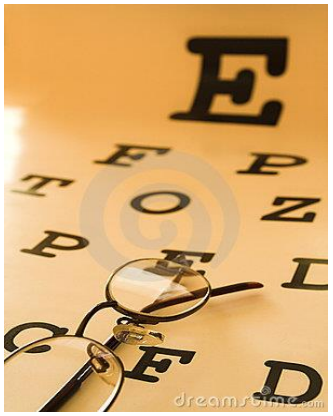


Review of Common Ophthalmology Conditions

We Are Family (Medicine)
Nancy Reid, DHSc, PA-C, DFAAPA

Disclosures

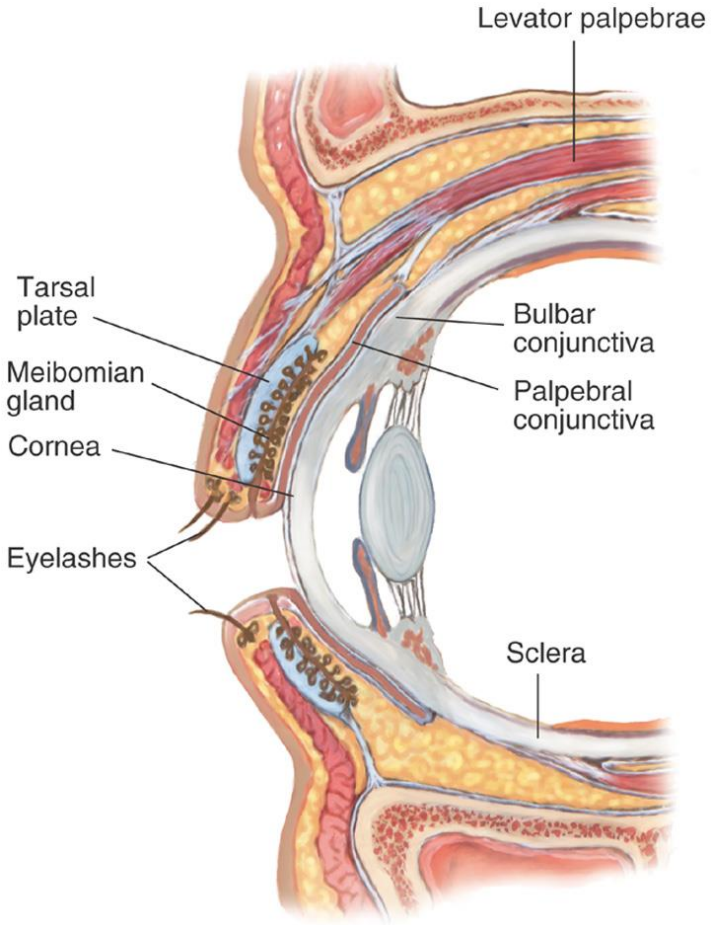
- I have no relevant relationships with ineligible companies* to disclose within the past 24 months.

Objectives

- 1.) Identify common eyelid disorders and the treatment for those disorders
- 2.) Discuss the pathophysiology behind acute closed-angle glaucoma and chronic open-angle glaucoma
- 3.) Differentiate between orbital cellulitis and periorbital cellulitis

Anatomy of Eye

- Levator Palpebrae Muscle
  - Elevates lids
  - CN III
- Orbicularis Oculi Muscle
  - Around eyelids
  - Closes eyelids
  - CN VII



Sagittal Section of Anterior Eye With Lids Closed

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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)

