



# Common Ocular Pathologies: To Refer or Not to Refer...That Is the Question

We Are Family (Medicine)

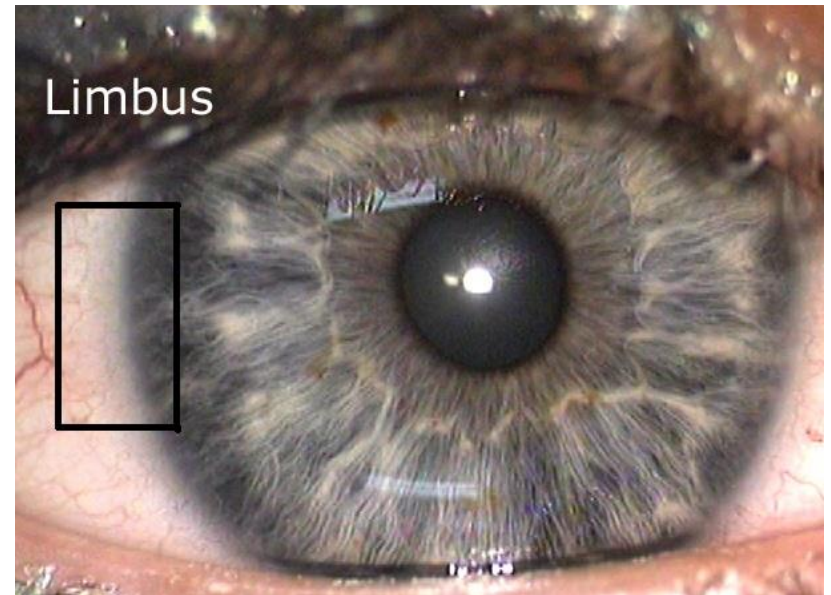
Nancy Reid, DHSc, PA-C, DFAAPA

# Review

- ▶ External Eye
- ▶ Internal Eye
- ▶ Physical Exam
  - Refractive Error
    - Presbyopia
    - Myopia
    - Hyperopia

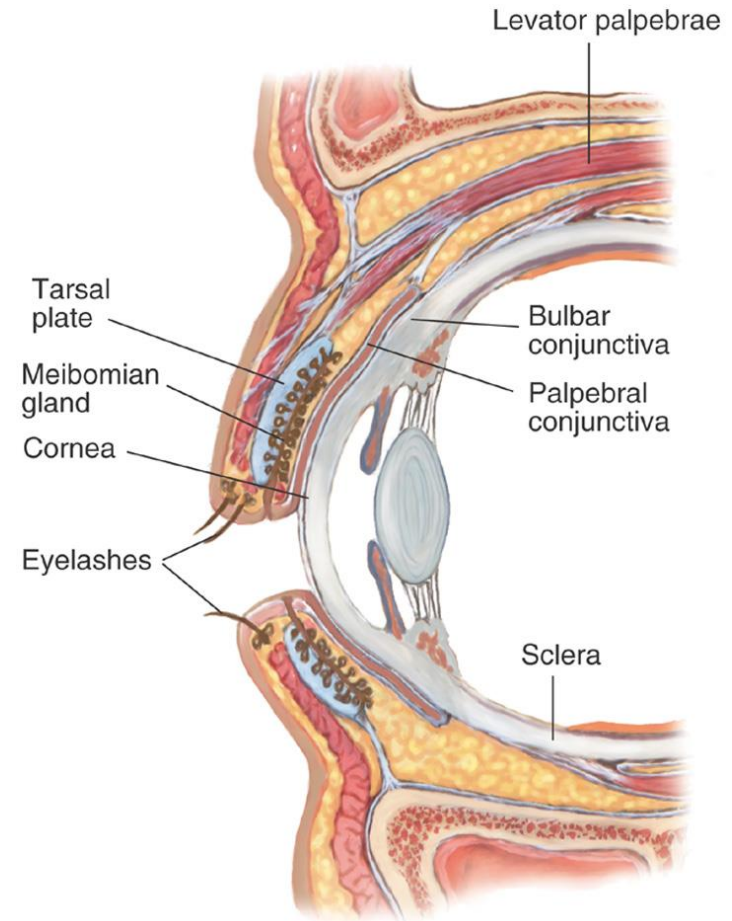
# Anatomy of External Eye

- ▶ Iris
  - Pigmented muscle
  - Controls amount of light going into retina
  - Sphincter Pupillae (inner)
  - Dilator Pupillae (outer)
- ▶ Pupil
  - Opening in eye
- ▶ Limbus
  - Junction of sclera & cornea



# Anatomy of External Eye

- ▶ **Cornea**
  - Clear part of the eye
  - avascular
- ▶ **Meibomian Glands**
  - Secrete oil
  - Keeps tears from evaporating quickly
- ▶ **Levator Palpebrae M.**
  - Elevates lids
  - CN III
- ▶ **Orbicularis Oculi M.**
  - Around eyelids
  - Closes eyelids
  - CN VII



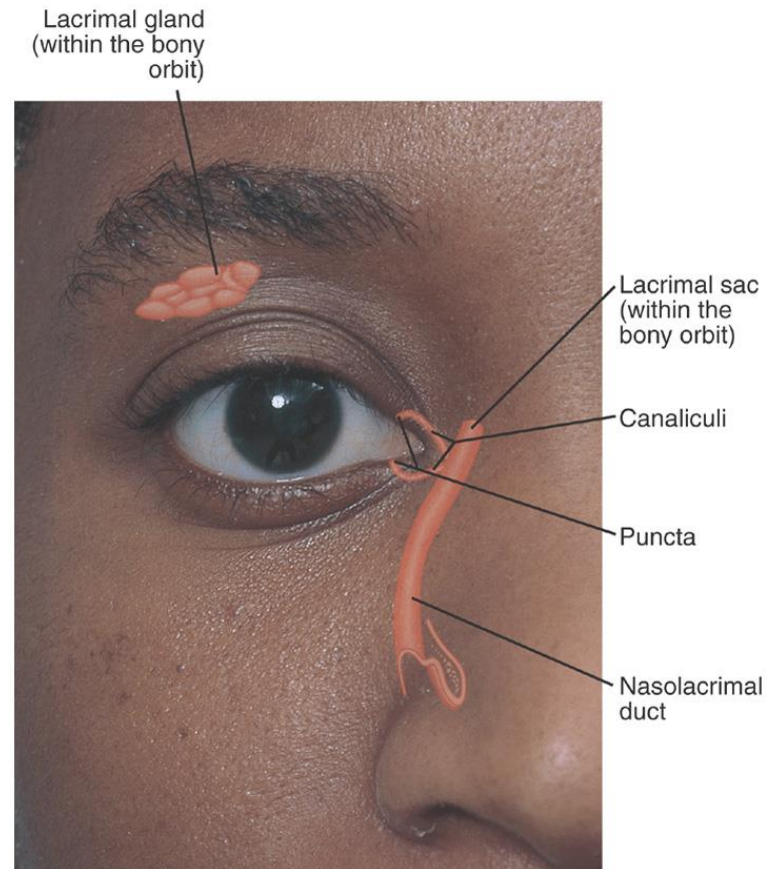
Sagittal Section of Anterior Eye With Lids Closed

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# Anatomy of External Eye

## Lacrimal Apparatus

- ▶ Lacrimal Gland
  - Reflexive tearing
- ▶ Puncta
- ▶ Canaliculi
- ▶ Lacrimal Sac
- ▶ Nasolacrimal Duct
  
- ▶ Accessory tear glands
  - Eyelid
  - conjunctiva



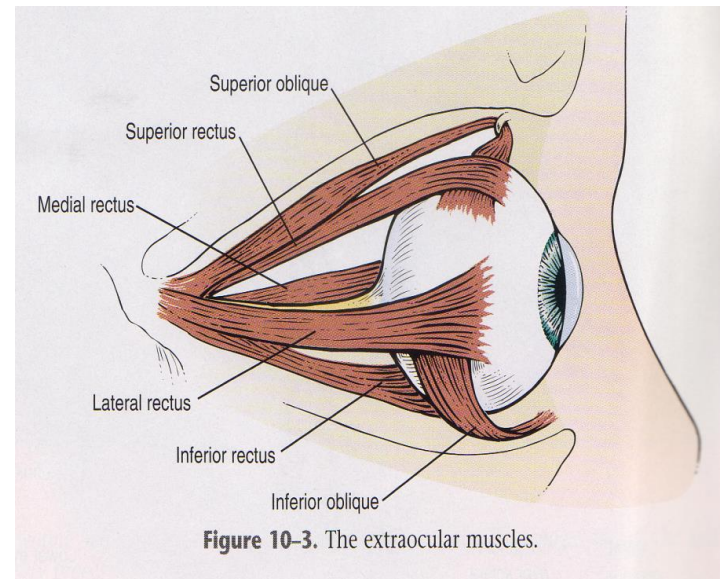
The Eye

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# Anatomy of Eye

## Extraocular Muscles / Cranial Nerve Innervation

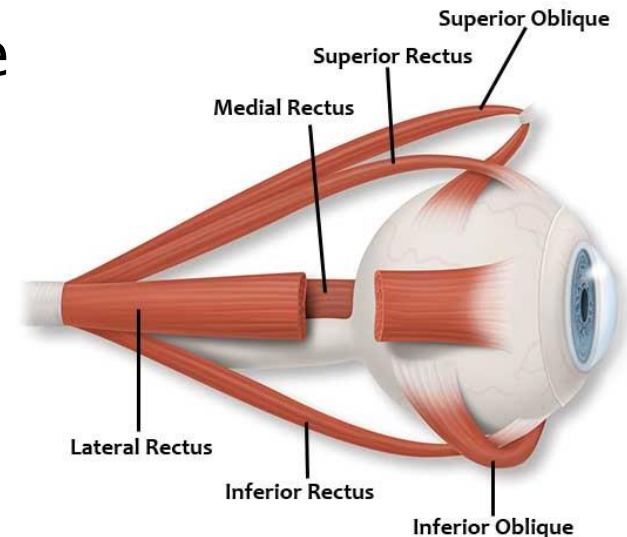
- ▶ Superior rectus (CN 3)
- ▶ Inferior rectus (CN 3)
- ▶ Medial rectus (CN 3)
- ▶ Lateral rectus (CN 6)
- ▶ Superior Oblique (CN 4)
- ▶ Inferior Oblique (CN 3)



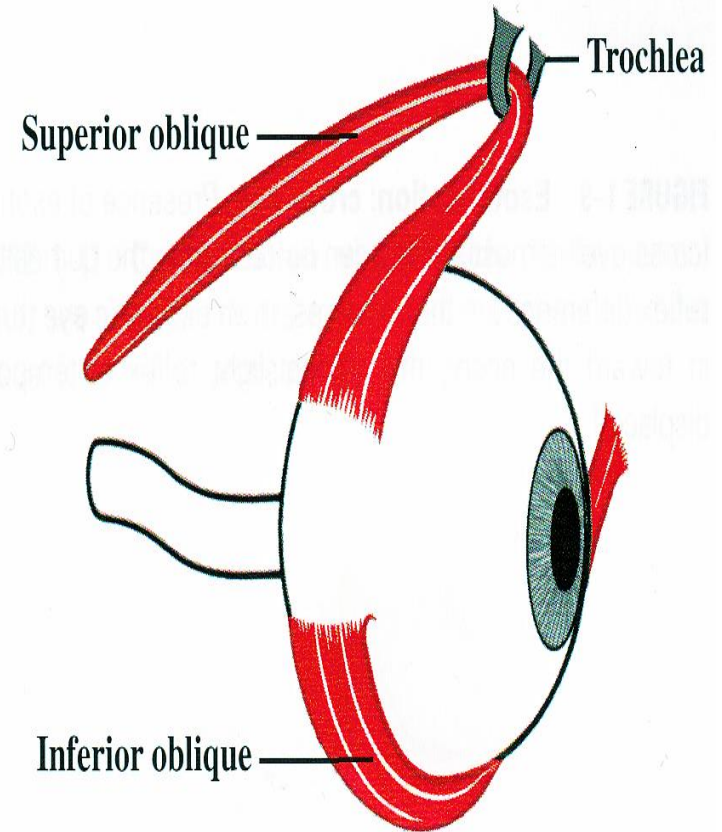
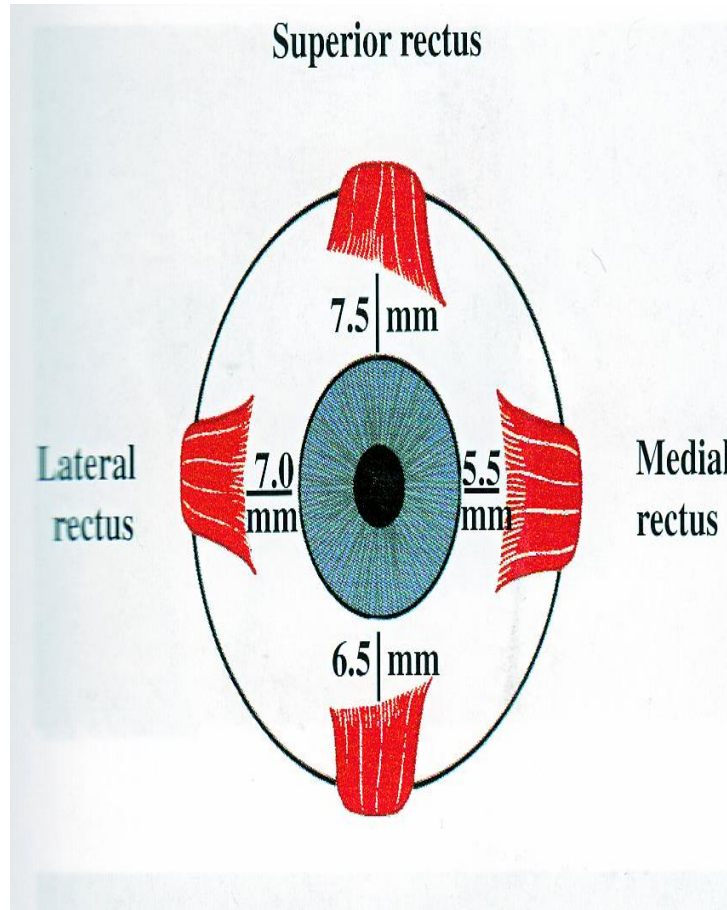
- ▶ CN 3 – med rectus, inf rectus, sup rectus, inf oblique
- ▶ CN 4 – sup oblique
- ▶ CN 6 – lat rectus

# Review

- ▶ Cranial Nerves of the Eye
  - CN 3– Opens the eye~ levator palpebrae; Pupil constriction
  - CN 7– Closes the Eye; tear production
  - CN 2– Transmits visual information from retina to the brain
  - LR6SO4R3
- ▶ Oblique muscles are named for where they are attached on the eye....not how they move the eye.
- ▶ If it involves the lid or pupil and the eye is down and out, it is CN 3.



