Objectives: To evaluate a patient with eye trauma

- List and describe the common manifestations of eye trauma including:
  - Corneal abrasion
  - Corneal foreign body
  - Subconjunctival hemorrhage

- Describe the presenting signs and symptoms of these diagnoses and narrow a differential diagnosis based on the elicited history and exam.

- Describe the initial management and urgency of referral for these diagnoses.

- Describe the importance of ruling out globe rupture before manipulating the eye.
6-year-old boy with pain and blurry vision

Sand thrown at him while playing

Mom looked for sand particles in his eye, but didn’t find any

“It still hurts right now and things look a little fuzzy. It feels like something is in there.”

Initial DDX?

1. Corneal abrasion
2. Corneal foreign body
3. Corneal ulcer
4. Acute anterior uveitis
Case #1 Exam

- **Proparacaine** drops facilitate the exam, and the patient feels **instant** relief.


- The pupil is **constricted**. Extraocular movements are intact.

- Moderate **conjunctival injection**. The **corneal light reflex is disrupted**. The anterior chamber is well formed.

- Small pupil and **photophobia** → limited fundus visualization.

- IOP 18 mmHg.

- Fluorescein stain with **cobalt blue light reveals corneal abnormalities**

*Always remove contact lenses prior!*

*Image showing an eye with corneal abnormalities and a fluorescein stain.*
Corneal Abrasion Clinical Pearls:

- Acute, painful red eye, usually with history of trauma (mechanical, foreign body, chemicals, etc)

- **Signs/ Symptoms:**
  - pain (relieved with proparacaine)
  - decreased visual acuity (usually mild to moderate)
  - Sensation of a foreign body
  - tearing, redness

- **Treatment:** antibiotic ointment or drops
  - Steroids contraindicated - slow epithelial healing, reduce resistance to superinfection
  - NO contact lens wear during recovery
    - *abx for contact lens wearers MUST cover pseudomonas
  - More than mild trauma or no improvement after 24-48 hrs → referral
Corneal foreign body: obvious or not?

- May present similarly to corneal abrasion, can occur concomitantly or in isolation: pain, red eye, foreign body sensation.

- **Sometimes there are no obvious signs**
  - Sharp perforations may not cause redness, vision may be normal
  - Accurate history is essential! ...glass, metal, sand, plastic, wood?

- **Intraocular foreign body** may occur with corneal foreign body
  - suspect with red eye + history of metal on metal
  - Orbital X-ray or maxillofacial CT if intraocular foreign body is suspected

- ALWAYS rule out open globe before manipulating the eye!
Corneal foreign body: Management

- Urgent evaluation and referral → Expedient removal
  - Prevent infection, inflammation, ocular necrosis

- Without removal...
  - Superficial foreign bodies can become embedded more deeply over time
    - Foreign body that penetrates across cornea → intraocular foreign body
  - Scarring caused by retained corneal foreign bodies can lead to vision loss

- Removal should only be attempted by appropriately trained professionals
Foreign Body Removal:

- Instill topical anesthetic (ex. Proparacaine)
- Evert the upper eyelid to evaluate the upper palpebral conjunctiva
  - Also look for conjunctival foreign body
- Roll a cotton-tipped applicator across the lid to pick up object
- Use of irrigating solution can help dislodge superficial retained foreign bodies
- If embedded, instruments may be required

- Embedded iron foreign bodies have characteristic “rust ring” with reactive infiltrate
  - Removal with ophthalmic drill
    - Deep remaining rust is safer to leave in place
  - Consider debridement if corneal epithelium is slow to heal
A 52-year-old woman with an irritated *red eye* and *frank blood*
Single car MVC, struck her forehead on the steering wheel, but no LOC
no visual loss

**Initial DDX?**

1. Subconjunctival hemorrhage
2. Traumatic Hyphema
3. Neoplasm with 2ary hemorrhage:
   - Kaposi sarcoma or lymphoma
4. **NOT TO MISS:** Open globe
Case #2 Exam

- The pupil is normal. Extraocular movements are intact.
- Conjunctiva mostly normal, but with a sector that is obscured by frank blood.
  - Solid red but no injection of the vessels
- Normal fundus.
- IOP 16 mmHg.
Subconjunctival Hemorrhage

Clinical Pearls:

- Capillary rupture → blood between conjunctiva and sclera

- **Etiology:**
  - Atraumatic:
    - Increased intraocular pressure with sneezing, straining or coughing
    - Less commonly: HTN, anticoagulants, diabetes, coagulopathies
  - Traumatic: isolated or associated with open globe

- **Signs/ Symptoms:**
  - Irritation, but NOT significant pain
  - Vision unaffected

- **Treatment:** self limited over days – weeks depending on size
  - Use artificial tears for irritation relief, avoid NSAIDs and ASA if possible

*Scary looking but benign... UNLESS associated with trauma ocular trauma!*
Subconjunctival Hemorrhage

Clinical Pearls:

- When evaluating a patient with history of trauma:
  - If exam reveals significant subconjunctival hemorrhage extending 360 degrees around the cornea →
  - May necessitate surgical exploration for possible open globe
    - Use extreme care when manipulating the eye

Always suspect open globe if there is 360 degree, bullous subconjunctival hemorrhage + trauma!
Conclusions: Evaluation of a patient with eye trauma

- Know presenting signs and symptoms and narrow a DDX from history and exam
  - Acute, painful red eye with hx of trauma, foreign body sensation, fluorescein + → corneal abrasion, foreign body
  - Frank blood, “bright red eye”, happened suddenly ± trauma → subconjunctival hemorrhage

- Know the urgency referral for these diagnoses
  - No tx for atraumatic subconjunctival hemorrhage
  - Abx for corneal abrasion, removal of foreign body
  - Traumatic 360 subconjunctival hemorrhage → URGENT surgical exploration

- It is CRUCIAL to rule out globe rupture before manipulating the eye!!
Resources:


- http://eyewiki.aao.org/

- https://www.aao.org/