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Chambers of Horrors!!
Eye Emergencies You Must Know

Joe Lex, MD,
FACEP, MAAEM
Temple University School of Medicine
Philadelphia, PA
The Basics

Three major complaints:
- Change in vision
- Change in eye color
- Pain
History: Pain and Discomfort

- Anterior surface: burning, itching, tearing, foreign body sensation
- Orbital / periorbital: dull ache, pressure
History: Photophobia

- Hallmark of uveal inflammation (iritis, uveitis)
- Differentiate from “light sensitivity”: mild discomfort from bright lights
History: Discharge & Tears

- Discharge: primarily anterior surface disorders, like infection
- Tearing: reflex in origin, surface irritation from dysfunctional lubrication or injured epithelium
History: Visual Disturbance

- Blurred vision: anything from refraction error to occipital cortex
- Floaters: usually degenerative opacities within vitreous
  - Can be RBCs, WBCs, pigment granules in aqueous or vitreous
History: Visual Disturbance

- Glare or halo: light scatter from unclear ocular media
  - Mucinous tear film
  - Corneal edema / epithelial abnormality
  - Cataract
  - Vitreous haze
History: Double Vision

- Monocular: pathology within cornea or lens
- Binocular: ocular motility disturbance
- Horizontal: 3rd or 6th nerve palsy
- Vertical: after trauma, inferior rectus entrapment
We’ll Try to Cover…

- Stye vs. chalazion
- Conjunctivitis vs. iritis vs. scleritis vs. episcleritis
- Vision loss – painful vs. painless
- Glaucoma
- Optic neuritis
We’ll Try to Cover…

- CRAO vs. CRVO
- Bell’s palsy
- Horner’s syndrome
- Minor trauma
- Major trauma
- Chemical burns
Eye Examination – 10 Part

1. Visual acuity
2. Lids, lashes, adnexa
3. Conjunctiva & sclera
4. Cornea
5. Pupil & iris
6. Anterior chamber & lens
7. EOM Motility
8. Visual fields
9. Slit lamp & IOP
10. Funduscopcopy
Eye Examination: General

- Start with peripheral and superficial
- Work to central and deep
1. Visual Acuity
Herman Snellen

Dutch ophthalmologist,
February 19, 1834 – January 18, 1908
Visual Acuity

- 20 feet from chart
- Use green and red lines as reference
- Pinhole to correct

---

Jeff Dahl, [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:20/20_chart.png)
Visual Acuity

- Near-card also acceptable
- Hold 14 inches from eyes
- Presbyopics through bifocal
Visual Acuity – Pinhole

Use pinhole if patient forgot glasses

Nummer9, Wikimedia Commons
Visual Acuity – Pinhole

- Allows only passage of light perpendicular to lens
  - Light does not need to be bent prior to focusing onto retina
- Deficit corrects with pinholes ➔ refractive problem
Visual Acuity – Documenting

- **OD** = oculus dexter = right eye
- **OS** = oculus sinister = left eye
- **OU** = oculus uterque = each eye
- **OU** = oculi uniti = both eyes
- Use + or – prn: 20/60\(^{-1}\), 20/40\(^{+2}\)
Visual Acuity – Documenting

- Can’t read largest character on Snellen chart → count fingers
- Can’t count fingers → movement
- No movement → light perception
  - Document as NLP (no light perception) rather than “blind” or “unable to see”
2. Lids, Lashes & Adnexa
Objectives

- Define blepharitis, and outline an appropriate treatment plan
- Identify and recognize clinical presentation and treatment for stye & chalazion
- Recognize and appropriately treat septal and preseptal cellulitis
Blepharitis
Blepharitis
Blepharitis
Blepharitis
Blepharitis – Angular
Blepharitis

- Not serious: eye damage rare
- Lid cleaning: baby shampoo on Q-tip
- If needed: antibiotic cream
Bugs!!
Pediculosis / Pthiriasis

- Pediculosis: eyelid infestation by *Pediculus humanus corporis* (body) or *capitus* (head)
- Pthiriasis: eyelid infestation by *Pthirus pubis* (pubic louse, or crab louse)
- Both organisms are blood-suckers
Pediculosis / Pthiriasis