# Extraocular Muscles

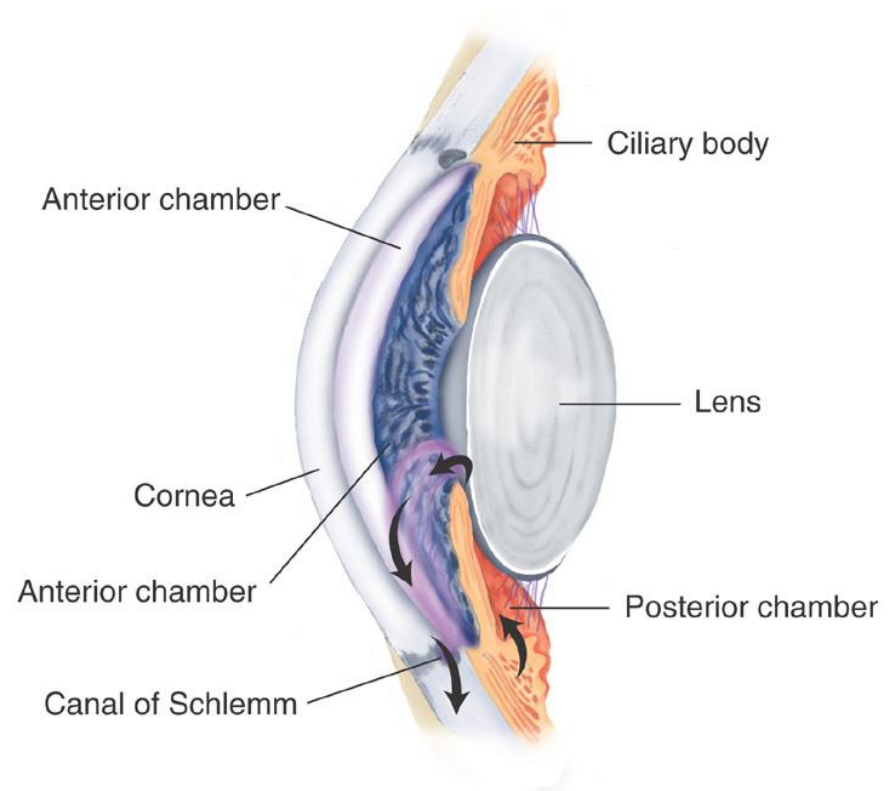




# Anatomy of Eye

## Circulation of Aqueous Humor

- ▶ Ciliary Body
- ▶ Posterior Chamber
- ▶ Through pupil
- ▶ Anterior Chamber
- ▶ Trabecular Meshwork
- ▶ Canal of Schlemm
- ▶ Circulation



Circulation of Aqueous Humor

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# Internal Eye Anatomy

Retina – inner layer, senses light

Vitreous Humor– gel inside the eye

Optic Disc (1.5 mm diameter)

Posterior pole of retina, yellowish/ pink

Head of optic nerve, central retinal vein & artery

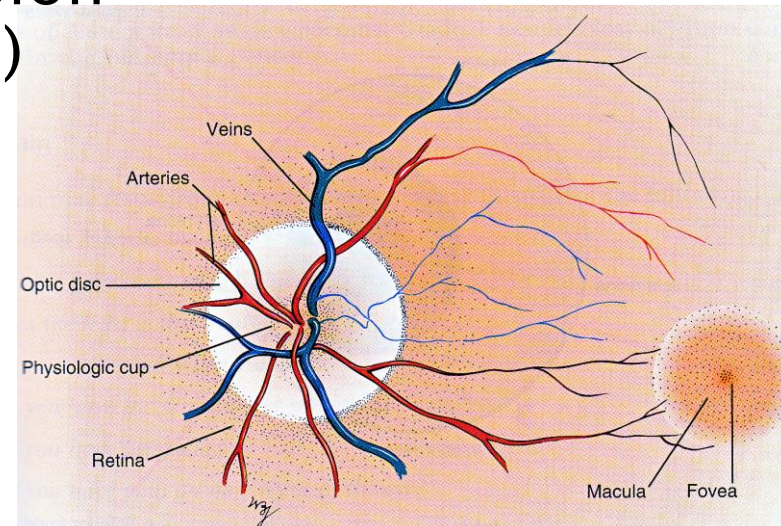
Physiologic Cup

Center of optic disc

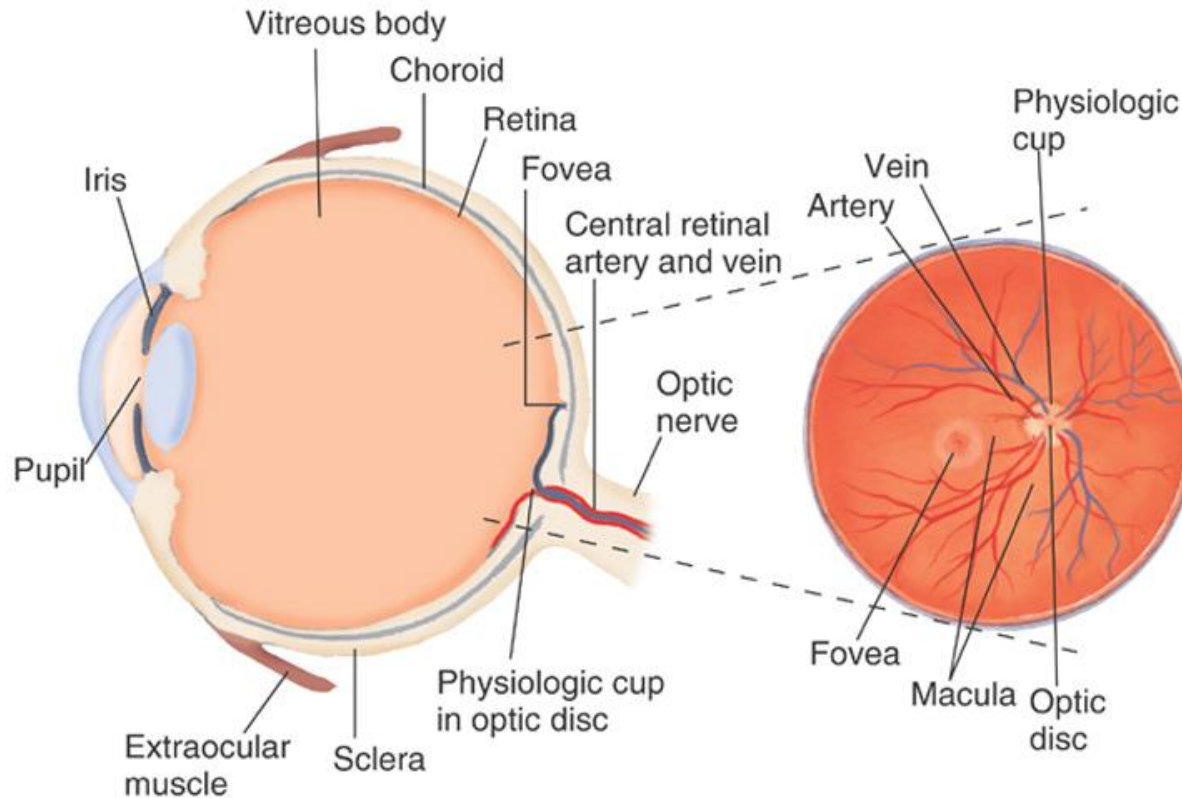
30% of disc diameter

Macula – no vessels, keenest vision

Fovea – center of macula (cones)



# Internal Eye Anatomy

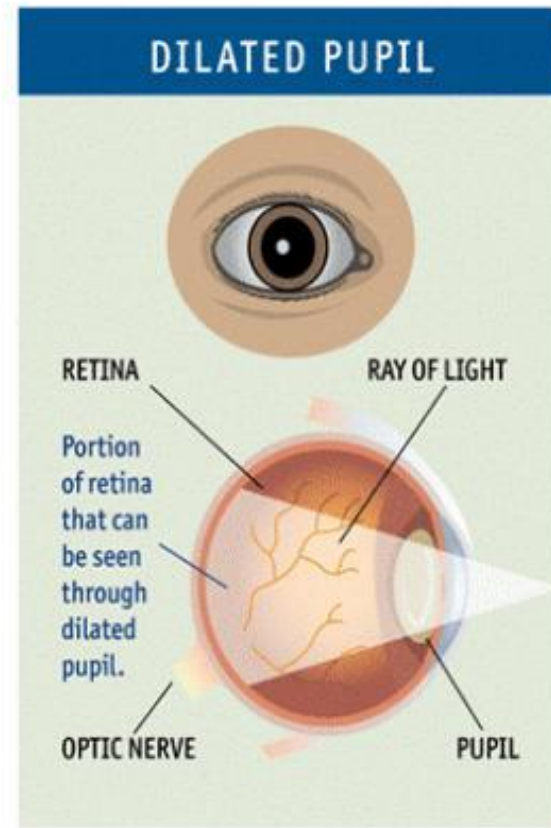
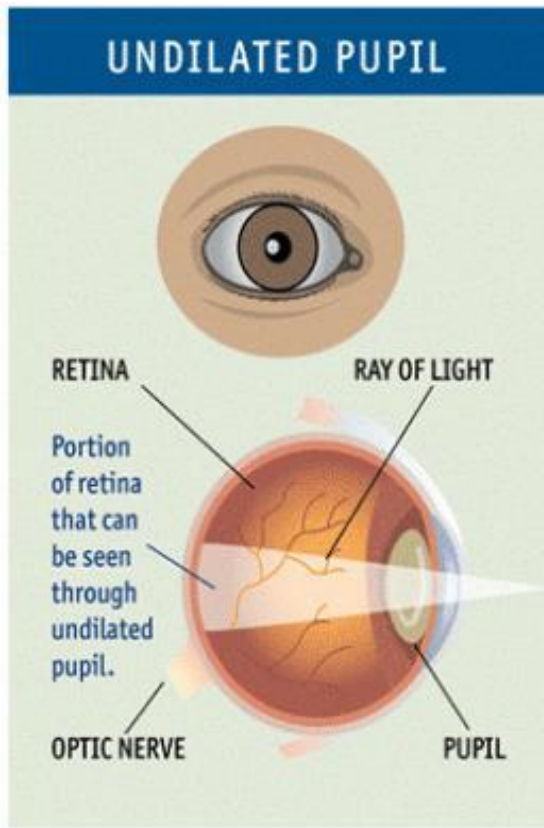


Cross Section of the Right Eye From Above Showing a Portion of the Fundus Commonly Seen With the Ophthalmoscope

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# Dilation of the Eye

- ▶ Used for best visualization of posterior eye



# Physical Exam

- Visual acuity
  - With and without correction
    - Near and Far Vision
- Inspection
- Pupil function
  - Inspection
  - Reaction to Light
  - Near Reaction (AKA. Accommodation)
    - PERRLA
- Ocular motility
  - Extraocular Movements (EOMs)
    - EOMI
  - Convergence
  - Cover/Uncover test \*
  - Cover/Cross-Cover test \*
  - Hirschberg test \*
- Visual fields testing
- Anterior chamber test
- Fundoscopic exam (includes red reflex)

# Refractive Errors

## Emmetropia

- Condition of the normal eye
- Vision perfect
- Parallel light rays fall on retina

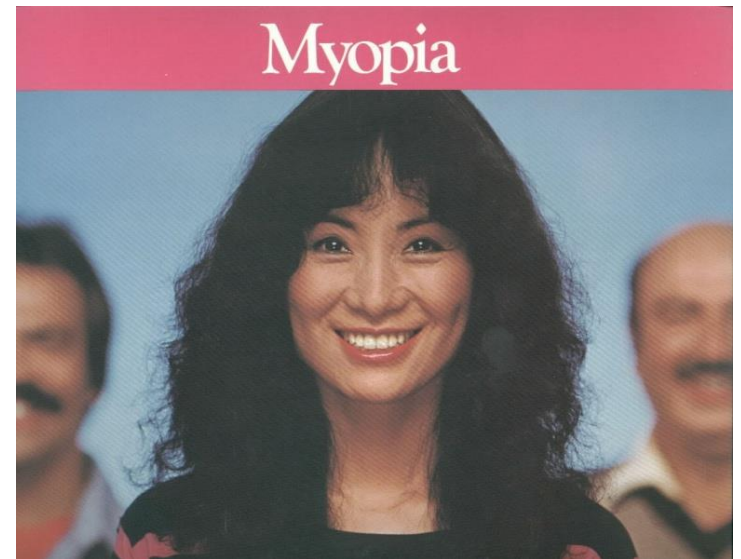
## Presbyopia

- ▶ Lens becomes hardened w/ age (after 40 yrs.)
- ▶ Lens is less pliable
- ▶ Progressive decrease in near vision
- ▶ Decrease in accommodation

# Refractive Errors

## Myopia

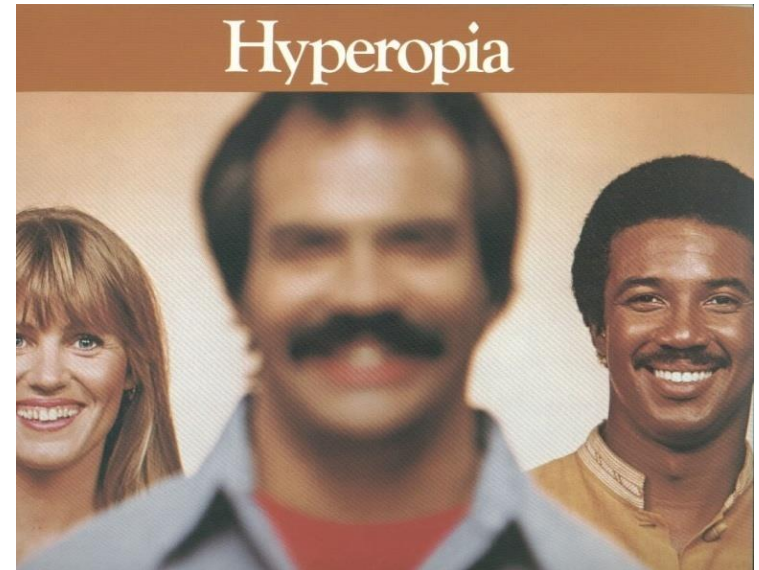
- ▶ Difficult seeing far away
- ▶ Near-sighted
- ▶ Light rays focus in front of the retina
- ▶ Distance image is blurred
- ▶ Eye is “too long”



# Refractive Errors

## Hyperopia

- ▶ Difficulty seeing close up
- ▶ Far-sighted
- ▶ Light rays focus behind the retina
- ▶ Close image is blurred
- ▶ Eye is “too short”
- ▶ Cornea is flat



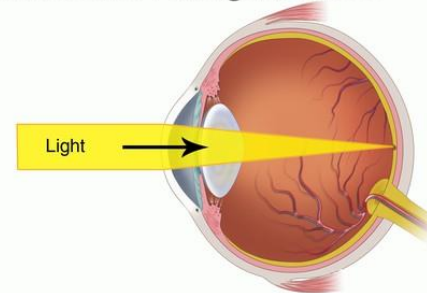


# Refractive Errors

## Nearsightedness and Farsightedness

### Normal Eye

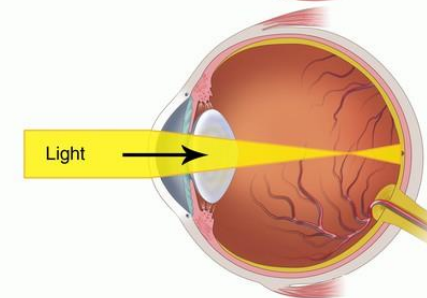
The eye is the correct shape. The light rays focus on the retina.



