

## THE PAIN AND DRAMA... OF TRAUMA



Jill Autry, OD, RPh  
Eye Center of Texas Ophthalmology Center  
Bellaire, Woodlands/Conroe, Pasadena, Clear Lake, Katy, Sugar Land

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## Ocular Examination

- Ensure globe is intact and uninvolved
  - Look for proptosis or enophthalmos
  - Look for subconjunctival heme, corneal abrasions, hyphema, dislocated lens, retinal involvement
- Vision
- APD
- Check for diplopia
- Check for EOM restriction
- IOP
- DFE
- Check for infraorbital numbness
  - Includes lower lid, cheek, side of the nose, and upper lip
  - Check with cotton wisp test or fingernail scratch

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## Periorbital Trauma

- Falls, fights, car accidents, ball injuries
- Mechanism of injury can help discern likelihood of serious sequelae—Start with good history
- Check globe first
- Hematoma at location of impact with surrounding and sometimes creeping areas of ecchymosis
- May have associated subconjunctival hemorrhage, periorbital lacerations

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### Treatment

- Reassure patient
- Ice packs x 24-48 hours for swelling
- Discoloration can take 2-3 weeks to resolve
- OTC analgesia (acetaminophen preferred)
- CT of face and orbits if fracture suspected
  - 3mm axial and coronal cuts
- Follow up in 3-4 days to check for traumatic iritis, retinal involvement, etc.
- Emergent follow-up if patient notices diplopia, decreased VA, ocular pain, etc.

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### Orbital Fracture

- Orbital fractures are secondary to ocular involvement. Do eye exam first.
- More common if eye is struck with object larger than the diameter of the orbital rim
- Most common is inferior wall, second most common is medial wall
- EOM restriction and/or pain, diplopia, orbital emphysema, CSF rhinorrhea
- Enophthalmos more common with blowout fractures

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### Eyelid Lacerations

- Can be caused by blunt force or penetrating injuries
  - If penetrating injury, concern for foreign object to be embedded
- Inspect globe
- Palpate for broken bones

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### Treatment/Follow-up

- Large complicated lacerations require referral
  - Jagged cuts
  - Fat prolapse signals deeper wound
  - Medial canthal injuries prone to canalicular damage
  - Concern for foreign body material inside area
  - Animal bites
- Small, uncomplicated lacerations can be closed with sutureless glue such as Dermabond™ or SurgiSeal™

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### Laceration Management

- Cover with prophylactic antibiotic
  - Keflex 500mg bid or Amoxicillin 875mg bid
- If caused by human or animal bite, cover with Augmentin instead 875mg bid
  - Make sure animal has up-to-date vaccinations against rabies
- May need tetanus immunization booster
  - Send to local health clinic

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### Subconjunctival Hemorrhage

- Inspect globe for signs of penetrating injury
  - Bullous subconjunctival heme or heme 360 degrees more common
- Inspect for foreign material at hemorrhage site
- Inspect for conjunctival laceration with addition of fluorescein
  - Any associated conjunctival lacerations of 5mm or less do not need repair

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### Corneal Abrasions

- Common, superficial trauma to the corneal epithelium
- Always check the globe for penetrating injury
- Get history of trauma
  - Cause of injury, activity being performed
  - Especially concerned if pt was hammering metal, using a lawnmower or weedeater, or welding
  - Watch out for the “I Musta” scenario

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### Pearls for Treating Abrasions

- Have technician place drop in waiting room if patient cannot be brought back immediately
- Look at the eye before instillation of fluorescein
- Bandage CL
  - Can leave on 2-3 days then return for follow-up
    - Remove by sliding over to sclera and pinching off or use forceps
    - Do not remove BCL too early
  - Or pressure patch if unable to place BCL
    - Pressure patch patient needs to return next day
- Healing epithelium can appear dendritic as it heals—it is not herpetic!