- Remove all visible organisms and nits (eggs) with forceps
- Pediculocidic medicated shampoo
  - Permethrin 1%
- Smother lice and nits with petroleum jelly or other bland ointments tid
Ptosis

[Image: Ptosis by Stevenfruitsmaak, Wikimedia Commons]
Drooping Lids
Entropion

Ectropion

Source Undetermined

Source Undetermined
Entropion

1. **Senile**: most common form
2. **Congenital**: typically affects upper eyelid
3. **Spastic**: neurologic, inflammatory or irritative process of eyelids
Entropion

4. Cicatricial: shortened tarsus secondary to ocular tissue scarring
   – Stevens-Johnson syndrome
   – Trachoma
   – Herpes zoster
   – Trauma
   – Chemical injuries or thermal burns
Entropion
Ectropion

- Stretching with age, lower eyelid droops downward, turns outward
- Eyelid skin: thinnest skin in body
- Symptoms: sagging, dry, red, tearing, light and wind sensitivity
- Treatment: surgery
Ectropion
Dacryocystitis

- Infection of tear sac between inner canthus of eyelid and nose
- Usually from blockage of tear duct
- May be related to malformation of tear duct, injury, eye infection, or trauma
Dacryocystitis – Findings

- Generally one eye
- Excessive tearing
- Tenderness, redness, swelling, discharge
- Red, inflamed bump on inner corner of lower lid
Dacryocystitis – Treatment

- Infants: gentle massage of area between eye and nose ± antibiotic drops or ointments
- Adults: above plus may need tear duct irrigation; surgery sometimes necessary
Dacryocystitis
Dacryocystitis
Dacryocystitis
Stye (External Hordeolum)

- Acute staph infection of eyelash oil gland
- Location: lash line
- Appearance: small pustule
- Treatment: warm compresses, erythromycin ophthalmic ointment
Stye

Source Undetermined
Stye
Chalazion (Internal Hordeolum)

- Acute or chronic inflammation of eyelid due to blocked oil gland
- Red tender lump in lid

Kotek1986, Wikimedia Commons
Chalazion (Internal Hordeolum)

Treatment:
1. Warm moist compress 3-4 x a day
2. Erythromycin ophthalmic ointment to lid margins QID
3. (?)doxycycline 100 mg PO bid for 14 – 21 days if recurrent
4. Ophthalmology referral 4–6 weeks
Chalazion
Orbital Cellulitis (Post-Septal)

1. Extension from periorbital structures (paranasal sinuses, face, globe, lacrimal sac)
2. Direct inoculation of orbit from trauma or surgery
3. Hematogenous spread from bacteremia
Orbital Cellulitis (Post-Septal)

- Cardinal signs: proptosis and ophthalmoplegia
- Other findings: chemosis, fever, malaise, ↓ vision, headache, ↑ intraocular pressure, pain on eye movement, lid edema
Orbital Cellulitis (Post-Septal)
Orbital Cellulitis (Post-Septal)
Orbital Cellulitis (Post-Septal)
Orbital Cellulitis (Post-Septal)
Orbital Cellulitis (Post-Septal)

Treatment

- **Medical:** appropriate antibiotics
- **Surgical drainage** if poor response to antibiotics (48 – 72 hours) or if CT scan shows completely opacified sinuses
Orbital

Periorbital

Source Undetermined

Source Undetermined
Periorbital Cellulitis (Preseptal)

- Swelling, tenderness, redness around the eye
- **No** limitation of eye movement
- Less serious, more common than orbital cellulitis
Periorbital Cellulitis (Preseptal)
3. Conjunctiva & Sclera
Objective

Identify and recognize the presentation and treatment for viral, bacterial, and allergic conjunctivitis.