### Myopia

#### Nearsighted Eye

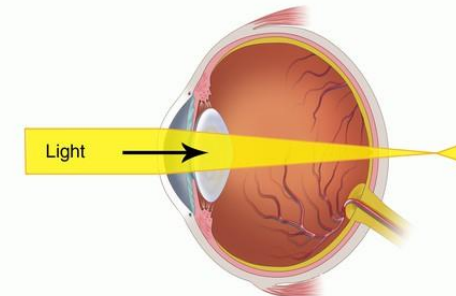
The eye is too long. The light rays focus in front of the retina. (Blurry at a distance)



### Hyperopia

#### Farsighted Eye

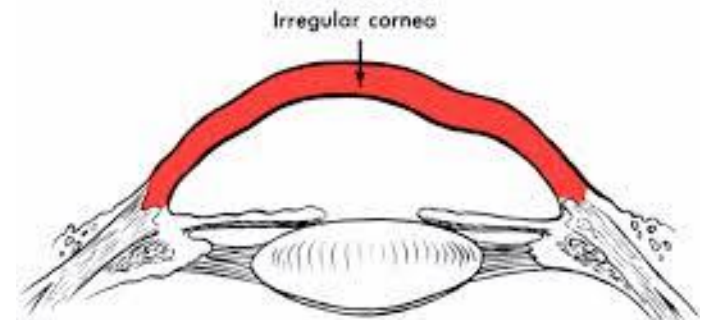
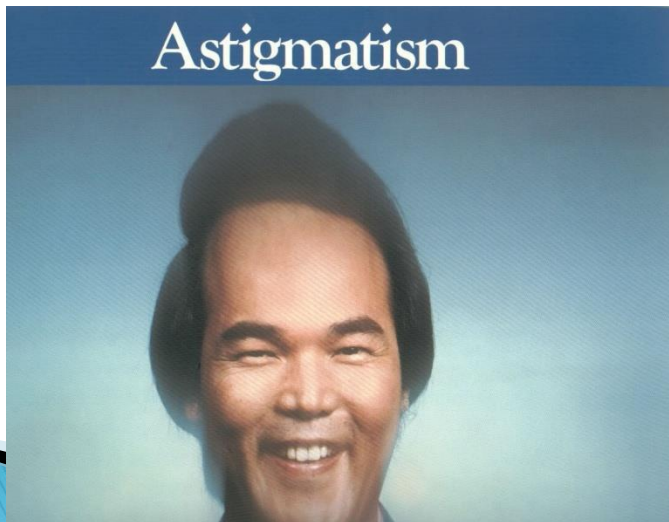
The eye is too short. The light rays focus behind the retina. (Blurry close up)



# Refractive Errors

## Astigmatism

- ▶ Error in focusing ability of eye
- ▶ Light is not uniformly focused in all directions
- ▶ Caused by unequal curvature of the front surface of the cornea (not spherical)



Astigmatism results most frequently from an irregular cornea. The cornea may be only slightly flattened horizontally, vertically, or diagonally to produce distortion of vision. The compensating shape of the lens largely nullifies the irregularities of the cornea.

# Eyelid Disorders

- ▶ Blepharitis
- ▶ Chalazion
- ▶ Hordeolum
- ▶ Ectropion
- ▶ Entropion



# Blepharitis

- ▶ Common chronic bilateral inflammation of the lid margins
  - Eyelid skin, eyelashes, & glands
- ▶ E: ulcerative, staphylococcal or seborrheic
- ▶ S/Sx: irritation, burning & itching, red-rimmed eyes & scales on lashes
- ▶ Tx:
  - Exfoliated with baby shampoo
  - Anti-staph antibiotic ointment
    - Bacitracin
    - Erythromycin

# Blepharitis



# Hordeolum

- ▶ Acute inflammation typically due to Staphylococcal abscess
  - S/SX:
    - Localized, red, swollen, **acutely tender** area on either the upper or lower lid
    - Internal- points inward and inflammation of meibomian gland
    - External- seen on lid margins
  - TX:
    - Warm compresses
    - Antibiotic ointment
      - Bacitracin
      - Erythromycin
    - I&D if no resolution with conservative tx

# Hordeolum



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# Chalazion

- ▶ Chronic granulomatous inflammation of the **Meibomian gland**
- ▶ S/Sx: **nontender**, hard swelling on the upper or lower lid
- ▶ Tx:
  - Warm Compresses
  - +/- intralesional steroids
  - Incision and Curettage





# Chalazion



EyeRounds.org

# Entropion

- ▶ Inward turning of eyelids (typically lower)
- ▶ Seen in older people as a result of laxity of the lid fascia
- ▶ May follow extensive scarring of the conjunctiva and tarsus → contracture of tissue
- ▶ Tx:
  - Surgery if causing corneal abrasions
  - +/- Botulinum toxin injections for temporary fix

# Entropion



EyeRounds.org

# Ectropion

- ▶ Outward turning of the lower lid
- ▶ Common in elderly
- ▶ Seen as a complication of lower blepharoplasty
- ▶ S/Sx: causes excessive tearing, exposure keratitis, cosmetic deformity
- ▶ Tx: artificial tears  
surgery → tighten lid muscles

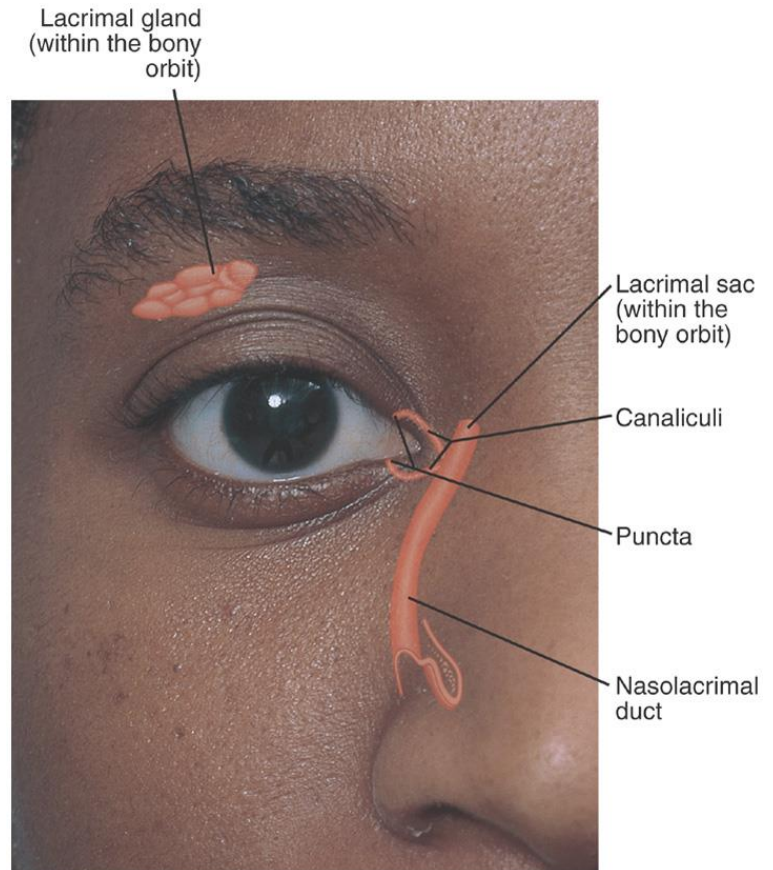
# Ectropion



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# Lacrimal Disorders

## ▶ Dacryocystitis



The Eye

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# Dacryocystitis

- ▶ Infection of lacrimal sac due to obstruction of the nasolacrimal system
- ▶ Unilateral
  - Congenital
  - Acquired– F>M; > 40 years old
- ▶ E:
  - Acute– Staph aureus &  $\beta$ -hemolytic streptococci
  - Chronic– Staph epidermidis, anaerobic streptococci, candida albicans

# Dacryocystitis

- ▶ S/Sx: pain, swelling, TTP over lacrimal sac area
  - Purulent matter may be expressed
- ▶ Tx:
  - Medical
    - Systemic antibiotics
  - Surgical
    - Adults– dacryocystorhinostomy
      - fistulization of the lacrimal sac into the nasal cavity
    - Peds– balloon dilation or probe



# Dacryocystitis



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Horizontal path of a Lacrimal Probe



# Infectious Orbit Disorders

- ▶ Periorbital Orbital Cellulitis
- ▶ Orbital Cellulitis



# Periorbital Cellulitis

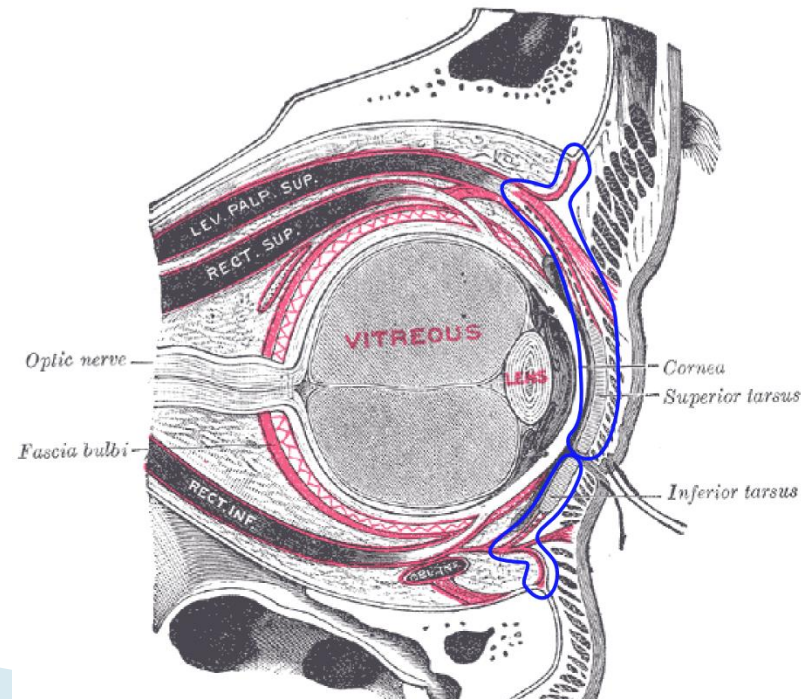
- ▶ Hx: break in the skin around the eye, infected chalazion, extension of conjunctivitis or sinusitis
- ▶ S/Sx: erythema, edema, discharge, teary eye, fever, reduction of vision
- ▶ Usually seen in those under age 2
- ▶ E:
  - **Pre-septal infection**
    - *S. aureus*
    - *S. pneumonia*
    - *Streptococci*
    - *MRSA is on the rise*
    - Invent of vaccine for *H. influenzae* has decreased incident



# Periorbital Cellulitis

## ▶ Imaging:

- CT scan is often needed to differential periorbital cellulitis from orbital cellulitis
  - no fat stranding of orbital contents
  - no involvement of the EOM
  - eyelid swelling
  - no proptosis



# Periorbital Cellulitis

## ▶ Tx:

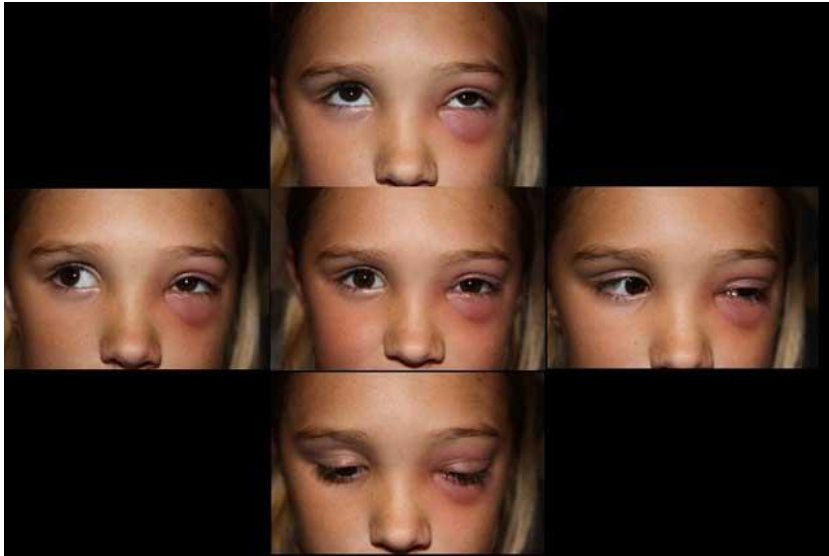
- Outpatient antibiotic treatment
- Hospitalize children younger than 1 year or critically ill appearing
- Antibiotic: targeted as cause of causative agent
- Children younger than 4 may need IV antibiotic
- If outpatient therapy fails to show improvement after 24 to 48 hours:
  - patients should be hospitalized with broad-spectrum antibiotics
  - CT scan
  - Surgical consultation should be considered for possible incision and drainage.