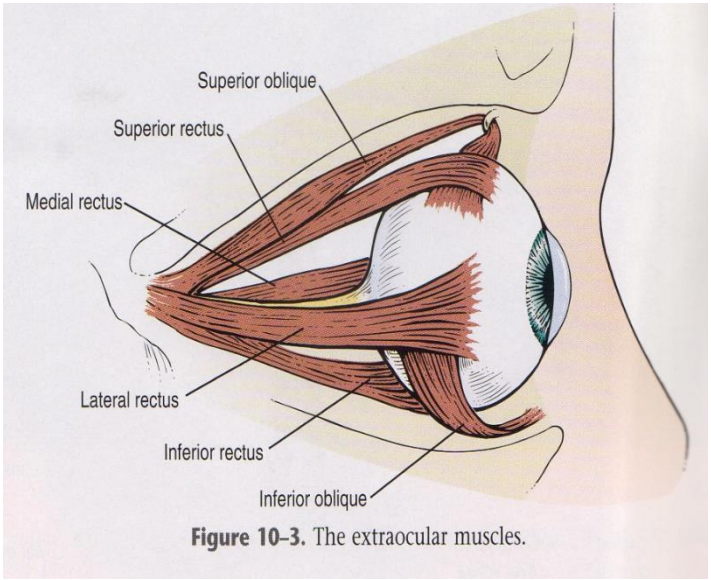
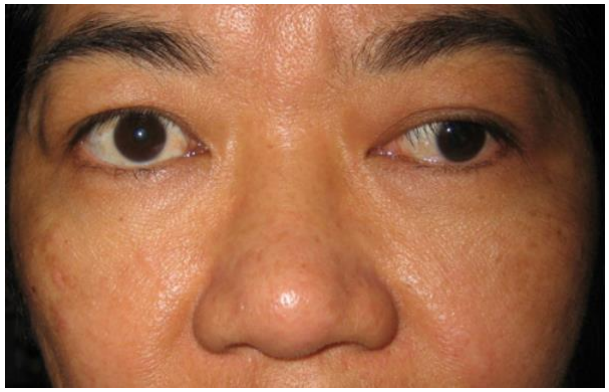


Figure 10–3. The extraocular muscles.

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

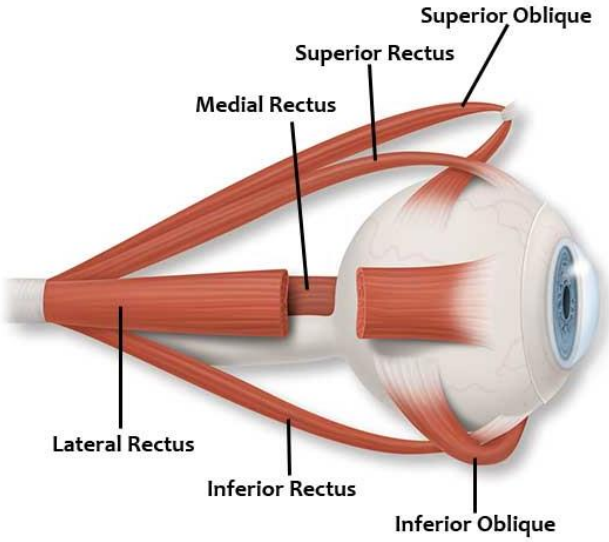
Review

- 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.



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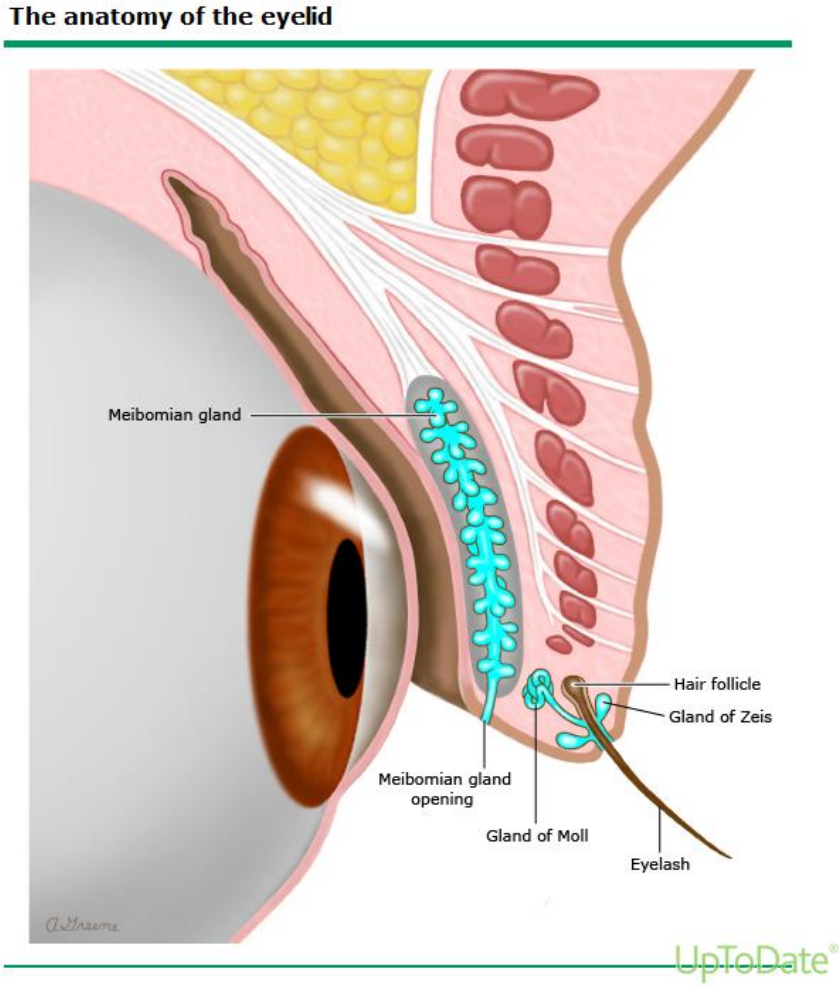
Eyelid Disorders

