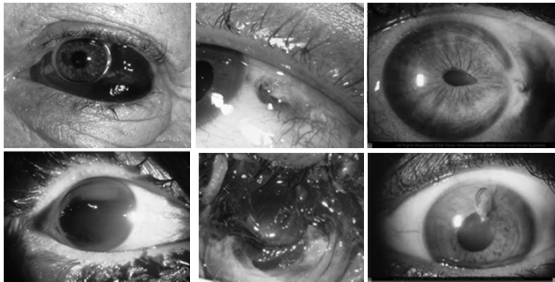
Ruptured Globe



Risk of Rupture



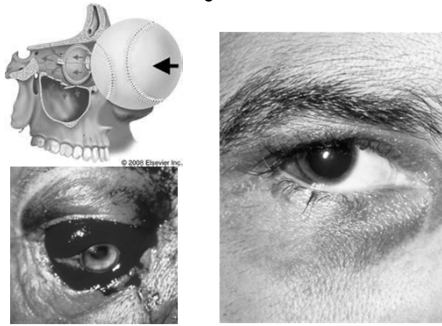
Signs of Rupture



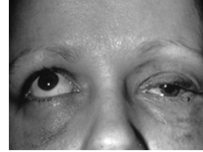
Stop Exam and Shield the Eye



Orbital Trauma

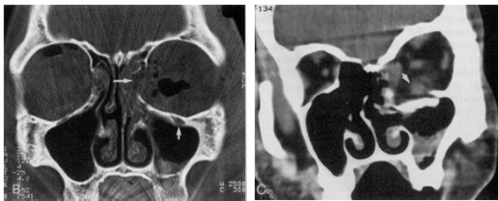


Blow out fracture: symptoms/signs



- Diplopia
- Restricted ductions
- Elevation, abduction.
- V2 hypesthesia
- Rim step
- Enophthalmos
- Crepitus of the eyelid

Blowout Fractures



Medial wall fracture

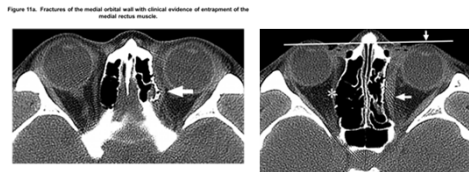
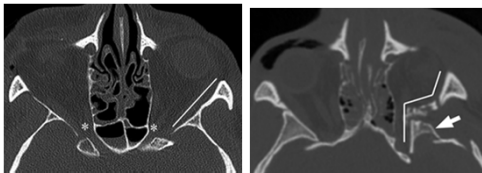
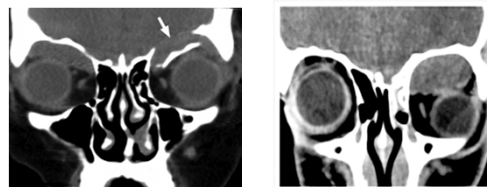


Figure 11a. Fractures of the medial orbital wall with clinical evidence of entrapment of the medial rectus muscle.

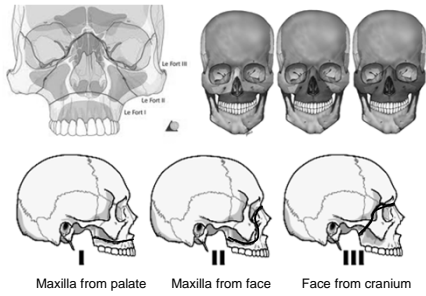
Orbital Apex



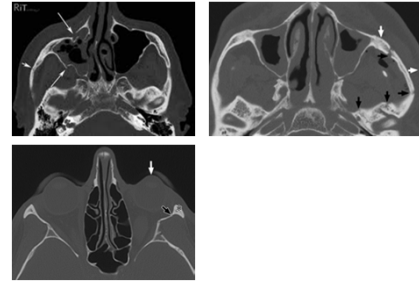
Roof Fractures



Associated Facial Fractures



Zygomatico Facial Complex (zmc) Fractures



ORBITAL TRAUMA: BLOW-OUT FRACTURES

- Surgery indicated only for persistent diplopia or poor cosmesis
- Surgery can be delayed since diplopia may be transient

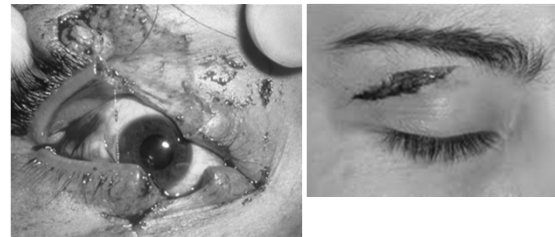
Lid lacerations

- Windshield-related or broken glass accidents
 - Consider foreign body and tissue loss.
- Bite wounds
 - Consider infection (eg, rabies) and tissue loss.
 - In human bite wounds, determine the assailant's HIV and hepatitis status.
- Caution with seemingly small penetrating lid lacerations,
 - underlying globe or intracranial trauma.
- Limited history in patients who are inebriated
- Children might conceal the details of their injury for fear of parental rebuke or implicating a playmate who caused the injury.
 - Be especially wary of underlying foreign bodies in children.
 - Consider spousal or parental abuse.