# Orbital Cellulitis

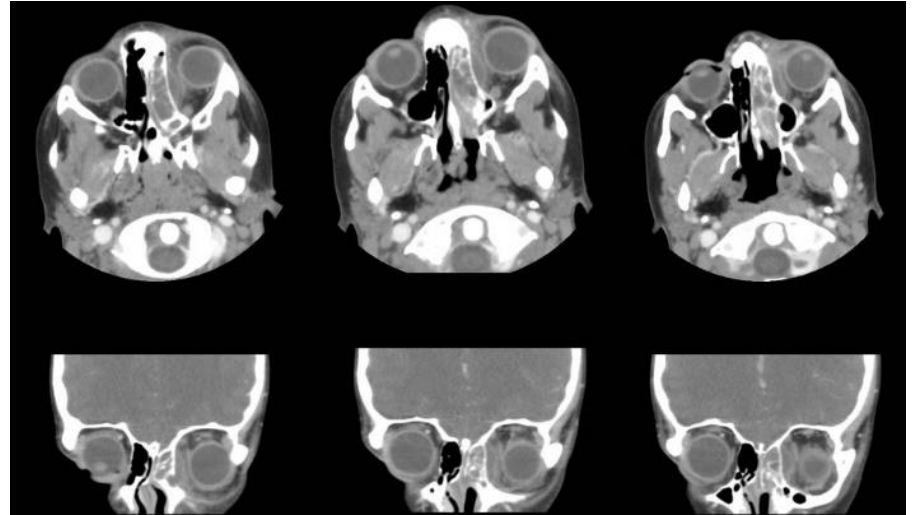
- ▶ S/Sx: abrupt onset of fever, proptosis, pain with and restriction of EOM, edema and erythema of lid
- ▶ Usually seen in kids
- ▶ E:
  - **infection of paranasal sinuses**
    - *S. pneumoniae*
    - *H. influenzae*
    - *S. aureus*
- ▶ Tx:
  - Urgent referral
  - IV antibiotics
    - Prevent spread to cavernous sinus, meninges, and brain



# Orbital Cellulitis



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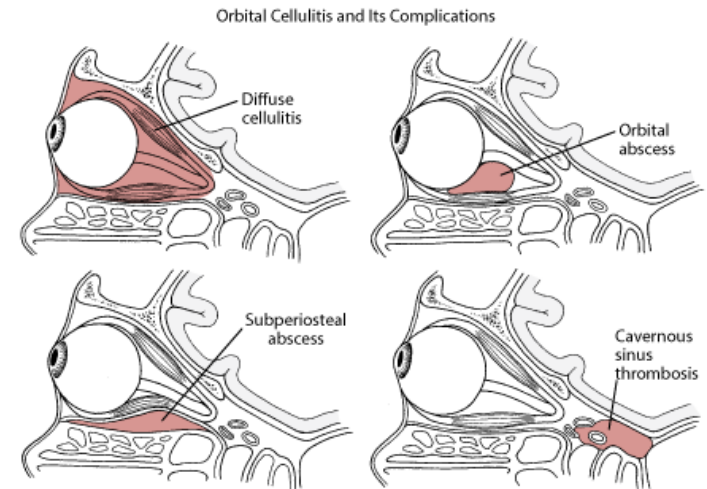
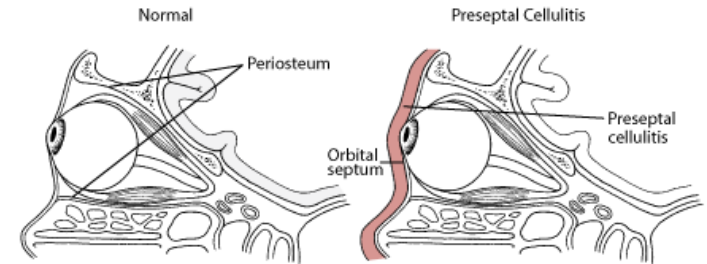


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# Periorbital vs. Orbital Cellulitis

## Periorbital vs. Orbital Cellulitis

| FACTORS           | PERIORBITAL (PRESEPTAL)  | ORBITAL (POSTSEPTAL)  |
|-------------------|--|---|
| Pathogenesis      | Trauma or bacteremia   | Sinusitis   |
| Age (mean)        | 21 months  | 12 years  |
| Clinical findings | Periorbital induration, erythema, warmth, tenderness   | Proptosis, chemosis, ophthalmoplegia, decreased visual acuity   |
| Bacteria          | Trauma:<br><i>Staphylococcus aureus</i> , group A <i>Streptococcus</i><br><br>Bacteremia:<br><i>Streptococcus pneumoniae</i> | <i>S. pneumoniae</i> , nontypeable <i>Haemophilus influenzae</i> , <i>Moraxella catarrhalis</i> , group A <i>Streptococcus</i> , <i>Staphylococcus aureus</i> , anaerobes |



Adapted with permission from Givner LB. Periorbital versus orbital cellulitis. *Pediatr Infect Dis J* 2002;21:1158.



# Comparison Photos



Jordan M. Graff, MD  
U of Iowa, 2005

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dacryocystitis



Periorbital Cellulitis

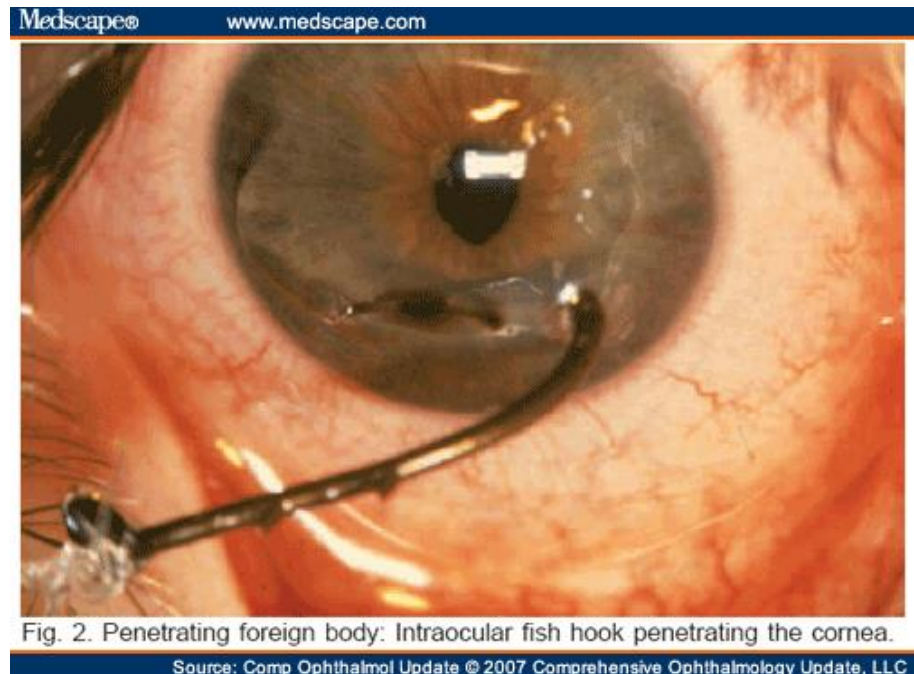


Orbital Cellulitis

Whose eye looks worse?  
Who presents looking more ill?

# Traumatic Disorders

- ▶ Subconjunctival Hemorrhage
- ▶ Corneal Abrasion
- ▶ Foreign Body
- ▶ Hyphema



# Subconjunctival Hemorrhage

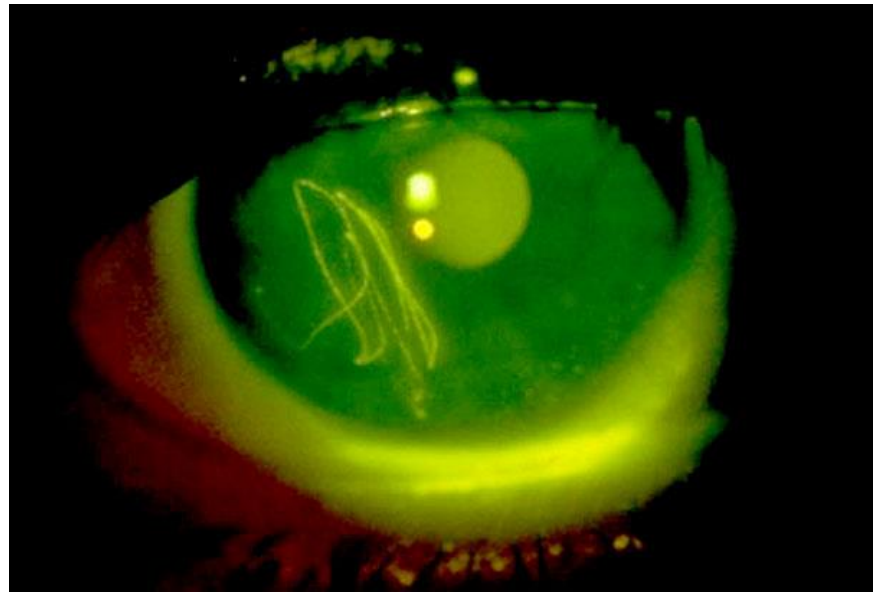
- ▶ Does not affect vision
- ▶ Minimal symptoms
- ▶ Pt. gets a lot of attention
- ▶ Stops at limbus
- ▶ Tx: Do Nothing



# Corneal Abrasion

- ▶ Scratch on the cornea
- ▶ S/Sx: redness, tearing; FB sensation
- ▶ Exam:
  - Evert lid
  - Slit lamp with fluorescein dye
- ▶ Tx:
  - Broad-spectrum antibiotic gtts or ointment
    - trimethoprim/polymyxin B
  - Contact lens wearers– must cover for pseudomonas
    - gentamicin
    - tobramycin
    - ciprofloxacin

# Corneal Abrasion

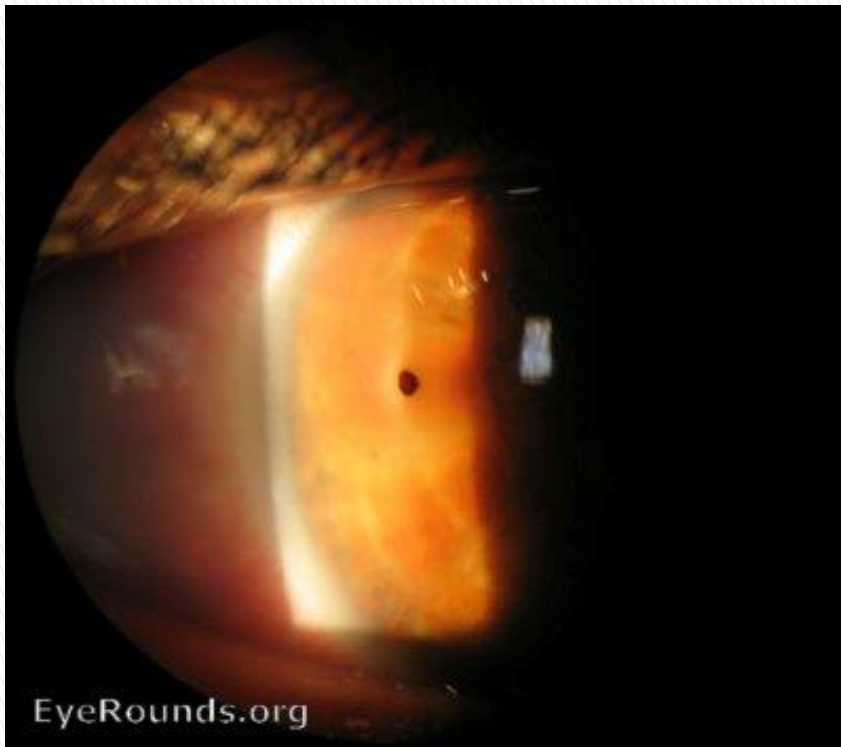


# Foreign Body (Corneal/Intraocular)

- ▶ Fluorescein stain if not able to see with blind eye
- ▶ Inspect under the lids
- ▶ Remove with sterile wet cotton-tipped applicator
- ▶ Steel foreign bodies leave a rust ring and needed removal by ophthalmologist
  - Polymyxin-bacitracin ophthalmic ointment
  - F/U examine 24 hours later
- ▶ Intraocular FB gets emergent referral to ophthalmology

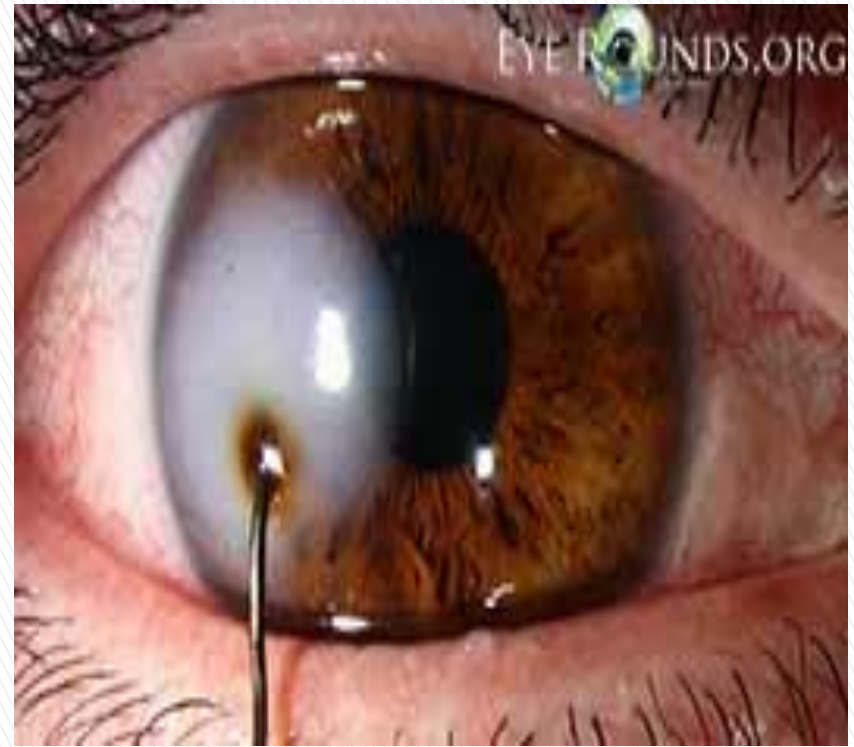
# Foreign Body

Corneal



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Intraocular



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# Hyphema

- ▶ Blood in the anterior chamber
- ▶ caused by eye trauma
  - sports injuries, home/work accidents, falls
- ▶ S/Sx: pain, photophobia, blurred vision
- ▶ Tx:
  - Emergent referral to ophthalmology
  - Medical
    - topical cycloplegics/corticosteroids
    - a rigid shield
    - activity restriction (quiet ambulation)
  - Surgery:
    - presence of corneal blood staining
    - dangerously ↑ IOP despite maximum tolerated medical therapy



# Hyphema



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# Conjunctival Disorders

- ▶ Viral
- ▶ Bacterial
  - Gonococcal
  - Chlamydial
- ▶ Allergic



# Conjunctivitis

- ▶ MC eye disease
  - Acute or Chronic
- ▶ Most cases are due to
  - Viral
  - Bacterial (including gonococcal & chlamydial)
- ▶ Mode of transmission for infectious conjunctivitis
  - Fingers
  - Towels
  - Handkerchiefs
- ▶ Must be differentiated from the dangerous
  - Acute uveitis, acute glaucoma, corneal disorders

# Viral Conjunctivitis

- ▶ MC common cause: adenovirus
- ▶ Bilateral disease w/ copious, watery discharge
- ▶ **Preauricular lymphadenopathy** common
- ▶ Infection spreads easily
  - Contaminated swimming pools
  - Eye clinics
- ▶ Sx can last 10–14 days
- ▶ Tx:
  - Supportive– cold compresses
  - Antihistamine decongestant drops OTC

# Viral Conjunctivitis

**Figure 1:** External Photographs. Red eye (OS>OD) with crusting on the lashes.



**Figure 2:** Slit Lamp Photos OS



# Bacterial Conjunctivitis

- ▶ MC bacterial causes
  - Staphylococci
  - Methicillin-resistant *S aureus* (MRSA)
  - Streptococci (*S pneumoniae*)
  - *Haemophilus*
  - *Pseudomonas*
  - *Moraxella*
- ▶ Copious, purulent discharge
  - Hyper-purulent discharge → culture for gonococcal infection

# Bacterial Conjunctivitis

## ▶ Treatment

- Erythromycin 5mg/g ophthalmic ointment
  - 0.5 inches ribbon QID (5–7 d)
- Trimethoprim–polymyxin B 0.1%– 10,000 units/ml ophthalmic drops
  - 1–2 gtts QID (5–7 d)
- Ofloxacin 0.3% ophthalmic drops
  - 1–2 gtts QID (5–7 d) \*Contact lens wearer
- Ciprofloxacin 0.3% ophthalmic drops
  - 1–2 gtts QID (5–7 d) \*Contact lens wearer