- Hordeolum
- Chalazion
- Blepharitis
- Ectropion
- Entropion
- Basal Cell Carcinoma

Eyelid Anatomy



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 and is an abscess of the gland of Zeiss and gland of Moll
  - TX:
    - Warm compresses
    - Antibiotic ointment
      - Bacitracin
      - Erythromycin
    - I&D if no resolution with conservative tx

Hordeolum

Internal hordeolum

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External hordeolum

EyeRounds.org

Hordeolum

Stye

An abscess is present below the lash line.

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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 injections
  - Incision and curettage

EyeRounds.org

Chalazion

EyeRounds.org

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
  - Commonly causes recurrent conjunctivitis
  - Complicated by hordeola or chalazia

Blepharitis

- Tx:
  - Lid hygiene
    - Warm compresses help soften scales and warm meibomian glad secretions
    - Exfoliated with baby shampoo or 0.01% hypochlorous acid
  - In acute exacerbations, antibiotic ointment applied to lid margins
    - Bacitracin
    - Erythromycin

Blepharitis

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

EyeRounds.org

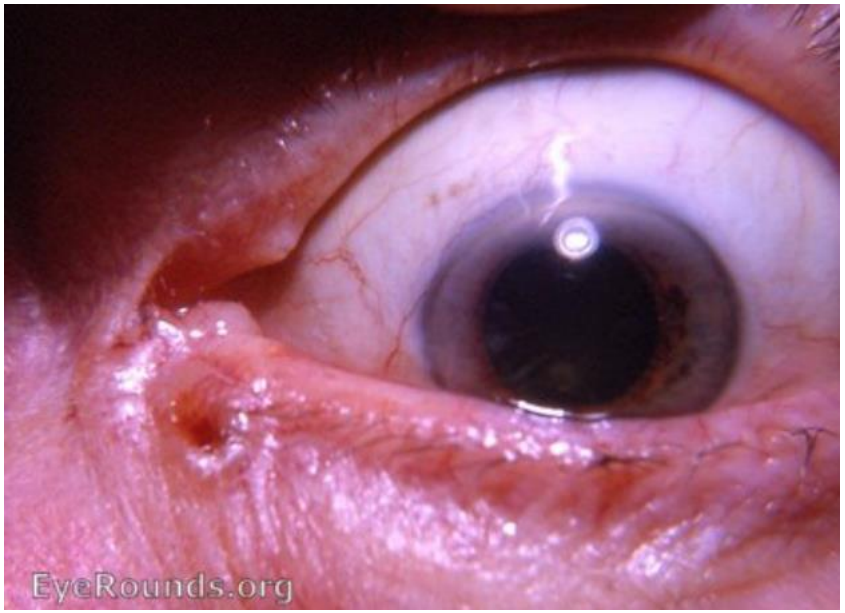
Basal Cell Carcinoma of the Eyelid

- BCC is the most common malignant tumor of the eyelid.
  - Accounts for 85%-90% of all malignancies
  - 2/3 of BCCs involve the lower eyelid margin
  - fair-skinned individuals with a history of prolonged sun exposure
- Pathology
  - locally invasive but only rarely metastasize
  - neglected tumors can grow to large size and invade as deeply as bone

Basal Cell Carcinoma of the Eyelid

- S/Sx: slow-growing, firm, painless, pearly, indurated lesions
  - associated telangiectasia
  - loss of lashes associated with the lesions
- Tx:
  - confirmed by incisional biopsy
  - Mohs surgery to conserve tissue