Differentiate conjunctivitis from iritis, scleritis, and episcleritis.
Pannus

- From Latin, "a piece of cloth"
- Pathologically defined as superficial vascularization of cornea with infiltration of inflammatory-connective-granulation tissue
- Not a diagnosis, but a finding
Pannus
Pannus
Conjunctivitis

- Mucopurulent discharge
- Eyelids stuck in morning
- Inflamed conjunctiva: palpebral and bulbar, but stops at limbus
- Cornea clear
Conjunctivitis: Evaluation

Fluorescein stain cornea to avoid missing abrasion, ulcer, dendrite
Conjunctivitis – Allergic

- Allergic: itch, burn, water
- Exam: injection, watery discharge, possible chemosis
- Treatment: cool compresses
  - Naphazoline (Clear Eyes®, Ocu-Zoline®, Allersol®, Vasoclear®)
Conjunctivitis – Allergic

Histamine blocker: acute
– Levocarbastine (Livistin®)

Mast cell inhibitor: prevents future attacks
– Lodoxamide (Alomide®)
– Cromolyn

Olopatadine (Patanol®): both
Conjunctivitis – Viral

- Often have history of exposure to “pink eye,” concurrent URI
- Exam: preauricular adenopathy, watery discharge, eyelid edema (especially with adenovirus)
Conjunctivitis – Viral

- Treatment: cool compresses
- Adenovirus: 2-3 weeks to clear, highly contagious
- Antibiotic ointment once or twice daily: prophylaxis against secondary bacterial infection
Conjunctivitis
Conjunctivitis
Conjunctivitis

Rasbak, [Wikimedia Commons](https://commons.wikimedia.org/wiki)
Conjunctivitis

James Heilman, MD, Wikimedia Commons
Conjunctivitis – Bacterial

- Exam: yellow discharge, lids stuck in morning
- Extremely severe: gonococcus
  - Only bacterial with PAN
- Treatment: early generation antibiotic (sulfacetamide qid)
Conjunctivitis – Bacterial

- Avoid late generation broad spectrum (fluoroquinolones): emerging resistance
- Non-responding: culture, adjust
- Gonococcal: ceftriaxone
Conjunctivitis – Bacterial

Tanalai, Wikimedia Commons
Conjunctivitis – Gonococcal
Conjunctivitis – Gonococcal
Conjunctivitis: Treatment

No contact-lens $\rightarrow$ cheap antibiotic drops QID 5 – 7 days

Contact-lens $\rightarrow$ fluoroquinolone (Ciloxan®, Ocuflox®) or aminoglycoside (Tobrex®) drops QID 5 – 7 days
 Conjunctiva – Pale (Anemia)
Subconjunctival Hemorrhage

- Common: minor trauma, cough, no apparent cause
- Frightening to see, no long-term sequelae
- Pain or vision loss suggests alternate diagnosis
Subconjunctival Hemorrhage

Therealbs2002, [Wikimedia Commons](https://commons.wikimedia.org/wiki/)
Subconjunctival Hemorrhage

Daniel Flather, Wikimedia Commons
Chemosis

- Swollen conjunctivae: sometimes lids can’t close
- Often related to allergic response, infection, severe exposure
- Other causes: angioedema, sleeping with eyes open
Chemosis

- Treatment: cool cloths, over-the-counter antihistamines, topical antihistamines
Chemosis
Chemosis
Ciliary Flush ➔ Uveal Tract
Ciliary Flush (More Later)
Pterygium
Pterygium
Leukoplakia (precancer)
Conjunctiva Jewelry
Sclera – Jaundiced

Sab3el3eish, Wikimedia Commons
Sclera – Jaundiced
Sclera – Blue (Osteogenesis Imperfecta)

Herbert L. Fred, MD and Hendrik A. van Dijk, Wikimedia Commons
Scleritis

- Severe boring eye pain, may radiate to forehead, cheek, behind eye
- Red eye, light sensitivity, ↓ vision
- 50% of patients have systemic autoimmune disease (rheumatoid arthritis, SLE, et al.)
Scleritis

Kribz, Wikimedia Commons
Scleritis

Source Undetermined
Scleritis
Episcleritis

- Episceral tissue between sclera and conjunctiva
- Acute mild-to-moderate discomfort with localized redness
- Self-limiting, no permanent damage
- No therapy needed: some patients may benefit from artificial tears
Episcleritis
Episcleritis
4. Cornea
Arcus Senilis (Gerontoxon)

