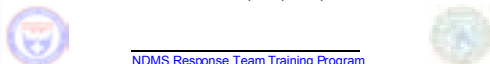


Special Issues in Disaster Care

Basic Eye Injuries and Treatments Following Disasters

Michael G. Weddle, MD, PhD, FACEP




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Objectives

By the conclusion of this lecture, you should be able to:


- Identify eye injuries and illnesses which may occur following disasters.
- Recognize those eye injuries and illnesses requiring urgent care by an ophthalmologist, and those which can be referred in a delayed fashion or treated locally.
- Identify basic treatments of eye injuries associated with disasters.



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Introduction

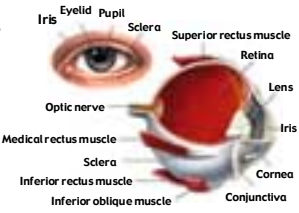
- The lecture provides supplemental information to that found in the article "Eye Care Following Disasters."
- The lecture describes basic conditions and treatments of eye injuries and diseases for medical care providers responding to disasters.



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Eye Anatomy

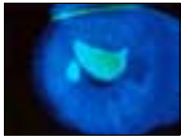
- Familiarize yourself with eye anatomy and names of the basic structures.
- Document information on a medical chart or victim card.
 - Include a drawing /diagram of the injured eye(s) and your observations.



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Fluorescein-Stained Corneal Abrasion

- Corneal abrasions and superficial foreign bodies are the most common types of eye injuries.




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Fluorescein-Stained Corneal Abrasion

Injuries to the eye can be seen with a woods lamp or cobalt-blue filter, after the eye is stained with fluorescein.

After dye is applied, cobalt lamp is used Lamp allows corneal imperfections to be seen



Images courtesy of NLM/NIH/adam.com
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Ice-Rink Sign

- Recognized as a collection of linear corneal abrasions (tiny scratches) over the top of the cornea.
- Abrasions suggest a hidden conjunctival foreign body beneath the upper lid.



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Lid Everted with Conjunctival Foreign Body

- A small particle on the conjunctiva is a foreign body that can usually be removed.



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Foreign Body

- If a foreign body is suspected, but not found, thoroughly irrigate the eye.
- Topical anesthetics drops will decrease pain prior to irrigation.

Flush the eye with clean water to remove foreign objects





Image courtesy of NLM/NIH/adam.com
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Corneal Foreign Body

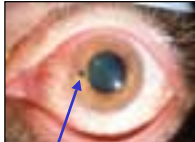
- A foreign body that remains unmoving on the cornea is imbedded, and is usually superficial.



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Corneal Foreign Body


- Only an ophthalmologist should remove foreign bodies that do not appear superficial and penetrate the cornea.
- After removing metallic foreign bodies, evaluate the cornea for areas of retained rust (rust-ring).



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Blow Out Fracture


The globe is pushed through the bony orbit and may entrap the extraocular muscles.



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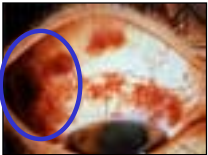
- Eye may be sunken and the victim is unable to look up to that side (paralysis of upward gaze).
- Results in double vision.



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Subconjunctival Hemorrhage

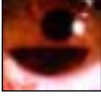
- Presents with bleeding beneath the clear conjunctiva.
 - Appears alarming, but is not necessarily dangerous.
- Treatment:
 - Apply warm soaks to the eye.
 - Discoloration should resolve over 2-3 weeks.




Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Hyphema Resulting from Blunt Trauma

- A blow to the eye may result in bleeding into the anterior chamber.
 - Blood will layer out in the chamber.
- Victims of penetrating trauma who present with hyphema are assumed to have an open globe.



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Ciliary Flush of Iritis

- Inflammatory reaction in the anterior chamber = traumatic iritis.
- Victim experiences deep pain when looking at a light.

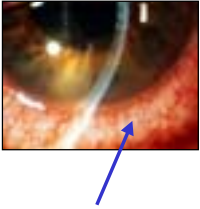


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Ciliary Flush of Iritis

- Swollen, injected blood vessels surrounding the corneal border or limbus = ciliary flush.