Basal Cell Carcinoma of the Eyelid



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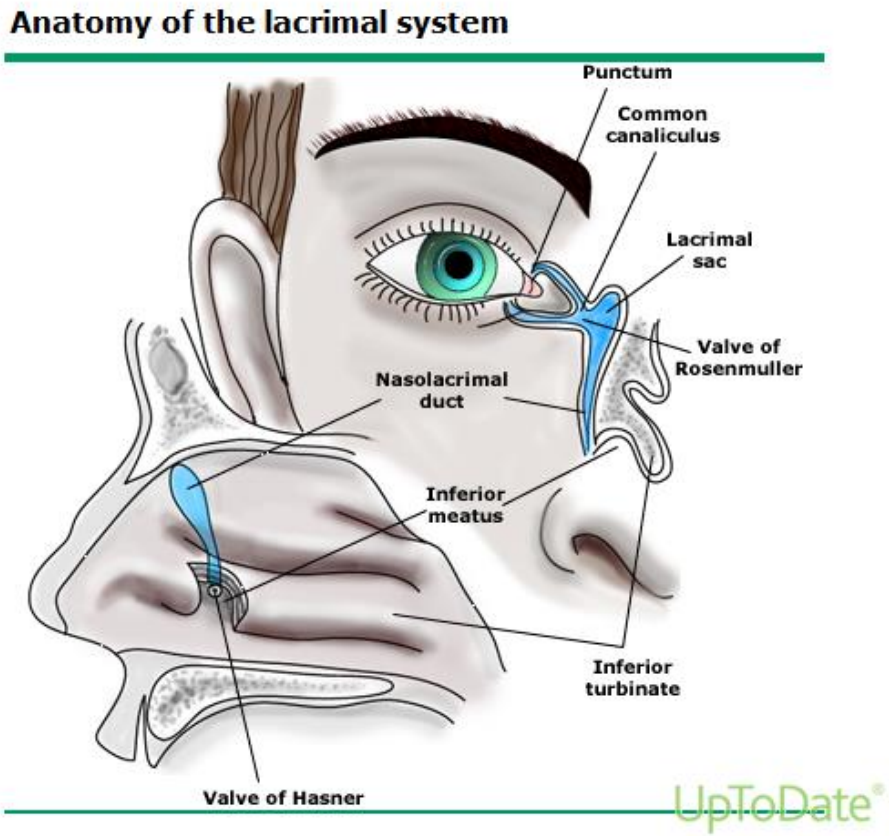
Lacrimal Disorders