- Common finding in elderly, of no pathological significance
- Formed by lipid deposition at periphery of cornea
- Also found in familial hypercholesterolemias
Arcus Senilis (Gerontoxon)
Arcus Senilis (Gerontoxon)
Arcus Senilis (Gerontoxon)

Loren A Zech Jr and Jeffery M Hoeg, Wikimedia Commons
Kayser-Fleischer Ring

Herbert L. Fred, MD, Hendrik A. van Dijk, [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Kayser_Fleischer_Ring.jpg)
Ultraviolet Keratitis

- Cornea “sunburned” by UV exposure
- “Snow blindness” or “welders flash”
- Presents 6 to 12 hours after UV exposure
- Very painful (“sand in the eyes”)
- Treat symptomatically
Ultraviolet Keratitis

Source Undetermined
Ultraviolet Keratitis

Source Undetermined
Corneal Abrasion

- Foreign body sensation: pain, photophobia, ↓ visual acuity
- Topical anesthetic ➔ complete relief (short-lived)
- Must examine for foreign body
Corneal Abrasion

- **Proparacaine (Ophthetic®) 0.5% ester;** onset 15 sec, lasts 20 min, not bacteriostatic
- **Tetracaine 0.5% ester;** lasts longer, more corneal toxicity
- **Cocaine 1 – 4% ester solution**
Proparacaine vs. Tetracaine

Proparacaine = Ophthaine®
- Least irritating
- Onset 20 seconds
- Lasts 10 - 15 minutes
- $15 / bottle

Tetracaine = Pontocaine®
- Stings a lot
- Onset 1 minute
- Lasts 15 - 20 minutes

Both 0.5% solution
Corneal Abrasion – Findings

- Bulbar conjunctival injection
- Visual acuity should be normal
- Fluorescein + cobalt blue or Woods light: dye uptake where corneal epithelial cells damaged
Corneal Abrasion
Corneal Abrasion
Corneal Abrasion
Corneal Abrasion – Fingernail
Poor Man’s Slit Lamp
Tetanus and Eyes

- Cornea avascular, “tetanus prone”
- 38 cases reported between 1847 (sic) and 1993
- 33 involved perforated globe
- None in patient with simple corneal abrasion

Corneal Abrasion

Treatment: short-acting cycloplegic (Cyclogyl® 1%)

- Broad-spectrum antibiotic
- Early follow-up
Corneal Abrasion

- Eye patch: controversial
  - No benefit at follow-up
- DO NOT send topical anesthetics home with patient → ulcerations, perforation possible

National Eye Institute, National Institutes of Health, Wikimedia Commons
Anesthetic Keratopathy
Corneal Foreign Body

- Pain, foreign body sensation, red conjunctiva, tearing, lid spasm (blepharospasm)
- Excellent pain relief from topical anesthetic
- Definitive diagnosis: slit lamp
Corneal Foreign Body
Corneal Foreign Body
Corneal Foreign Body
Corneal Foreign Body – Rust

Source Undetermined
Corneal Foreign Body – Rust
Spud

Ophthalmology Instrument
Foreign body spud and needle

Sarindam7, Wikimedia Commons
Magnet

Burr
Pearls

- Evert eyelid to look for foreign bodies
- Fluorescein can permanently stain soft contact lenses
Lid Foreign Body
Lid Foreign Body
Lid Foreign Body
Corneal Foreign Body

Treatment

- Attempt flush $\rightarrow$ gentle stream
- Under magnification: removal with small-gauge needle or spud
Scratch from contact lens: use antibiotics

- Infection, ulcers common
- Cover Gram-negatives, especially pseudomonas
Pearls

Avoid neomycin (Neosporin®): many people allergic
NSAID Eyedrops

- Decrease cyclooxygenase activity ➔ lower prostaglandin precursor ➔ less prostaglandin synthesis
- NSAID + soft contact may give symptomatic relief, preserve binocular vision