# Gonococcal Conjunctivitis

- ▶ Usually acquired through contact with infected genital secretions
- ▶ Ophthalmologic emergency
  - Due to corneal involvement may lead to perforations
- ▶ Treatment
  - Single 1g dose of IM ceftriaxone
  - Azithromycin 1 g orally
  - Topical antibiotics (erythromycin and bacitracin) may be added
- ▶ Screen for other sexually transmitted diseases
- ▶ Routine treatment for chlamydial infection is recommended



# Chlamydial conjunctivitis

- ▶ Two types
  - Trachoma
  - Inclusion conjunctivitis

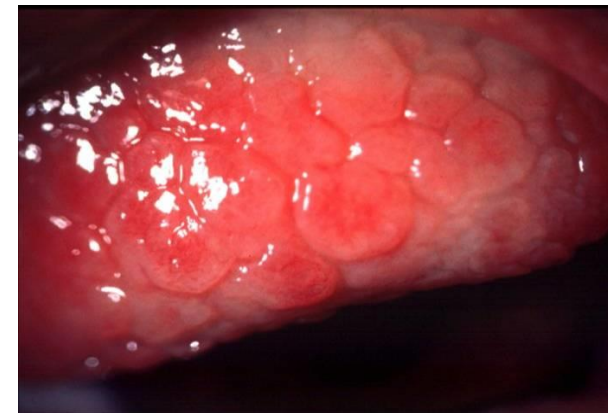


# Inclusion Conjunctivitis

- ▶ Caused by contact with genital tract secretion
- ▶ Hx: new sex partner in preceding 2 months
- ▶ E: *Chlamydia trachomatis* serotypes D–K
- ▶ S/SX:
  - Acute redness– usually unilateral
  - Purulent discharge
  - Follicular conjunctivitis with FB sensation
  - Healing leaves no sequelae
- ▶ Tx:
  - Adults– oral azithromycin 1g
  - Newborns– antibiotic ointment and IV antibiotics
    - Can cause blindness in newborns

# Allergic Conjunctivitis

- ▶ Benign, occurring in late childhood or early adulthood
- ▶ S/Sx:
  - Itching, redness, stringy discharge, photophobia, and visual loss
  - Chemosis
  - “Cobblestone” papillae
- ▶ Tx:
  - Ophthalmic solutions that include antihistamines, mast cell stabilizers, and eosinophil inhibitor activity
  - Oral antihistamines

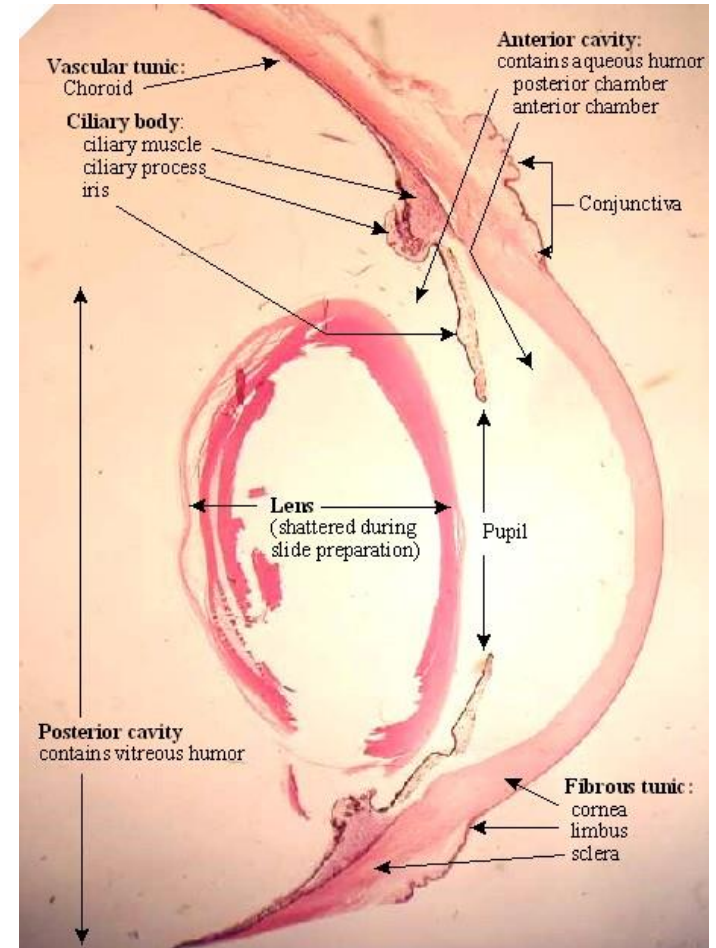


# Conjunctivitis

| Etiology   | Conjunctival Response  | Preauricular Lymphadenopathy | Discharge                              |
|------------|--|------------------------------|--|
| Bacterial  | Intense diffuse hyperemia, papillae                          | Occasional                   | Copious purulent                       |
|            | Moderate diffuse hyperemia, papillae                         | Unusual                      | Purulent-mucopurulent                  |
|            | Low-grade hyperemia, mixed follicles/papillae                | Unusual                      | Mucopurulent                           |
| Viral      | Diffuse hyperemia, petechial hemorrhages, follicle           | Common                       | Serous, serous-mucoid, or mucopurulent |
|            | Diffuse hyperemia, follicles                                 | Occasional                   | Serous-mucoid                          |
| Allergic   | Mild hyperemia, mixed papillae/follicles                     | Unusual                      | Mucoid                                 |
|            | Tranta's dots – limbal<br>Giant papillae – tarsal            | Unusual                      | Ropey mucoid                           |
|            | Giant papillae   | Unusual                      | Mucoid                                 |
| Chlamydial | Diffuse hyperemia, giant follicles, predominantly inferiorly | Occasional                   | Mucoid                                 |

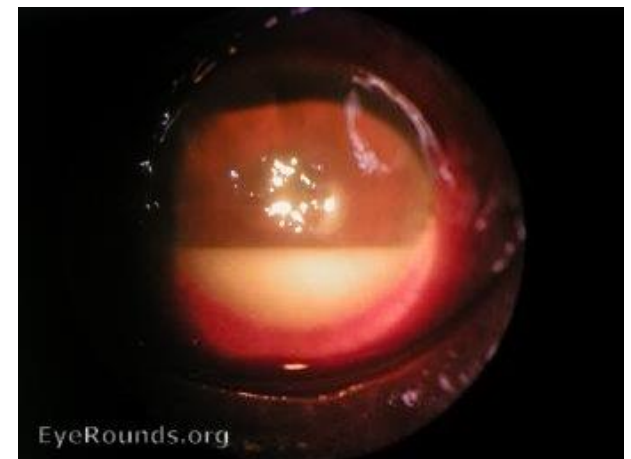
# Anterior Eye Disorders

- ▶ Hypopyon
- ▶ Pterygium
- ▶ Pinguecula
- ▶ Cataract
- ▶ Keratitis
- ▶ Corneal Ulcer
- ▶ Episcleritis
- ▶ Scleritis



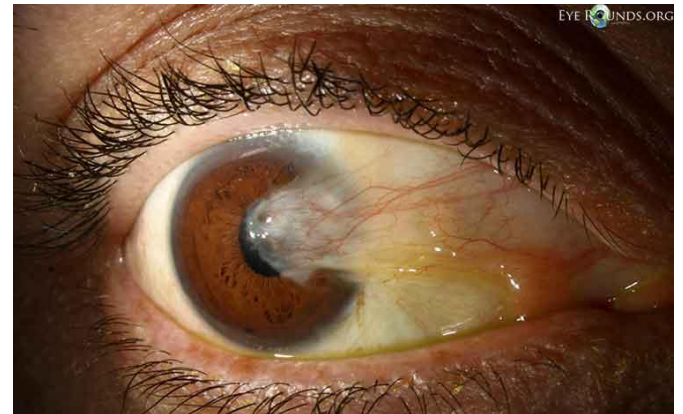
# Hypopyon

- ▶ Pus in the anterior chamber
- ▶ Infections of the iris and the uvea can be caused by both systemic as well as local conditions
- ▶ Causes:
  - TB, HSV, Lyme disease, MS, chickenpox, psoriatic arthritis
- ▶ TX:
  - Tx underlying cause



# Pterygium

- ▶ Fleshy, triangle of tissue encroaching on the cornea
- ▶ Associated with sun, wind, sand, & dust exposure
- ▶ Fairly common in SW USA
- ▶ Tx: only treated if it affects vision → surgery



# Pinguecula

- ▶ Yellow elevated nodule on either side of the cornea (MC– nasal side)
- ▶ Common in person over age 35
- ▶ Pinguecula rarely grow but inflammation may occur
- ▶ Tx: artificial tears or short courses of topical NSAIDS





# Pinguecula

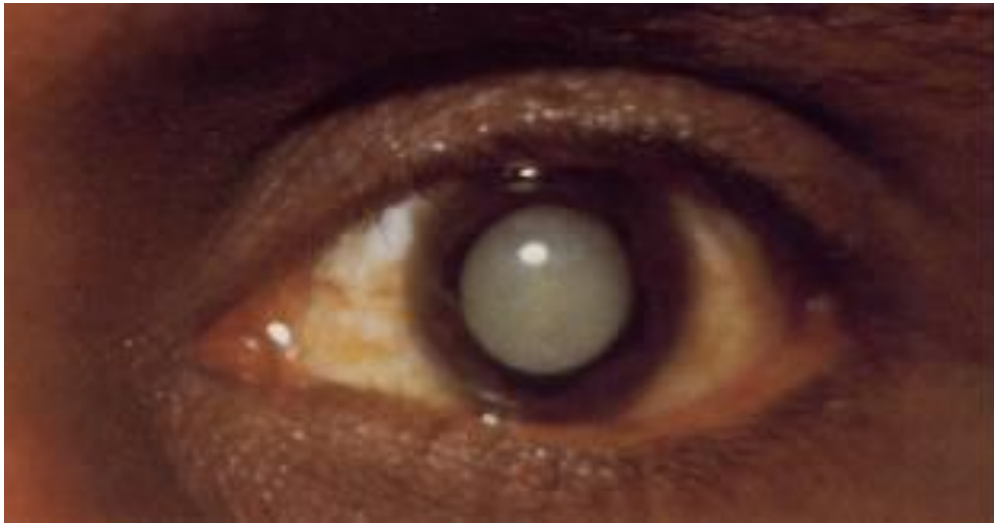


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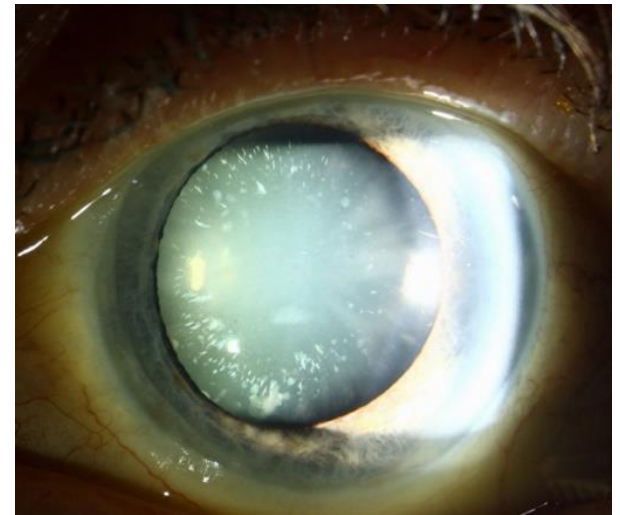
# Cataract

- ▶ Lens opacities causing blurred vision & gradual visual loss without pain/redness
- ▶ E: ↑ age (senile cataracts is MC), congenital due to rubella or CMV
- ▶ RF: smoking, corticosteroid use
- ▶ S/Sx: gradual visual loss & white pupil
- ▶ Tx: surgery
  - Ultrasonic fragmentation
  - Replacement of intraocular lens (IOL)

# Cataract



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# Bacterial Keratitis

- ▶ Usually aggressive & often due to prolonged contact wearing or corneal trauma
- ▶ Caused by Pseudomonas, Strep, Staph, & Moraxella
- ▶ S/Sx: eye pain, redness, cornea is hazy usually with a central ulcer, +/- hypopyon
- ▶ Dx: + gram stain or culture
- ▶ Tx:
  - Gm + → cephalosporin gtts
  - Gm - → fluroquinolone or aminoglycoside gtts



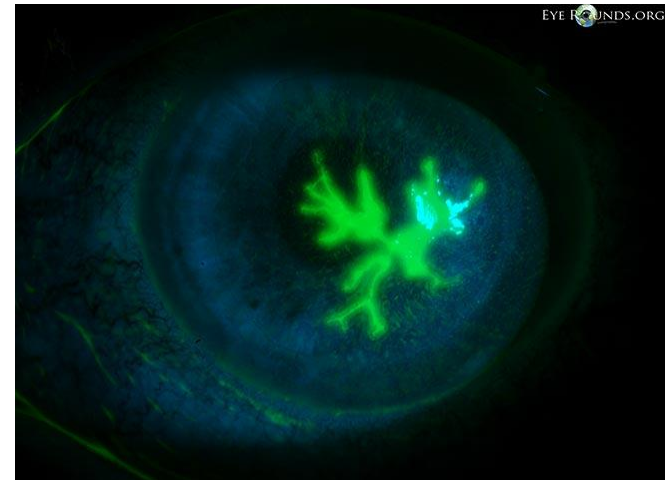
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# Viral Keratitis

- ▶ Herpes simplex keratitis
  - ▶ Herpes zoster ophthalmicus
- 

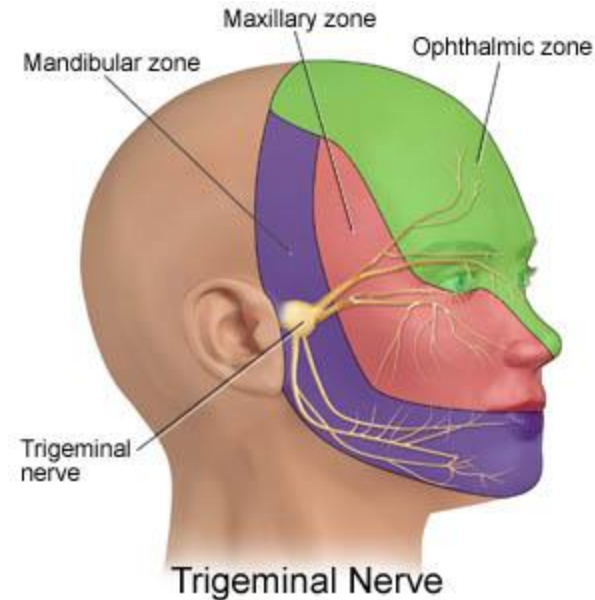
# Herpes Simplex Keratitis

- ▶ Corneal ulcer caused by HSV
- ▶ S/Sx: foreign-body sensation, light sensitivity, redness and blurred vision
- ▶ Dx: Dendritic ulcer seen with fluorescein examination
- ▶ Tx: acyclovir ointment
- ▶ NEVER NEVER Steroids



# Herpes Zoster Ophthalmicus

- ▶ Occurs when varicella–zoster virus is reactivated in ophthalmic division of CN V
- ▶ Represent  $\frac{1}{4}$  of all cases of herpes zoster
- ▶ Pt present with periorbital vesicular rash
- ▶ Permanent sequelae:
  - chronic ocular inflammation
  - loss of vision
  - debilitating pain