- Dacryocystitis

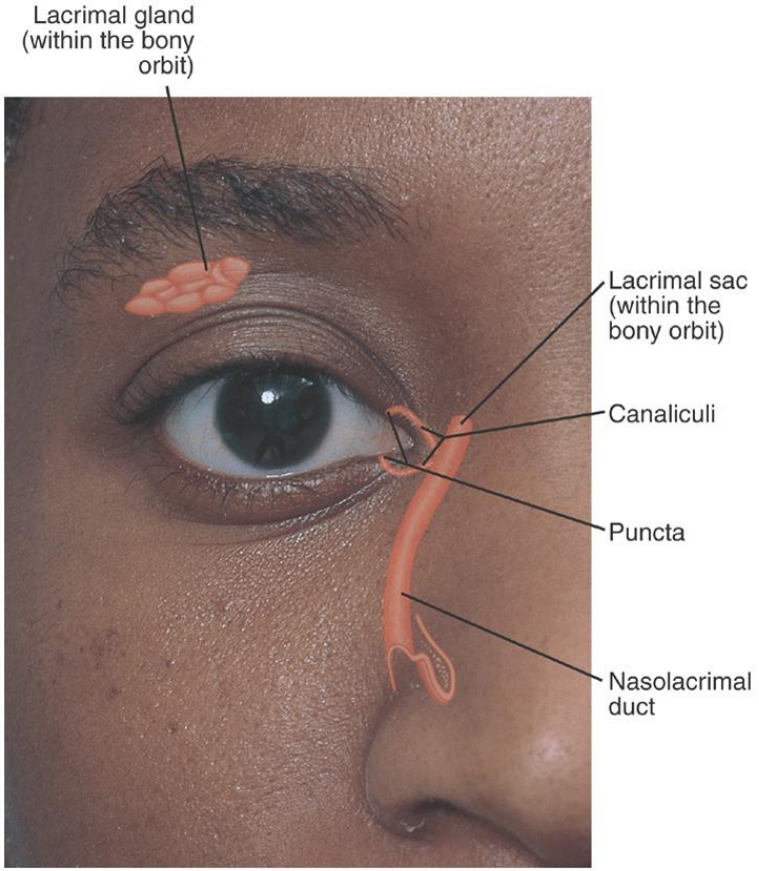


Anatomy of External Eye

Lacrimal Apparatus

- Lacrimal Gland
  - Reflexive tearing
- Puncta
- Canaliculi
- Lacrimal Sac
- Nasolacrimal Duct

- Accessory tear glands
  - Eyelid
  - conjunctiva



The Eye

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Dacryocystitis

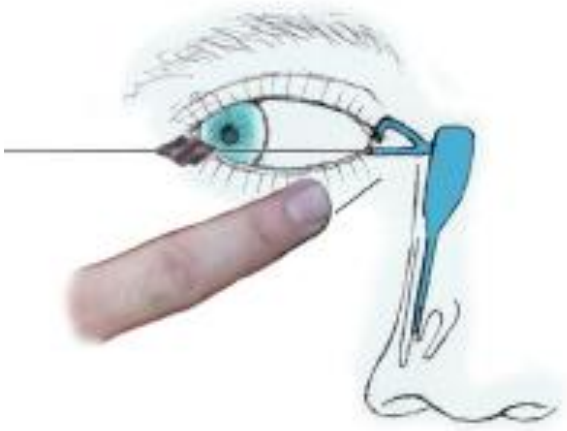
- Infection of lacrimal sac due to obstruction of the nasolacrimal system
- Unilateral
  - Congenital
  - Acquired- F>M; > 40 years old
- E:
  - Acute- Staph aureus & ß-hemolytic streptococci
  - Chronic- Staph epidermidis, streptococci, & gram-negative bacilli

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

EyeRounds.org



Horizontal path of a Lacrimal Probe

Infectious Orbit Disorders

- Periorbital Orbital Cellulitis
- Orbital Cellulitis

Orbital Anatomy

The orbital septum

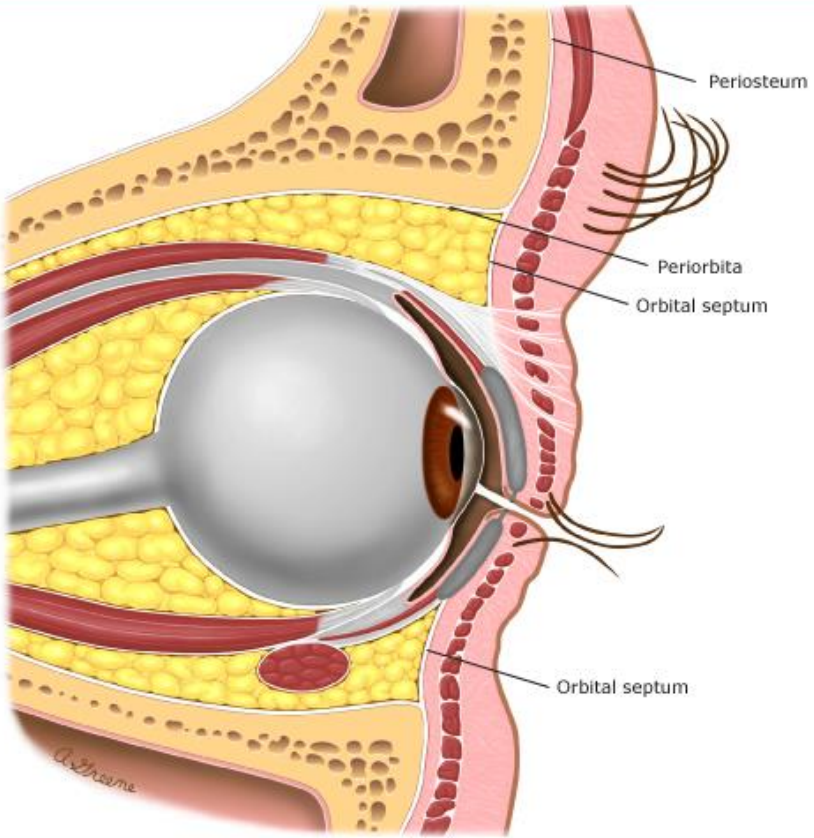


Diagram showing the proximity of the periosteum in relation to the orbital septum. Orbital cellulitis arises posterior to the orbital septum.