NSAID Eyedrops

- Diclofenac = Voltaren® ($48/5ml)
- Ketorolac 0.5% = Acular® ($45)
NSAID Eyedrops

$9 / ml =
$270 / ounce =
$2160 / cup =
$9000 / liter
$37,854 / gallon
Cycloplegics / Mydriatics

- Cycloplegic paralyzes ciliary muscles that adjust lens shape
  - Relieves photophobia, pain
- Mydriatic causes pupil to dilate
  - Can cause acute narrow angle closure
<table>
<thead>
<tr>
<th>Drug</th>
<th>Mydriasis</th>
<th>Cycloplegia</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atropine</td>
<td>30 min</td>
<td>1 hr</td>
<td>14 days</td>
</tr>
<tr>
<td>Homatropine</td>
<td>10 – 30 min</td>
<td>30 – 90 min</td>
<td>6 hr – 4 days</td>
</tr>
<tr>
<td>Scopolamine</td>
<td>40 min</td>
<td>40 min</td>
<td>24 hr</td>
</tr>
<tr>
<td>Cyclopentolate (Cyclogyl®)</td>
<td>15 – 30 min</td>
<td>15 – 45 min</td>
<td>24 hr</td>
</tr>
<tr>
<td>Tropicamide (Mydriacyl®)</td>
<td>20 – 30 min</td>
<td>20 – 25 min</td>
<td>4 – 6 hr</td>
</tr>
</tbody>
</table>
What Works Best?

- 401 patients with corneal abrasions
- Lubrication vs. homatropine vs. NSAID drops vs. homatropine plus NSAID drops
- All outcomes: no difference among any groups

Corneal Ulcer

- Common cause: soft contacts
- Worse in extended wear
- Pain, tearing, light sensitive
- Exam: staining epithelial defect
- Slit lamp: possible hypopyon
Corneal Ulcer

Treatment

- Fluoroquinolone drops every hour (Ciloxan®, Ocuflox®)
- Cycloplegic drops (Cyclogyl®)
- NO patch, rapid follow-up
Pseudomonas Keratitis

Source Undetermined
Corneal Ulcer
Corneal Ulcer
Shingles / Herpes Keratitis

- Zoster of trigeminal nerve
- Vesicle on tip of nose → worry about cornea involvement (nasociliary nerve branch)
- Fluorescein → dendrites
Shingles / Herpes Keratitis
Shingles / Herpes Keratitis
Shingles / Herpes Keratitis

Source Undetermined
Shingles / Herpes Keratitis
Shingles / Herpes Keratitis
Shingles / Herpes Keratitis
Shingles / Herpes Keratitis
Shingles / Herpes Keratitis

- STAT refer to ophthalmologist
- Oral anti-virals not helpful
- Some success with acyclovir ophthalmic
Contact Lens Jewelry
5. Pupil and Iris
Pupillary Reaction

- PERRLA: Pupils Equal Round Respond to Light & Accommodation
- About 25% of population has unequal pupils with no known etiology or pathological consequences
Pupillary Reaction

- Exam in semi-darkened room
- Have patient view distant object
  - Prevents accommodative and convergence from coming into play
- Anisocoria: reassess in varying light
  - If changes, more likely pathologic
Light Reflex

- View distant, then near target
- Watch both eyes to confirm equal, symmetrical responses
- If afferent arc intact, direct and consensual equal
- Do NOT shine light directly into eye; direct slightly inferior and upward
Heterochromia Iridis

Tazztone, Wikimedia Commons
Iridodialysis

- Usually traumatic
- Photophobia, deep eye pain due to ciliary muscle spasm
- Continued pain after instillation of topical anesthetic
- Pain on accommodation
Iridodialysis

- Ciliary flush, cells and flare common
- Treatment: long-acting cycloplegia, topical steroid
- Consultation with ophthalmologist, but next-day follow-up okay
Iridodialysis