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### Pharma for Abrasions

- Prophylactic antibiotic
  - Use at least a 3<sup>rd</sup> generation fluoroquinolone or tobramycin; Polytrim™ in kids
- Vegetative matter etiologies in most cases do not result in fungal infections
  - Can use Vigamox for prophylaxis considering its inherent antifungal properties if concerned
- Consider “comfort drops” for non-CL wearers who present with abrasion of known etiology
  - Remove top from Optive™ sample bottle and place 10-20 drops of anesthetic inside—label as “Comfort Drops”
- Put drop of cyclo or homatropine in eye in office for pain
- Need for more than OTC pain control is rare

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### History of Lasik

- Corneal abrasions even years after Lasik can result in Diffuse Lamellar Keratitis (DLK)
  - aka Sands of the Sahara (SOS)
- Treat as usual but also add topical steroid to prevent/treat DLK
  - Lotemax or Pred 4-6 times a day
- Injury can also displace flap
  - Will need to get refractive surgeon to replace

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### Recurrent Corneal Erosion

- More common with jagged etiologies and with pre-existing anterior corneal dystrophies
  - Fingernail injuries
  - Tree branches
  - Co-morbid EBMD pathology
- Keep BCL on longer if higher risk of RCE
  - at least 2 weeks with prophylactic antibiotic
  - Start Muro-128 ung qhs for 4-6 weeks after BCL removed
- Multiple recurrences may need surgical treatment
  - We do Epi-peel most commonly with Prokera™ placement afterwards

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### Corneal Foreign Body

- Most often metal, wood, or glass in the superficial layers of the cornea
- Rule out penetrating injury
  - More common with metal on metal history
- Use sterile cotton swab for superficial foreign bodies
- Use forceps and/or large gauge needle for deeper foreign bodies
- Use Algier brush for removal of rust rings

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### Penetrating Injuries

- More common with history of hammering metal, welding, weedeating, breaking glass, sticks, knives, scissors, nails
- Male gender more common
- Look for ocular signs of penetrating trauma

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### Signs of Penetrating Injury

- Poor vision
- Full-thickness corneal injury
- Bullous subconjunctival hemorrhage or 360 degree hemorrhage
- Seidel sign
- Shallow anterior chamber
- Constant epiphora
- Lens displacement/cataract formation
- Iris damage
  - Hole through iris
  - Peaked pupil
  - Iris prolapse
  - Iridodialysis
- Vitreous hemorrhage
- Low IOP-check IOP last

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### Seidel's Sign

- Fluorescein test to check for open globe
- Best results with fluorescein strips
- Suspect open globe if
  - Low IOP
  - Shallow AC
  - History of penetrating injury
  - Patient complains of constant tearing

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### Management of Penetrating Injury

- Do not further touch the eye
- Instill in office antibiotic
- Place a hard, vaulted shield over the eye
  - Do not pressure patch
- Send to ER with note “Penetrating ocular injury needing immediate ophthalmology consult”
  - Call 911 if you are unsure patient will go to ER

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### Hyphema

- Common result of blunt trauma to globe
- Microhyphema may look like cell and flare
  - But it takes a few days for C/F to form
- Check for periorbital area and globe for other injuries
  - Vision, IOP, Seidel’s sign, anterior chamber depth, broken facial bones, EOMs, APD, lens, iris, retina, etc.
- If hyphema covering pupil, will need Bscan to rule out fundus pathology

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### Hyphema Treatment

- Watch daily until resolved
- Start steroid q2h
- Homatropine 5% bid to tid
- Control IOP if elevated to avoid corneal blood staining
  - bimonidine, beta-blockers, CAIs
  - Avoid prostaglandins if possible
- Counseling
  - Limit activities
  - Keep head of bed elevated
  - No ASA or IB products
  - Long-term glaucoma risk (75% will have angle recession)

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### Iris Damage

- Traumatic iritis
- Iridodialysis
  - Separation of iris from the ciliary body attachment
  - Often see associated angle recession on gonioscopy
- Torn iris sphincter
  - Resulting in permanent mydriasis
- Hole through iris or iris prolapse
  - Concern for penetrating injury

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### Traumatic Iritis

- Usually caused by blunt force injuries
- Trauma induced necrotic products promote inflammation
- Increased permeability of ocular vessels allow inflammatory mediators and cells to appear
- Generally starts two to three days after trauma
- Signs
  - Cell/flare/fibrin/KP/hypopyon/decreased IOP/posterior and/or anterior synechiae
- Symptoms
  - Decreased VA, pain, sensitivity to light, redness