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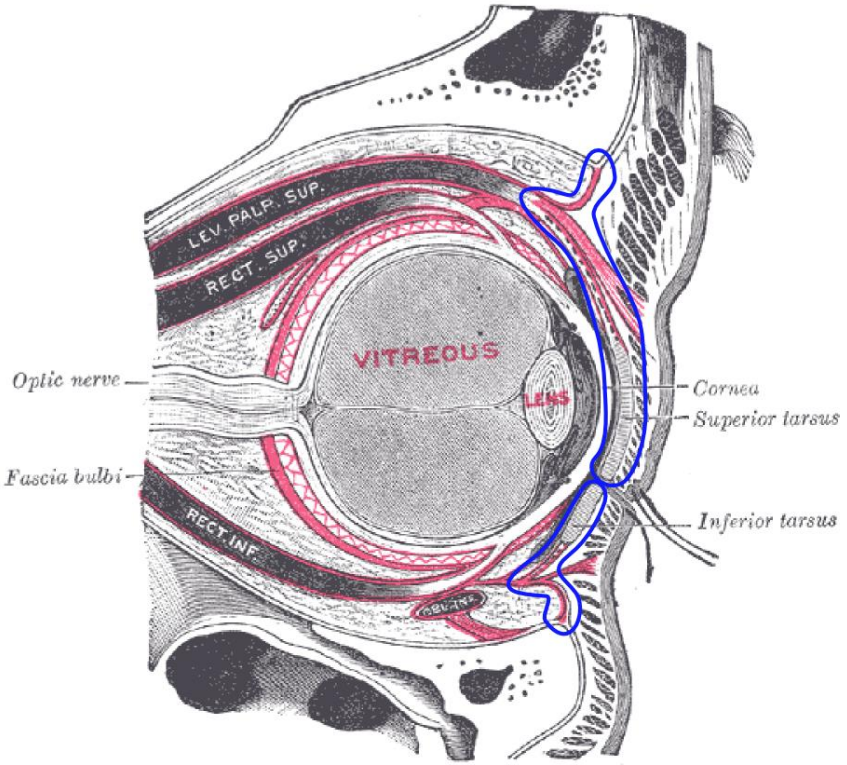
Periorbital Cellulitis

- 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
  - Affects orbital fat and muscles
- Usually seen in kids
- E:
  - infection of paranasal sinuses
    - *S. pneumoniae*
    - *H. influenzae*
    - *S. aureus*
  - 86-98% of cases of orbital cellulitis have coexisting rhinosinusitis

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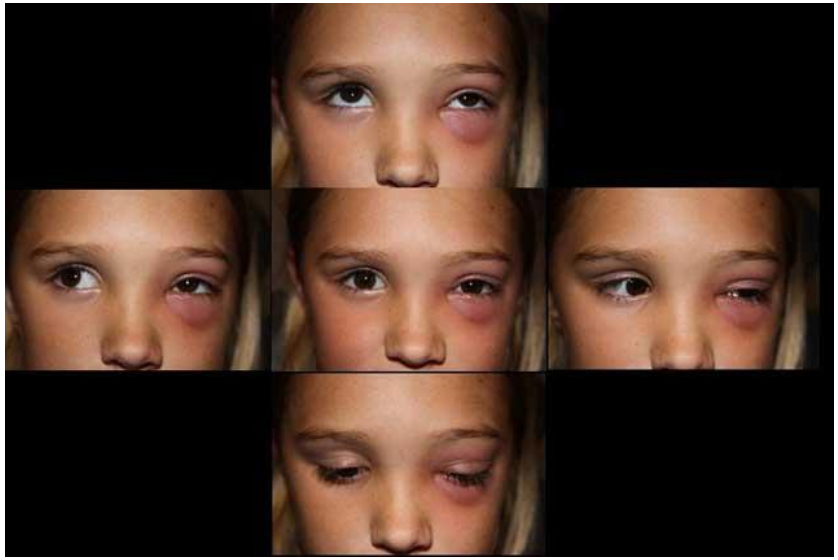
Orbital Cellulitis