Rakesh Ahuja, MD, Wikimedia Commons
Iridodialysis

Petr Novak, Wikimedia Commons
6. Anterior Chamber and Lens
Cells and Flare

- **Cells:** WBCs on the posterior cornea
- **Flare:** reflection of light on protein shed from inflamed iris or ciliary body
- **Think of sunlight streaming through dust**
Cells and Flare
Hyphema

- Disruption of iris or ciliary body blood vessels
- Complaint: pain, photophobia, ↓ visual acuity
- Findings: blood in anterior chamber
Hyphema
<table>
<thead>
<tr>
<th>Grade</th>
<th>Size of Hyphema</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Circulating RBCs only; no layering</td>
</tr>
<tr>
<td>1</td>
<td>Less than 1/3</td>
</tr>
<tr>
<td>2</td>
<td>1/3 to 1/2</td>
</tr>
<tr>
<td>3</td>
<td>1/2 to less than total</td>
</tr>
<tr>
<td>4</td>
<td>Total “eight ball”</td>
</tr>
</tbody>
</table>
Hyphema
Hyphema

Source Undetermined
Hyphema – Treatment

- Reliable patient, small hyphema: home therapy
- Elevate head of bed (30° – 45°)
- Limit eye movement (reading)
- Symptom relief
Hypopyon

- From Greek hupo “ulcer,” puon “pus”
- Pronounced hie PO pee on
- White cells (pus) in anterior chamber
- Causes: many
- Always an eye emergency
Hypopyon

EyeMD (Rakesh Ahuja, M.D.), Wikimedia Commons
Hypopyon
Hypopyon
Subluxed Lens

- Blunt trauma causes disruption of zonule fibers
- Monocular diplopia, marked blurred vision
- Trembling or shimmering of iris with rapid eye movements
Subluxed Lens

- Anterior dislocation can manually block aqueous flow, precipitate acute glaucoma
- Marfan’s Syndrome
Subluxed Lens
Subluxed Lens
Marfan’s Syndrome

- Dissections
- Aneurysms
- Hernias
- Arachnydactyly
- Sunken chest
- Loose jointed
Cataract

- Immature: some remaining clear areas
- Mature: completely opaque
- Hypermature: liquefied surface that leaks through the capsule
Cataract

- Difficulty seeing at night, halos around lights, sensitive to glare
- Most people have some clouding of lens after age 60
- Age 65 – 74: 50% have cataract
- 75 and older: 70% have cataracts
Cataract

Rakesh Ahuja, MD, Wikimedia Commons
Cataract

Community Eye Health, Flickr
What the Patient Sees

Cataract

National Eye Institute, National Institutes of Health, Wikimedia Commons
Intraocular Lens
Intraocular Lens – Displaced

Source Undetermined
Phacoanaphylaxis

- Lens is “privileged space,” highly antigenic
- Ruptured lens → intense allergic reaction → endophthalmitis
Endophthalmitis – Streptococcus
Endophthalmitis – Pseudomonas
ANAG – Presentation

- Eye and facial pain
- Unilateral blurred vision
- Photopsiae: colored haloes around lights
- Nausea and vomiting (occasional)
- Visual acuity: often 20/80 or worse
ANAG – Findings

- Deep conjunctival and episcleral injection in a circumlimbal fashion
- Fixed, mid-dilated pupil
- Edematous or "steamly" cornea
- Shallow anterior chamber
- Elevated intraocular pressure
Cloudy Cornea

Source Undetermined
Cloudy Cornea
Mid-position Pupil
Narrow Anterior Chamber
Narrow Anterior Chamber
Pale Optic Disc
Measuring IOP

- **Tonometry**: IOP 30 to 60mm Hg or higher
  - Schiotz®
  - Goldman®
  - Tonopen®
Schiotz Tonometer

Community Eye Health, Flickr
Goldman Tonometer
Tonopen®
What the patient sees

Glaucoma
ANAG – Treatment

- Shrink pupil (green): pilocarpine
- Miotics ineffective if pressures over 40mm Hg due to iris ischemia
- In that case, use beta-blocker and/or apraclonidine
ANAG – Treatment