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### Traumatic Iritis Treatment

- Cycloplegia
- Pred acetate 1%, Lotemax, or Durezol
  - Start qid to q2h depending on presentation
  - Taper over one to two weeks depending on response
  - Add topical NSAID at end of taper if desired
- Watch for change to increased IOP
  - Use timolol, brimonidine, or CAI to control IOP
  - Avoid prostaglandins if possible

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### Angle Recession Glaucoma

- Secondary open-angle glaucoma
- Onset is often delayed decades from injury
- Look for signs of previous trauma
- Treat accordingly
  - Gonioscopy-do not necessarily see angle recession
  - Medication to start
  - Brimonidine, Beta-blockers, CAs first choice only bc of unilateral cosmetic concerns with prostaglandins
  - SLT rarely effective
  - Often will reach maximum medical therapy and need trabeculectomy

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### Cataract

- If immediate formation, look for penetrating foreign body
- Can form years after initial injury or be more advanced than other cataract later in life
- Look for lens subluxation, weak or torn zonules, phacodonesis

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### Other Lens Damage

- Dislocated/subluxated lens
  - May report monocular diplopia
- Zonular dehiscence
  - Phacodonesis
- Compromised capsular integrity
- Dislocated IOL

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### Unilateral Cataract Surgery

- If pre-presbyopic, warn of loss of near VA--consider multifocal unilaterally
- If presbyopic and multifocal candidate--recommend clear lensectomy in alternate eye with multifocal
- Note multifocals may be contraindicated considering other traumatic damage to the eye
- If moderate to severe refractive error...
  - CL patient can shoot for plano goal in phaco eye but will be resigned to CL wear not specs
  - Spec only patient--balance phaco eye with Rx of other eye

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### Trauma Induced PVD

- Trauma alters the vitreoretinal interface
- More likely to evoke retinal break or vitreous hemorrhage due to stronger adhesions
- DFE with scleral depression recommended
- Signs/symptoms of RD
- Monitor more closely than age related PVD
- Limit activities

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### Vitreous Hemorrhage

- From blunt force or penetrating injury
- RBCs noted in anterior vitreous at slit lamp
- Hemorrhage noted with BIO
  - Can obscure view of the retina
  - May need Bscan
- 70% of patients with vitreous hemorrhage have associated retinal break, usually superior
- Watch daily with retinal exam, head of bed elevated, no ASA/lb products, limit activities

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### COMMOTIO RETINAE

- Sheenlike retinal whitening in posterior pole or periphery of retina
- Most common retinal damage from blunt trauma
- Shock waves from trauma damage outer layers of retina with extracellular edema and photoreceptor disruption
- Most often opposite to direction of injury
- Can leave permanent visual field defect but most often is self-limiting
- No acute treatment although oral steroids are sometimes advocated for posterior pole involvement
- Generally subsides 3-4 weeks

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### Retinal Break/Detachment

- Associated with trauma induced vitreal shift anteriorly
- Flashes/floaters/curtain of field loss
- Shaefer's sign, break or detachment seen
- Refer to retinal specialist

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### Choroidal Rupture

- Breaks in the choroid, Bruch's membrane, and the RPE due to blunt, non-penetrating trauma
- Usually posterior pole, often macula
- Crescent shaped cracks concentric to the disk
- CNV formation is common with subretinal bleeding
- No treatment unless CNV develops then consider anti-VEGF

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### Traumatic Optic Neuropathy

- Generally associated with closed head trauma or penetrating orbital trauma
- Variable amounts of decreased VA, VF defects, and loss of color vision
- Positive APD
- Do CT of orbits with MRI of brain
- Optic nerve may appear normal at onset but atrophy usually presents in 3-6 weeks
- IV steroids controversial

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### Warnings To Patient

- Glaucoma
  - At increased risk for glaucoma over your lifetime which may not present for decades. Need 6 month FU then yearly exams.
  - Do baseline VF and OCT NFL
  - STRESS ASYMPTOMATIC
- Cataract
  - At increased risk for earlier cataract formation over your lifetime. Need 6 month FU then yearly exams.
- Retina/Vitreous
  - Signs/Symptoms of retinal break/detachment
  - Amsler grid for choroidal ruptures

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