Photograph courtesy of Walter Reed Army Medical Center and USUHS

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Avulsed Iris Root


- Blunt injuries may cause the iris to be torn away at its root.
- Leaves a clear space beneath the outer edge of the cornea.
- Victim may complain of double vision even when covering the opposite eye.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Traumatic Cataract


- Blunt or penetrating injuries may rupture the capsule covering the lens.
- Results in traumatic cataract or clouding of the lens; possibly with rapid onset.
- Victim should be seen by ophthalmologist to:
 - Rule out retinal detachment.
 - Remove lens to prevent glaucoma.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Dislocated Lens


- Lens is completely torn away from the fibers holding it in place.
- Posterior dislocation = lens pushed back; does not require emergency surgery.
- Anterior dislocation = lens is pushed forward against or through the pupil:
 - Can lead to glaucoma.
 - Requires an emergency ophthalmologic referral.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Global (Scleral) Rupture

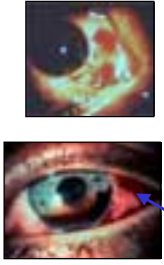
- A blow to the eye can result in a rupture of the globe, usually through the white sclera.
- Results in bloody swelling (chemosis) of the conjunctiva.
- Globe contents can be prolapsed onto the outside of the eye.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Conjunctival Bloody Chemosis


- Presents as bloody swelling of the conjunctiva.
- Suggests underlying scleral rupture and an open globe injury.
- Due to bleeding from beneath the sclera filling the conjunctival space.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Upper Lid Laceration

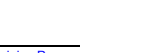
- Lacerations involving the lid margins or the medial corner of the eye are best repaired by an ophthalmologist or plastic surgeon.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Conjunctival Laceration

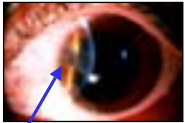
- Treat with topical antibiotic drops if lacerations are < 1 cm long.
- Carefully inspect underlying white sclera for evidence that the laceration penetrated the sclera resulting in an open globe injury.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Corneoscleral Laceration with Glass Foreign Body

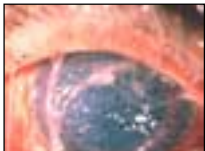
- Open globe injuries require immediate protection with a rigid eye shield, tetanus, antibiotic coverage, and evacuation.
- Penetrating foreign bodies are **NOT** to be removed outside of operating room.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Glass Foreign Bodies


- Up to 2/3 of penetrating eye injuries following explosions are caused by projected glass fragments.
- Very small fragments traveling at high velocity may penetrate the eye painlessly.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Occult Laceration with Peaked Pigment and Uveal Pigment Exposed


- Peaked or teardrop shaped pupil suggests an occult open globe injury.



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Positive Seidel Test with Aqueous Leak


- An open globe injury (i.e., perforation) can be detected by staining the cornea with a fluorescein-staining and observing aqueous humor leaking from the site of injury.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Preseptal Cellulitis

- Preseptal and periorbital cellulitis both describe an infection of the skin surrounding the eye:
 - Skin is red, swollen, hot to touch.
 - Globe itself and vision are not affected.



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Endophthalmitis

- Serious infection of the globe
 - Painful eye, poor vision
 - Result of a penetration globe injury

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Endophthalmitis with Hypopyon


- Usually an infected foreign body is left inside the eye.
- Develops into a hypopyon, a collection of pus layering out at the bottom of anterior chamber.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Corneal Ulceration


- Serious infection that begins as a scratch or an abrasion.
- Infection is usually bacterial.
 - Possibly viral or rarely acanthamoeba (parasite).



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Corneal Ulceration

- Ulcer is seen as a hazy white patch (infiltrate of white cells) beneath the corneal defect.



Photograph courtesy of Walter Reed Army Medical Center and USUHS
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Acute Trachoma

- Acute stage trachoma is easily treated.
 - Blindness commonly results if the infection progresses to a chronic stage.
- Acute stage conjunctiva presents as red and velvety with numerous small blisters (follicles) on the underside of the lid.



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Chronic Trachoma

- Untreated trachoma leaves eyelashes turned inward, chronically scratching cornea.
- Advance disease proceeds with a pattern of corneal trauma, ulceration, scarring.



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Neovascularization

New blood vessels can grow over the cornea.

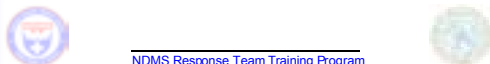


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Summary


- Familiarize yourself with the structures in the eye and know their names.
- Clearly document or draw the type of injury or conditions on medical charts/cards.
- Corneal abrasions and superficial foreign bodies are the most common types of eye injury.



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Summary

- Refer infections of the globe, including corneal ulcerations and any unexplained vision loss to an ophthalmologic specialist.



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