- If no significant IOP reduction after 45 minutes: oral carbonic anhydrase inhibitor (acetazolamide)
- Also use hyperosmotic: 3-5 ounces oral glycerin or isosorbide over ice
- Check IOP every 15 minutes
ANAG – Treatment

Once IOP below 40mm Hg:
- pilocarpine 2% and prednisolone acetate 1% every 15 minutes

Safe to discontinue this regimen when IOP below 30mm Hg
7. Extraocular Motility
Double Vision

- Monocular vs. Binocular
- Extraocular muscle testing
  - Six cardinal positions
Conjunctival Caput Medusae
Cavernous Sinus Thrombosis
8. Slit Lamp Examination
Slit Lamp Examination
Slit Lamp Examination

U.S. Navy, Wikimedia Commons
9. Funduscopic Examination
Acute Vision Loss

- Painful: ANAG, optic neuritis
- Painless
  - Central retinal artery occlusion (CRAO)
  - Central retinal vein occlusion (CRVO)
  - Temporal / giant cell arteritis
  - Retinal detachment
Funduscopic Exam
Optic Neuritis

- Women > men
- Rapid visual reduction, usually painful
- Color desaturation more common than acuity loss – bright reds look pink
Optic Neuritis – Disk

Source Undetermined
Optic Neuritis – Disk
Optic Neuritis

Significance: may be first attack of multiple sclerosis

Treatment: controversial

?steroids
CRAO

- Vascular occlusion of central retinal artery \(\rightarrow\) retinal ischemic stroke
- Embolism from primary cardiac pathology
- Age: 50 – 70
CRAO – Physical Exam

- Funduscopic exam ➔ pale edematous retina, fovea appears “cherry red” (only in comparison to pale retina)
CRAO – “Cherry Red” Spot
CRAO – “Cherry Red” Spot
CRAO – “Cherry Red” Spot

Branch occlusion
CRAO – Treatment

- Dislodge / dissolve embolism
- Dilate artery to promote flow
- Reduce IOP to allow $\uparrow$ perfusion gradient
- $\uparrow$ pCO$_2$ – rebreather
CRVO

- Leads to edema, hemorrhage, vascular leakage
- Vision loss can be minimal or severe
- Can be ischemic or nonischemic
- Loss may improve over time
CRVO – Physical Findings

- Varies: classically shows dilated, tortuous veins, retinal hemorrhage, disc edema
- Unilateral finding
- Prognosis: depends on size of lesion
CRVO

Community Eye Health, Flickr
CRVO
CRVO
Retinal Detachment

- Rhegmatogenous: vitreous fluid dissects retinal layers
- Exudative: leakage of fluid from retinal vessels
- Traction: fibrous vitreous bands contract and pull retina away
Retinal Detachment

- NO pain
- May see flashing lights
- Vision “filmy,” “cloudy,” “like a curtain falling”
- Vision may be preserved if macula not involved
Retinal Detachment
Retinal Detachment
Retinal Detachment
Eye Trauma
Contusion ➔ Black Eye

- Ecchymosis, swelling, ↓ vision
- Visual acuity
- EARLY exam before swells shut
- Check extraocular muscles, eye grounds, cornea, etc.
Contusion ➔ Black Eye
Contusion ➔ Black Eye

Treatment
- Symptomatic
- Cold compresses, elevate head of bed
- Resolution in 2 – 3 weeks
If it's cold, the raw steak will work, but it's the cold – not anything in the steak – which will stop the black eye. An ice bag is a much better – and cheaper – treatment.
Orbital Fractures
Orbital Floor Fractures

- Weakest point: orbital floor
  - Infraorbital foramen
- Second weakest: medial wall
- Third weakest: lateral wall
- Strongest: supraorbital
Orbital Floor Fractures

- Orbital soft tissues can prolapse into maxillary sinus
- Enophthalmos, ptosis, diplopia, cheek anesthesia, limited upward gaze
- X-ray: “teardrop” sign
Orbital Floor Fractures
Orbital Floor Fractures
Orbital Floor Fractures