Anatomical Considerations

- Partial thickness, full thickness, location, adjacent structures
- Injury to the levator, medial canthal tendon, lateral canthal tendon, canaliculi, and supraorbital nerve.
- Orbital fat : violation of the septum and possible injury to the levator.
- Displacement /rounding of the canthal angles : canthal ligament injury.
- Medial lacerations: consider canalicular involvement.
- Superonasal lacerations : r/o intracranial penetration.
- Document: Diagram and Photograph the lid laceration, if appropriate.
- CT scan to rule out foreign body.

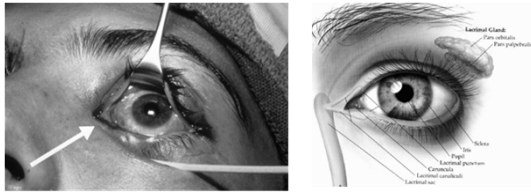
Lid lacerations



Full thickness

Superficial vs Deep

Canalicular Lacerations



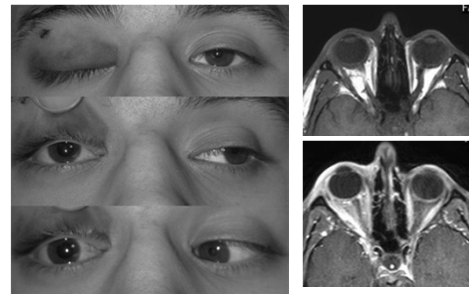
Deep lacerations with avulsion



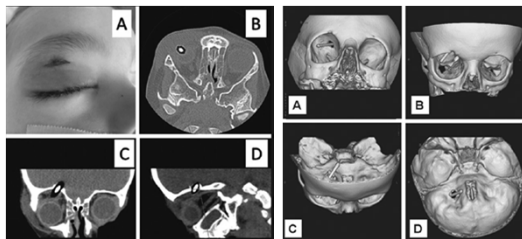
Superficial Lacerations

- Avoid lid margin retraction
- Give tetanus prophylaxis
- Remove superficial foreign bodies
- Rule out deeper foreign bodies

Small penetrating lacerations



Intracranial penetration



Foreign Bodies

CT scan

- Wood, vegetable: "air-like" hypodensity
- Glass: hyperdense
- Plastics: variable
- Metals: hyperdense with streak

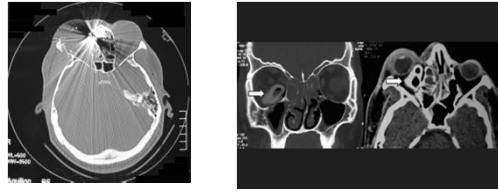
MRI

- Better for wood and glass

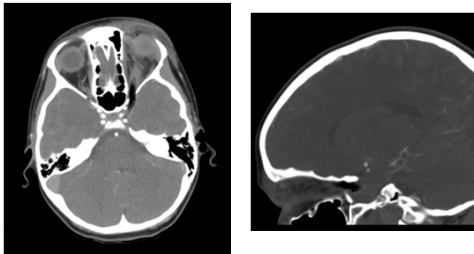
Foreign Body

- Identify material
- Organic: needs to come out
- Non-organic: can be left in if asymptomatic and doesn't pose risk otherwise needs to be removed

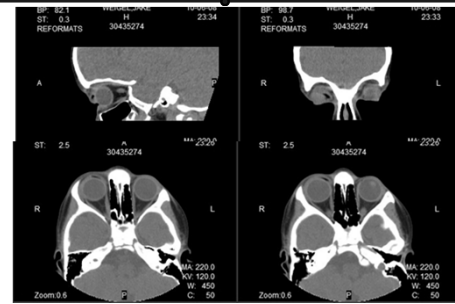
Plastic



Orbital air v Pneumocephalus



W-Ei



Emergency Eye Problems

- | Traumatic | Ocular or systemic disease |
|-------------------------------|-----------------------------------|
| • Corneal abrasions | • Sudden blindness |
| • Orbital fractures | • Acute glaucoma |
| • Lid, facial lacerations | • Red eye |
| • Hyphema | • Orbital cellulitis |
| • Chemical injuries | |
| • Ruptured globes | |
| • Foreign bodies | |
| • Orbits-cranial penetration. | |

Urgency

- Chemical burns (minutes)
- Central retinal artery occlusion (1-6 h)
- Angle closure glaucoma (hours)
- Ruptured globe (<5-6 hours)
- Orbital cellulitis (admission, IV Ab)