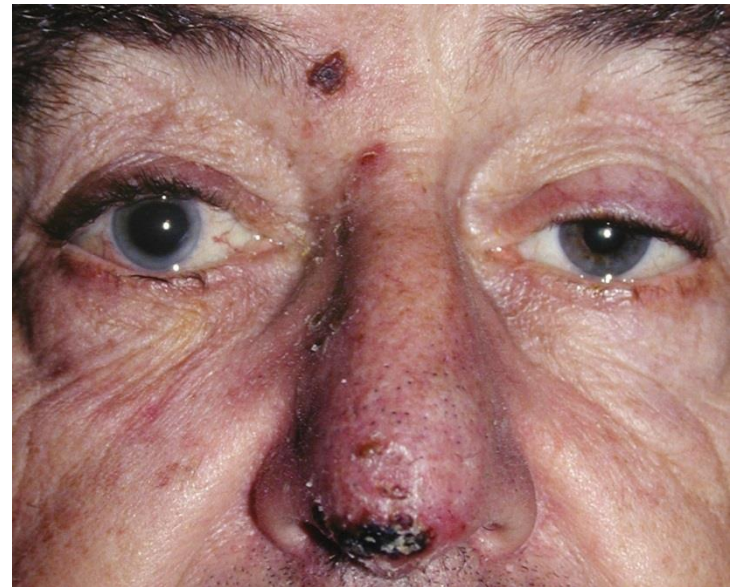
# Herpes Zoster Ophthalmicus

## ▶ HX

- Influenza-like fatigue, malaise, and low-grade fever that lasts up to one week before rash appears
- Pain and tingling preceding rash

## ▶ S/Sx

- Periorbital vesicular rash
- Hutchinson's sign
- Unilateral symptoms
- Keratitis
- Uveitis
- ↑IOP





# Herpes Zoster Ophthalmicus

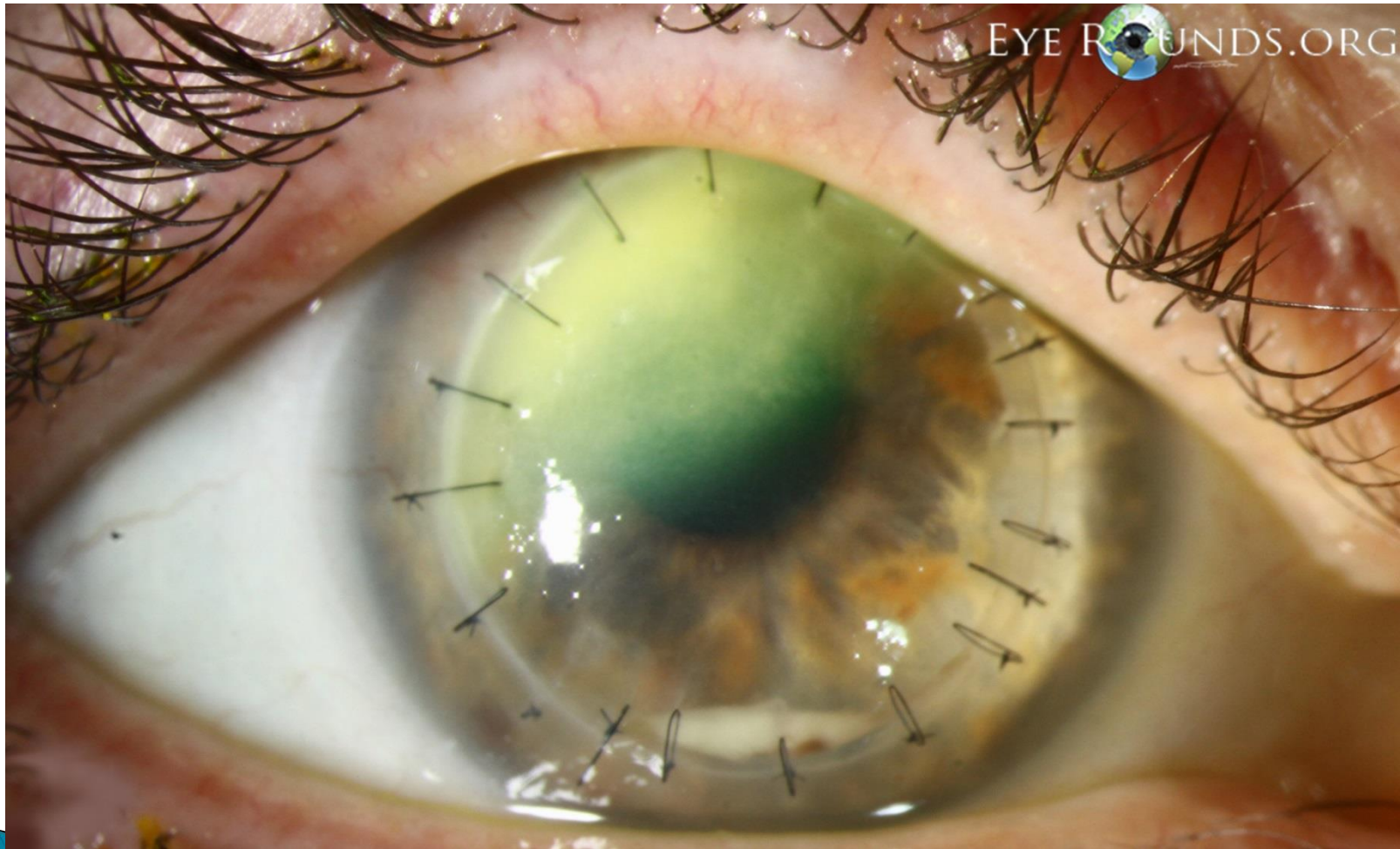
## ▶ TX:

- Start antiviral medication within 72 hours after the appearance of the rash reduces ocular involvement
  - Acyclovir 800mg 5 x a day  
or
  - Valacyclovir 1g TID  
or
  - Famciclovir 250–500mg TID
- If complicated by anterior uveitis topical corticosteroids and cycloplegics must be added

# Fungal keratitis

- ▶ Most commonly seen in:
  - After corneal injury involving plant material or in agricultural setting
  - Eyes with chronic ocular surface disease
  - Increasingly in contact lens wearers
- ▶ Cornea will have multiple stromal abscesses with relatively little epithelial loss
- ▶ Must get corneal scrapings and cultured on media suitable for fungi
- ▶ Dx is often delayed
- ▶ Tx:
  - Topical antifungal preparations
  - Systemic imidazole
  - Corneal grafting is often required

# Fungal Keratitis



# Fungal Keratitis



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# Acanthamoeba Keratitis

- ▶ Common among contact lens wearers
- ▶ Caused by *Acanthamoeba*
- ▶ S/Sx:
  - Pain, blurred vision, photophobia, excessive tearing, and FB sensation
- ▶ RF:
  - Storing and handling contacts improperly
    - Using tap water
  - Swimming, showering, or hot tub use in contacts

# Acanthamoeba Keratitis

- ▶ Dx:
  - Using corneal scraping
  - Confocal microscopy
- ▶ Tx:
  - Topical biguanides probably the only effective primary treatment
  - Systemic NSAIDS
  - Corneal grafting may be needed

# Acanthamoeba Keratitis



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# Keratitis due to Environmental Etiology

- ▶ Exposure Keratitis
  - Due to dryness of the cornea caused by incomplete and inadequate eyelid closure
- ▶ Photokeratitis
  - Due to intense ultraviolet radiation exposure
    - “Snow blindness”
    - “Welder’s arc eye”





# Corneal Ulcer

- ▶ Most commonly due to infection
- ▶ Noninfectious causes
  - Exposure keratitis (inadequate eyelid closure)
  - Severe dry eyes
  - Severe allergic eye disease
- ▶ S/Sx: painful red eye with photophobia, tearing, circumcorneal injection; +/- discharge
  - Delayed treatment may lead to intraocular infection or corneal scarring
- ▶ Tx:
  - Determined by the cause

# Corneal Ulcer



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# Episcleritis

- ▶ Self-limiting, recurring, idiopathic inflammation of the episcleral tissue that does not affect vision
- ▶ MC in young adults; F > M
- ▶ Sx/S
  - hyperemic, edematous, +/- raised nodule
  - Palpebral conjunctiva is normal
- ▶ TX
  - Self-limited
  - Topical corticosteroids
    - prednisolone acetate 1%
  - Topical vasoconstrictors
    - tetrahydrozoline



# Scleritis

- ▶ Inflammation of the sclera
  - Relatively uncommon
  - Must be differentiated from episcleritis
- ▶ 50% cases are associated with systemic disease
  - Connective tissue disease
  - Autoimmune disease
- ▶ RF:
  - M>F; 40–50 years old

# Scleritis

## ▶ S/Sx:

- Pain, redness, tearing, photophobia, ↓ VA
- Pain can be boring, lancinating, awakens pt. sleep
- Discolored, blue hue of sclera

## ▶ Tx:

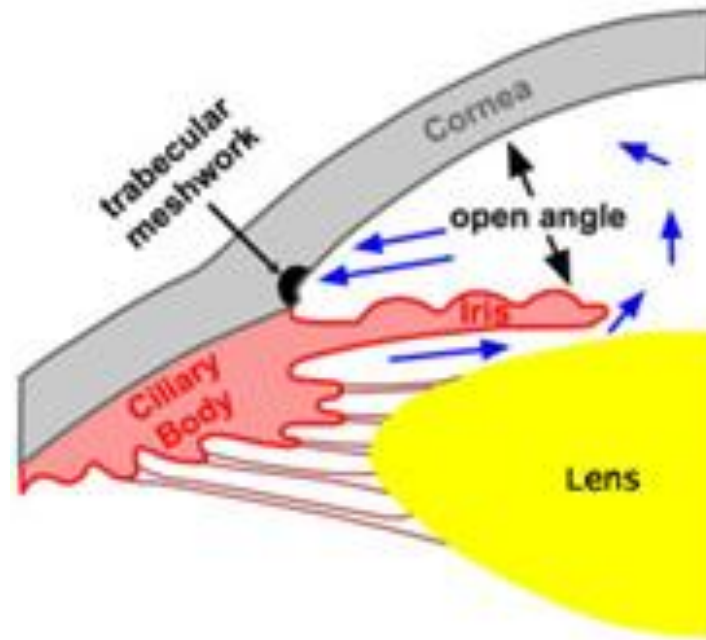
- Medical
  - Treat the underlying systemic disease
  - Topical corticosteroid drops
  - Topical NSAIDS
  - Systemic corticosteroid drops
  - Systemic NSAIDS
- Surgical
  - Maybe required if scleral thinning occurs

# Scleritis

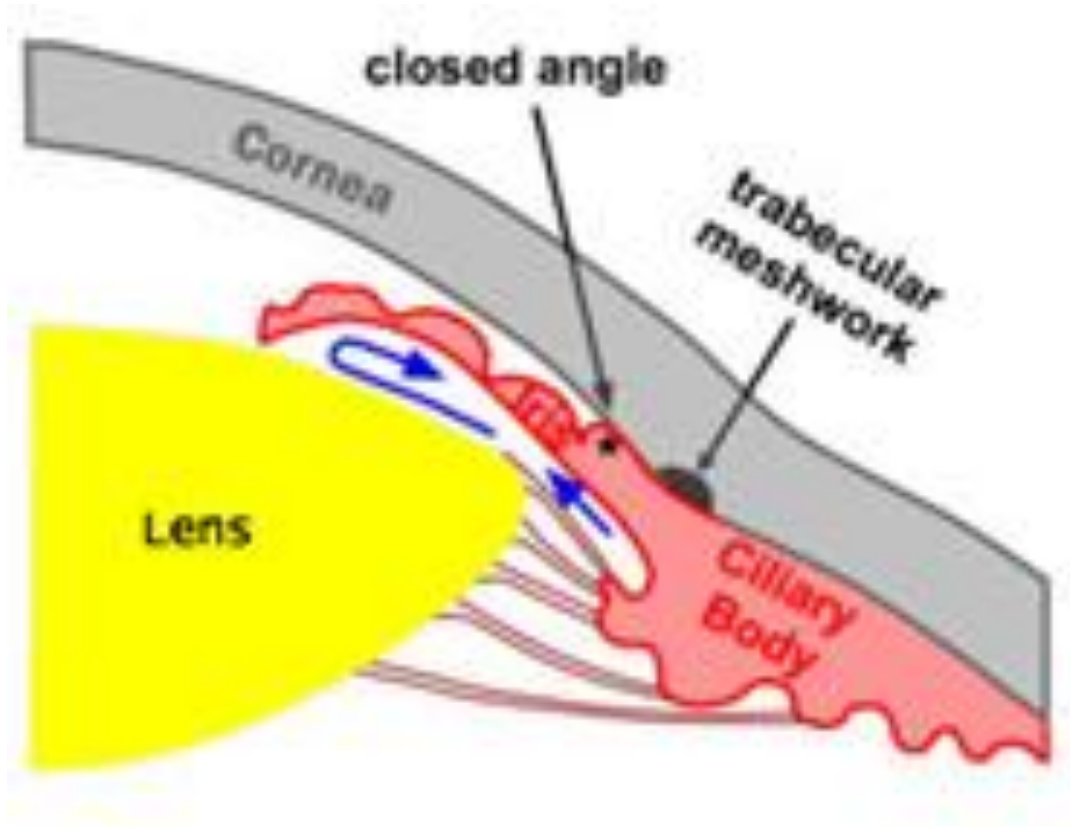


# Glaucoma

- ▶ Acute Angle-Closure Glaucoma
- ▶ Chronic Open Angle Glaucoma



# Acute Closed Angle Glaucoma





# Acute Angle-Closure Glaucoma

- ▶ <10% of all glaucoma cases in US
- ▶ S/Sx: severe pain and blurred vision due to closure of a preexisting narrow anterior chamber angle;
  - Halos around lights
  - Extremely rapid onset of symptoms
- ▶ Risk Factors:
  - Elderly
  - Asian/Inuit
  - Farsighted