- Imaging:
  - CT Scan or MRI
    - MRI is superior to CT scan in following the progression of soft tissue disease
  - Imaging Findings
    - Inflammation of extraocular muscles
    - Fat stranding, and
    - Anterior displacement of the globe
- Tx:
  - Urgent referral
    - Surgery may be required to drain paranasal sinuses or orbital abscess.
  - IV antibiotics
    - Prevent spread to cavernous sinus, meninges, and brain
- Complications:
  - subperiosteal abscess, orbital abscess, vision loss, cavernous sinus thrombophlebitis, and/or brain abscess
  - relative afferent pupillary defect indicates optic nerve involvement

Orbital Cellulitis



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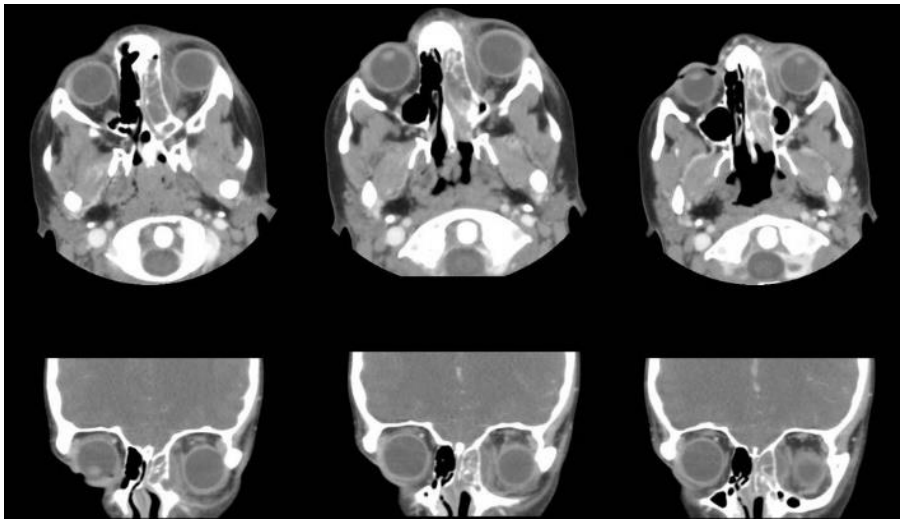

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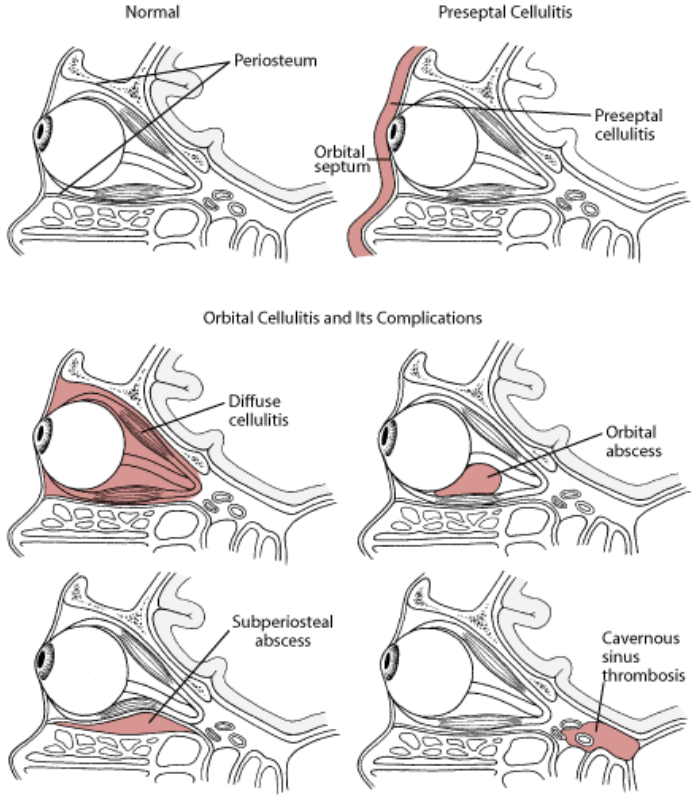
Periorbital vs. Orbital Cellulitis