Source Undetermined
Retrobulbar Hemorrhage

- Blunt trauma
- Acute rise intraorbital pressure
- Central retinal artery occlusion
- Proptosis, ↓ vision, ↑ IOP
- Orbital CT → hematoma
- Treatment: canthotony
Retrobulbar Hemorrhage
Lateral Canthotomy
Lateral Canthotomy
Lateral Canthotomy
Lateral Canthotomy
Penetrating Ocular Trauma

- Common causes: BB pellet, lawn mower projectiles, hammering, knife, gunshot
- Give tetanus, IV cephalosporin
- STAT ophthalmology consult
Penetrating Ocular Trauma

- Shallow anterior chamber
- Hyphema
- Irregular pupil – “teardrop”
- Reduced visual acuity
- Can’t see posterior chamber
Penetrating Ocular Trauma

Source Undetermined

Source Undetermined
Penetrating Ocular Trauma
Positive Seidel’s = Perforation
Positive Seidel’s = Perforation
Ruptured Globe
Ruptured Globe
Ruptured Globe
Deflated Globe
Penetrating Ocular Trauma

Treatment

- Protective non-pressure eye shield
- STAT ophthalmology referral
Alkali Burns

- TRUE EMERGENCY
- Liquefactive necrosis $\rightarrow$ dissolves tissue
- IMMEDIATE irrigation with large amounts liquid until pH 7.4–7.6
Morgan Lens
Morgan Lens
Nasal Cannula
Irrigation

- Use neutral solution
- Use urine dipstick to check pH
Alkali Burn

Secker, G.A., and Daniels, J.T., Wikimedia Commons
Alkali Burn

Source Undetermined
Alkali Burn

Source Undetermined
Lye Burn, Fresh
Acid Burn

- Less devastating than alkali
- Coagulation necrosis (not liquefaction)
- Treatment: same as alkali, irrigate until neutral pH
Acid Burn

Source Undetermined
Other Chemical Burn

- Initially treat all as acid or alkali
- After copious irrigation, treat as corneal abrasion
Chemical Burn: WP

Source Undetermined
Superglue

- Cyanoacrylates used by ophthalmologists
- If lids stuck together, may leave as glue dissolves over several days
Thermal Burns

- Eyelids > globe
- $1^\circ$: irrigation, ointment
- $2^\circ$ & $3^\circ$: ophthalmology consult
- Hot liquid splash, cigarette: treat as corneal abrasion
- Molten metal: can perforate
<table>
<thead>
<tr>
<th>Class</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-infective</td>
<td>Tan</td>
</tr>
<tr>
<td>Anti-inflammatory / steroid</td>
<td>Pink</td>
</tr>
<tr>
<td>Mydriatic and cycloplegic</td>
<td>Red</td>
</tr>
<tr>
<td>Nonsteroidal anti-inflammatory</td>
<td>Gray</td>
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<tr>
<td>Miotic</td>
<td>Green</td>
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<tr>
<td>Beta-blocker</td>
<td>Yellow</td>
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<tr>
<td>Beta-blocker combination</td>
<td>Dark blue</td>
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<tr>
<td>Adrenergic agonist</td>
<td>Purple</td>
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<tr>
<td>Carbonic anhydrase inhibitor</td>
<td>Orange</td>
</tr>
<tr>
<td>Prostaglandin analogue</td>
<td>Turquoise</td>
</tr>
</tbody>
</table>
Fluorescein Stain
Placing Drops
Placing Ointments

Community Eye Health, Flickr
Immediate Referral

- Acute glaucoma
- Corneal abscess / ulcer
- CRAO / CRVO
- Globe perforation / corneal laceration
- Chemical burn
- Scleritis
Referral Within 24 Hours

- Iritis / uveitis
- Corneal abrasion
- Foreign body
- Herpes Zoster with eye involvement
- Retinal detachment
- Orbital cellulitis
Referral Within One Week

- Persistent conjunctivitis
- Episcleritis
- Facial nerve palsy (unless severe corneal exposure then within 24 hours)
No Referral Needed

- **Stye / chalazion**
- **Subconjunctival hemorrhage (unless associated with more significant trauma)**
- **Conjunctivitis**