# Acute Angle-Closure Glaucoma

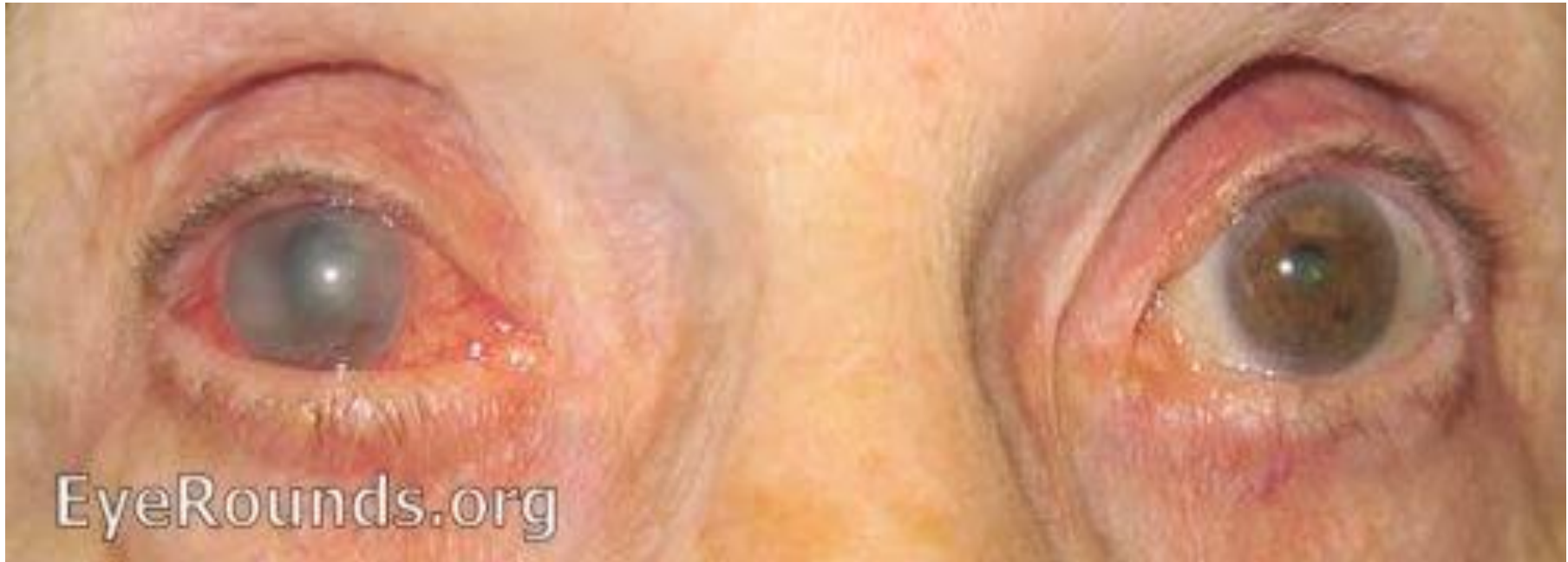
## ▶ PE:

- IOP is usually over 50 mm Hg
- conjunctival injection
- corneal epithelial edema
- mid-dilated nonreactive pupil
- shallower chamber in the presence of occlusion
- hard eye; steamy cornea
- nausea and abdominal pain

## ▶ TX:

- Emergent ophthalmology referral
- Aimed at reducing IOP
- IV acetazolamide, IV mannitol, beta blockers gtts, miotic agent (pilocarpine), laser peripheral iridotomy

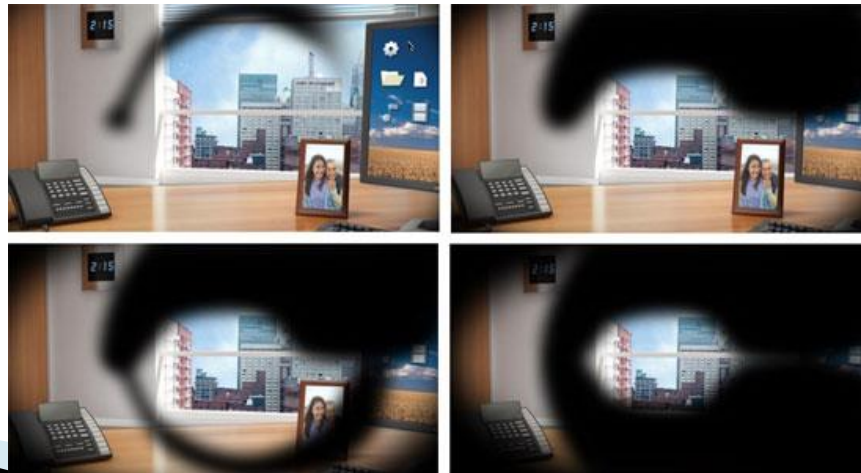
# Acute Angle-Closure Glaucoma



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# Chronic Open Angle Glaucoma

- ▶ >90% of all glaucoma
- ▶ “silent thief of sight”
- ▶ Slow bilateral increase in IOP leading to loss of **peripheral vision**
  - Due to increase production of aqueous humor
  - Due blocked trabecular meshwork



# Chronic Open Angle Glaucoma

- ▶ RF: ↑ advancing age, FM Hx, diabetes
- ▶ In Afro-Caribbean's, Africans, and Hispanics
  - it is more frequent
  - occurs at an earlier age
  - results in more severe optic nerve damage
- ▶ S/Sx: none initially, eventual loss of peripheral vision over years leading to tunnel vision
- ▶ Exam: pathologic cupping of the optic disk
- ▶ Tx: prostaglandin analogues,  $\beta$ -blocker, pilocarpine, laser trabeculoplasty

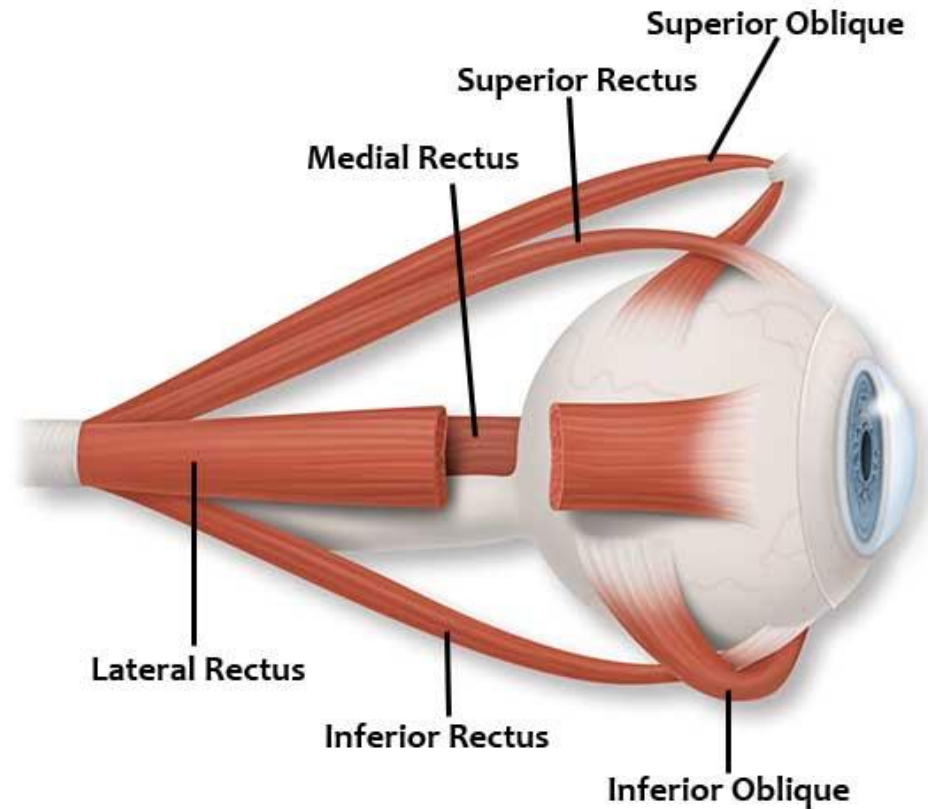
# Glaucoma Comparison

## TYPES OF GLAUCOMA

| Type                        | Cause/Effect  | Symptoms   | Comments   |
|-----------------------------|---|--|--|
| Chronic Open Angle Glaucoma | Gradual blockage of drainage channel<br>Pressure builds slowly  | Gradual loss of side vision<br>Affects side vision first                 | This type of glaucoma progresses very slowly and is a lifelong condition.  |
| Acute Closed Angle Glaucoma | Total blockage of drainage channel<br>Sudden increase in pressure                                     | Nausea<br>Blurred vision<br>Severe pain<br>Halos around lights           | This condition constitutes a medical emergency, as permanent blindness occurs rapidly without immediate treatment. |
| Secondary Glaucoma          | Injury, infection, tumors, drugs, or inflammation cause scar tissue which blocks the drainage channel | Gradual loss of side vision<br>Affects side vision first                 | This form of glaucoma may progress slowly, as in cases of chronic glaucoma.  |
| Congenital Glaucoma         | Fluid drainage system abnormal at birth   | Enlarged eyes<br>Cloudy cornea<br>Light sensitivity<br>Excessive tearing | This condition must be treated soon after birth if vision is to be saved.  |

# Extraocular Movement Pathology & Amblyopia

- ▶ Strabismus
- ▶ Amblyopia



**Oculomotor Muscles**

drawing compliments of the American Academy of Ophthalmology, Ophthalmic Image Collection

# Strabismus

- ▶ “crossed eye”
- ▶ disorder in which the two eyes do not line up in the same direction, and therefore
  - Do not look at the same object at the same time
  - Produces double vision → amblyopia
- ▶ Causes:
  - problem has to do with muscle control
- ▶ PE: cover/uncover; cover/cross-cover; Hirschberg corneal light reflex
- ▶ Tx: patching, surgery



# Strabismus

Esotropia



Exotropia



# Tropias vs. Phorias



**Tropias**  
*versus*  
**Phorias**

 [OphthoBook.com](http://OphthoBook.com) 

# Amblyopia

- ▶ “lazy eye”
- ▶ loss or lack of development of central vision in one eye
- ▶ Patching forces the eye to work
- ▶ Results from
  - Strabismus
  - Deprivational
    - Congenital cataract
  - Refractive

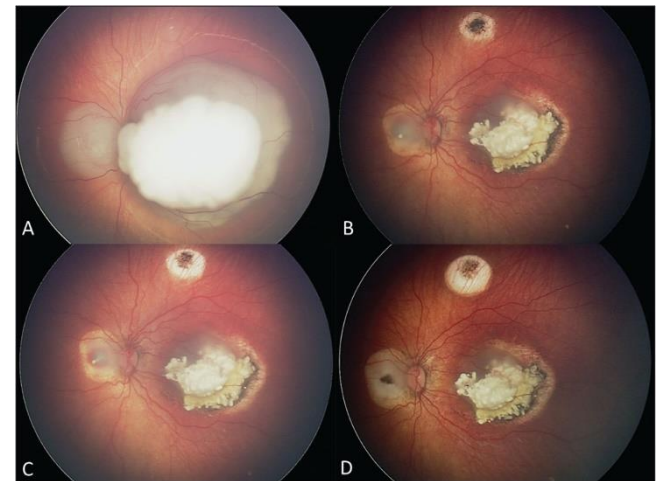
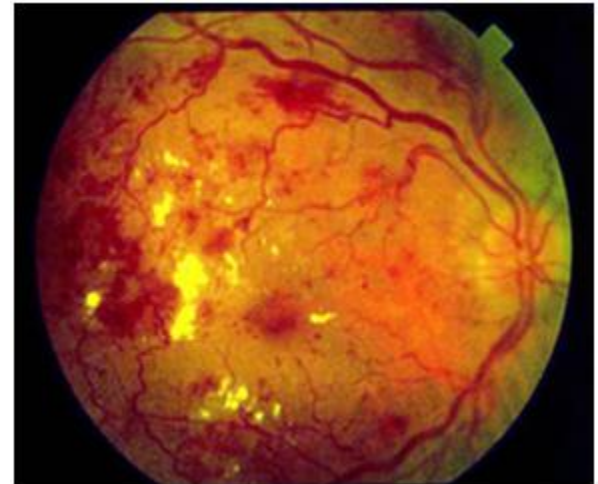


# Amblyopia Video



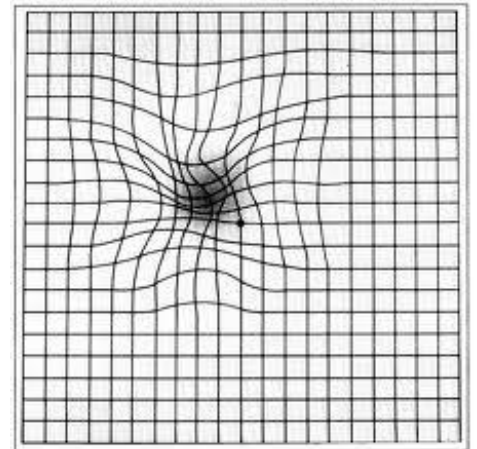
# Posterior Eye Disorders

- ▶ Macular degeneration
- ▶ Optic neuritis
- ▶ Papilledema
- ▶ Retinal detachment
- ▶ Retinal vascular occlusion
  - Central Retinal Artery Occlusion
  - Central Retinal Vein Occlusion
- ▶ Retinoblastoma

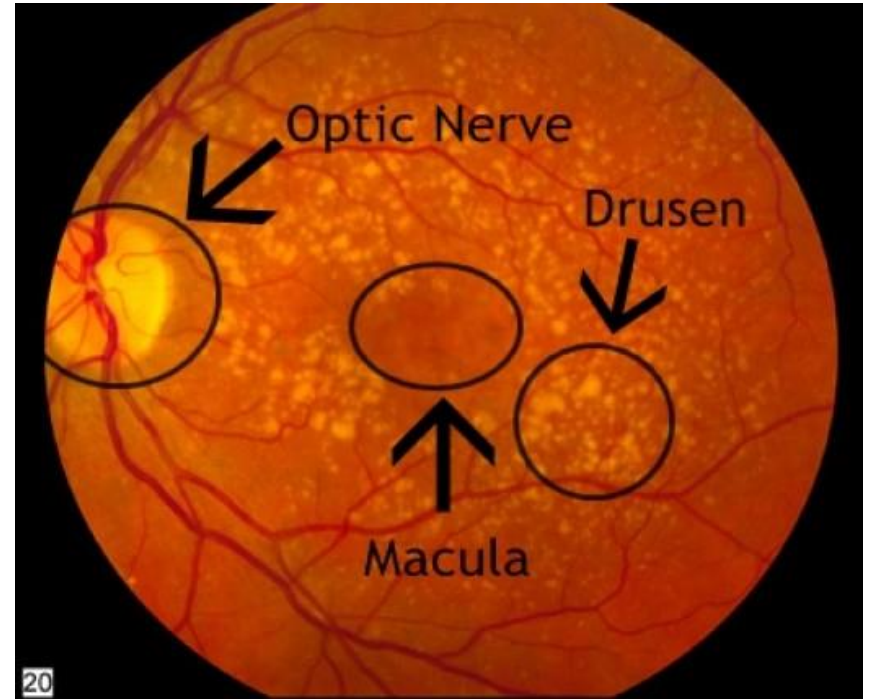


# Macular Degeneration

- ▶ MC → permanent visual loss in the elderly due to the atrophy of outer retina
- ▶ RF: whites, F > M, family Hx, smoking
- ▶ S/Sx:
  - painless, gradual progressive bilateral central visual loss
  - distortion of images
- ▶ PE: **retinal drusen bodies** (yellow deposits around macular region)
- ▶ TX:
  - Anti-angiogenic injections
  - Laser photocoagulation



# Macular Degeneration



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# Optic Neuritis

- ▶ Sudden **unilateral loss** of vision & pain with EOM (vision returns in 2–3 weeks)
- ▶ Associated w/:
  - **Multiple Sclerosis**
  - Viral infections
    - Measles, Mumps, Varicella
- ▶ S/Sx:
  - **Loss of color vision**
  - Relative afferent pupillary defect
- ▶ PE: optic nerve swelling, **flame-shaped hemorrhage**
- ▶ TX: IV steroids
  - Should not receive PO steroids as it *increases* the recurrence rate.



# Optic Neuritis

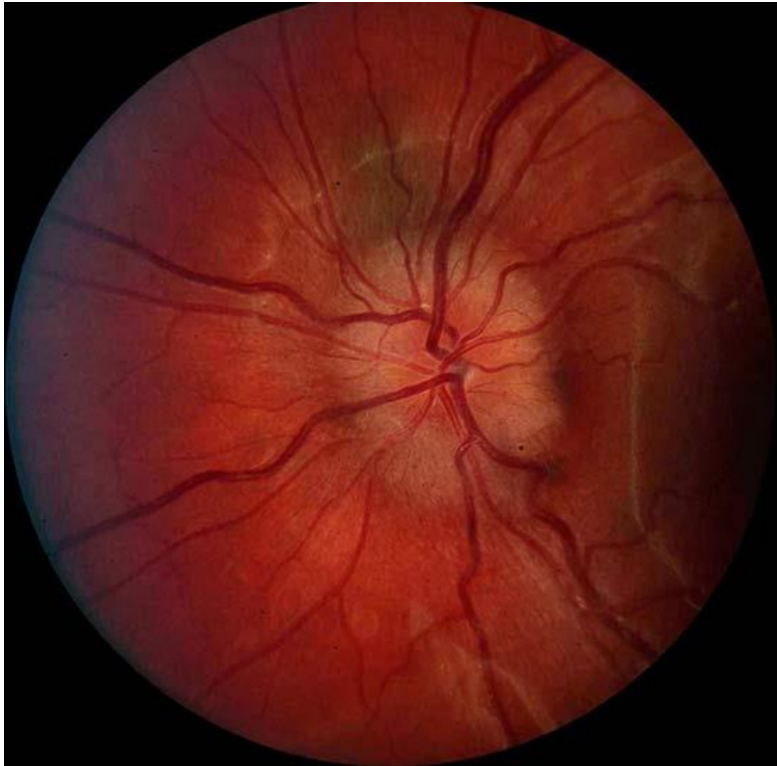


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# Papilledema

- ▶ Optic disk swelling due to raised intracranial pressure
- ▶ Usually bilateral
- ▶ E:
  - Pseudotumor cerebrii
  - Tumors, inflammation, edema, encephalitis
  - Intracranial hypertension
- ▶ S/Sx: enlargement of blind spot +/- loss of acuity
- ▶ Tx: target cause
  - Acetazolamide
  - Neuro-imaging
  - optic nerve sheath fenestration
  - lumboperitoneal shunt

# Papilledema



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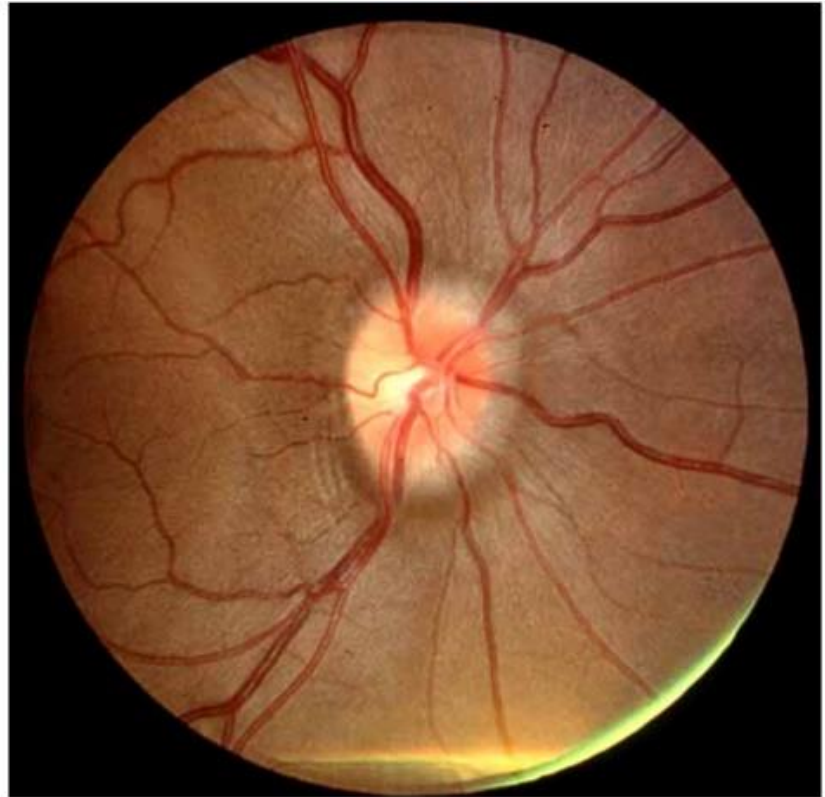
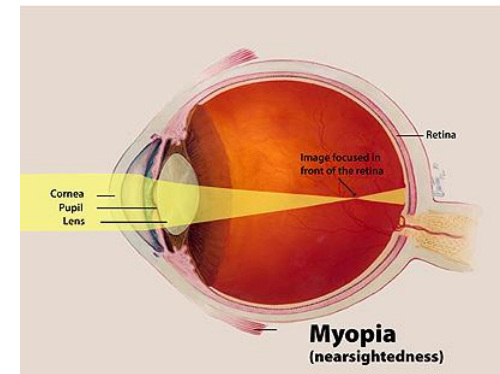


Figure 6. Grade I papilledema is characterized by a C-Shaped halo with a temporal gap.

EyeRounds.org

# Retinal Detachment

- ▶ Spontaneous vs. Traumatic
- ▶ S/Sx: blurred vision without pain or redness often with flashing lights and new floaters
- ▶ RF: cataract extraction, **myopia**, older, or hx of trauma
- ▶ PE: hanging retina in the vitreous
  - Superior temporal area → MC
- ▶ TX:
  - Immediate referral
  - Cryotherapy
  - Photocoagulation



# Central Retinal Vein Occlusion (CRVO)

- ▶ Sudden painless monocular visual loss often upon **waking in the a.m.**
- ▶ RF: glaucoma, HTN, DM, CVD, use of oral contraceptives
- ▶ PE: disc swelling, venous dilation, retinal hemorrhages, cotton-wool spots
- ▶ Tx: treat macular edema w/ laser treatment or intravitreal injection of VEGF
- ▶ Severity of initial visual loss is a good guide to visual outcome

# Central Retinal Artery Occlusion (CRAO)

- ▶ Sudden, profound, painless monocular visual loss
  - If greater than 50 → giant cell arteritis must be considered
  - Carotid and cardiac sources of emboli must be investigated → duplex US, ECG, echo
- ▶ RF: DM, HTN, HLD, oral contraceptive use, systemic vasculitis
- ▶ PE: pallid swelling of the retina, **cherry red fovea**, attenuated retinal arteries, emboli may be visualized

# Central Retinal Artery Occlusion (CRAO)

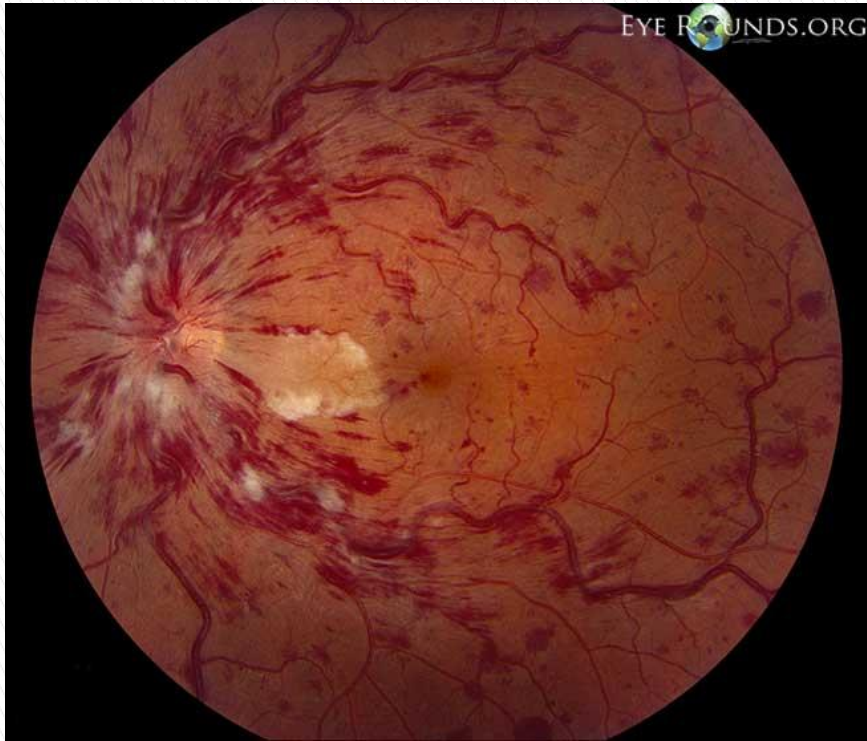
## ▶ Labs:

- Sed rate and c-reactive protein may be elevated in giant cell arteritis

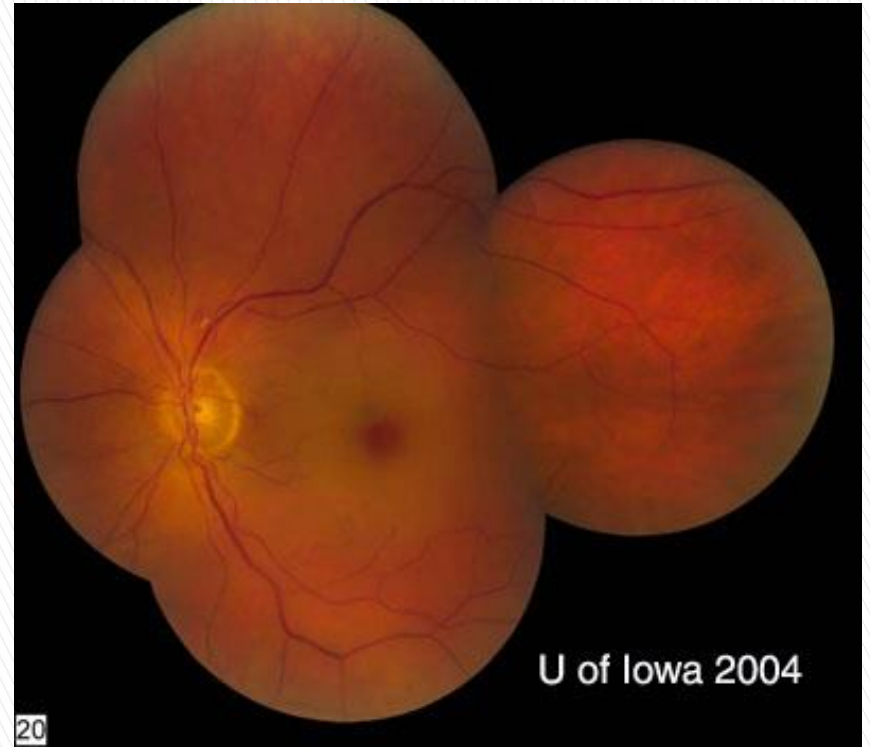
## ▶ Tx:

- Emergent treatment is needed
  - Lay patient flat → ocular massage & high concentration O<sub>2</sub>
  - IV acetazolamide
  - Anterior chamber paracentesis
- Giant cell arteritis → high dose corticosteroids and temporal artery biopsy
- Retinal embolization due a-fib or hypercoagulable state requires anticoagulation

# CRVO



# CRAO



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# Retinoblastoma

- ▶ Rare cancer that starts in the retina
- ▶ Usually develops early in childhood, typically before the age of 5
  - Early detection is extremely important or the disease can be fatal
  - Almost half of children have a hereditary genetic defect
  - Can also be caused by a congenital mutation in chromosome 13 gene (13q14)

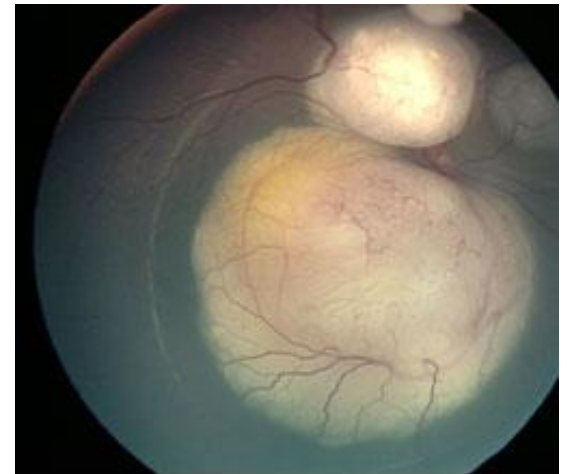


Fig. 1 Retinoblastoma pre-treatment.

# Retinoblastoma

- ▶ S/Sx:
  - Leukocoria– white appearing pupil when trying to visualize red reflex
  - Deterioration of visual acuity
  - Red and irritated eye with glaucoma
  - Newly developed squint
- ▶ PE:
  - Abnormal **red reflex**
- ▶ Imaging:
  - CT or MRI



# Retinoblastoma

## ▶ DX:

- Average age of diagnosis is 12–18 months

## ▶ Tx:

- Priority is to preserve the life of the child then preserve the vision
- Enucleation of the eye
- External beam radiotherapy
- Brachytherapy–radioactive implant
- Thermotherapy
- Laser photocoagulation
- Systemic chemotherapy

## Well Child Check Schedule

---

5 Day  
2 Week  
2 Month  
4 Month  
6 Month  
9 Month  
12 Month  
18 Month  
2 Year  
3 Year  
4 Year

# Retinoblastoma

## ▶ Prognosis

- Depends on early presentation
  - 95–98% cure rates with early detection
- Extraocular retinoblastoma
  - Worse prognosis
  - Cancer spreads to brain, spinal cord, bone marrow, and lymph nodes

## ▶ Smart phone app

- CRADLE– ComputeR Assisted Detector of Leukocoria
  - Bryan Shaw, Baylor University

# Documenting An Eye Exam

**CC:** Chief complaint, straight forward

**HPI:** using history questions from external eye questions

Include past ocular history- Surgery, contact lenses, history of strabismus/patching, amblyopia

**PMH:**

**PSH:**

**Meds:**

|

**O:** external exam- no conjunctivitis, icterus, discharge, foreign body, ciliary injection, cornea clear,  
(note any trauma, external lesions, lids/lashes issues)

**VA sc:** 20/100 20/70

cc: 20/20 20/20 (sc= without correction, cc= with correction; Right eye documented first)

**PERRLA** (Pupils equal round, reactive to light, & accommodation)

**EOMI; no trophias noted on cover-uncover test; no phorias noted on cross-cover test**

(extraocular movement intact) (abnormalities noted by "H" and X%)

**CVF- full OU** (or documented with cross hairs and check marks)

**Anterior chamber- deep and quiet**

**Lens- clear**

**Fundoscopic exam:**

**Red reflex present**

**C/D: 0.5**

**No A-V nicking, copper wiring, silver wiring**

**No papilledema**

**No NVE** (neovascularizations) (note any other abnormalities)

(comment as to where dilated or not dilated)

**A:**

**P:**

# Questions