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: *Staphylococcus aureus*, group A Streptococcus	*S. pneumoniae*, nontypeable *Haemophilus influenzae*, *Moraxella catarrhalis*, group A Streptococcus, *Staphylococcus aureus*, anaerobes
	Bacteremia: *Streptococcus pneumoniae*	

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



Comparison Photos

dacryocystitis

Periorbital Cellulitis

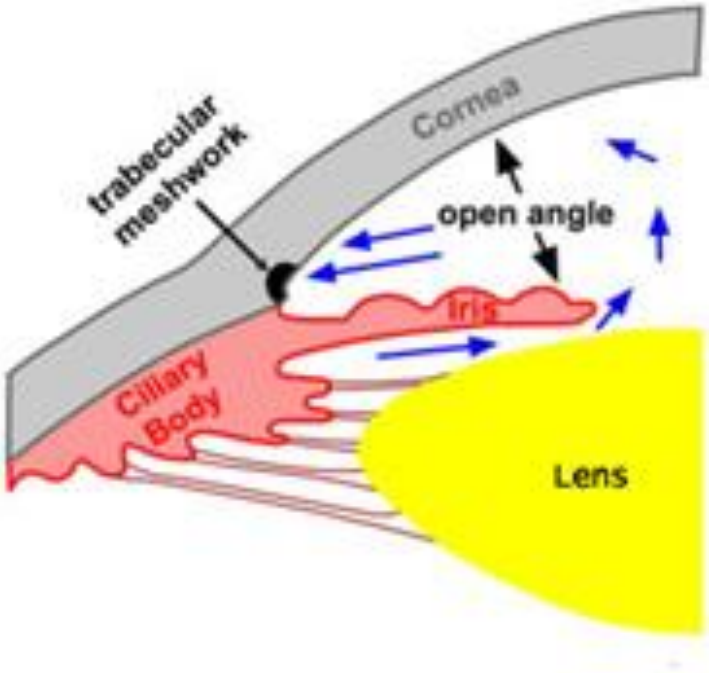
Orbital Cellulitis

Whose eye looks worse?

Who presents looking more ill?

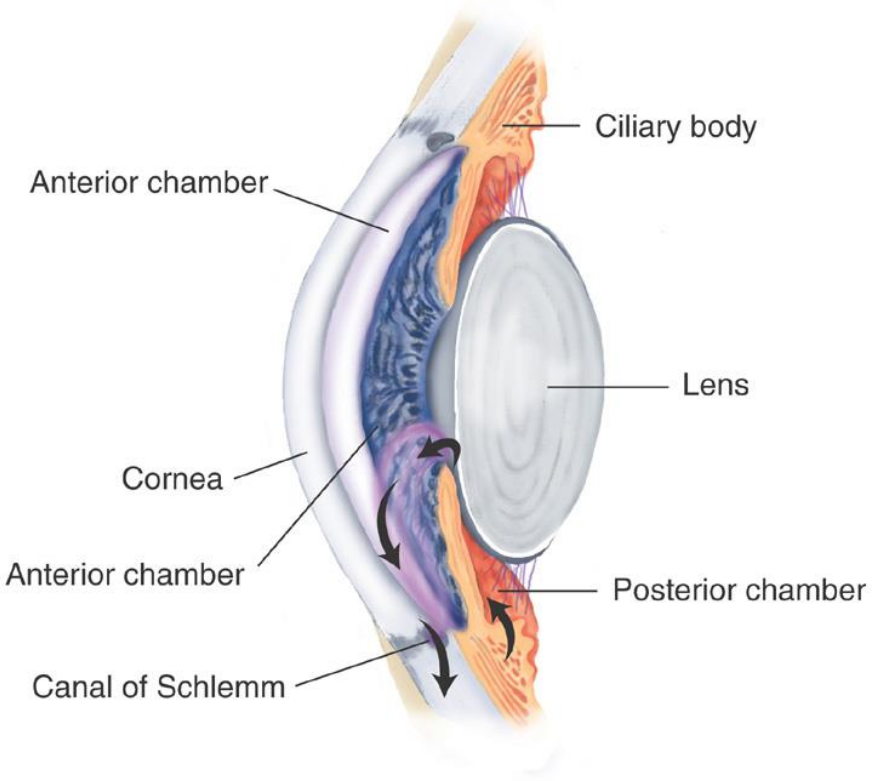
Glaucoma

- Acute Angle-Closure Glaucoma
- Chronic Open Angle Glaucoma



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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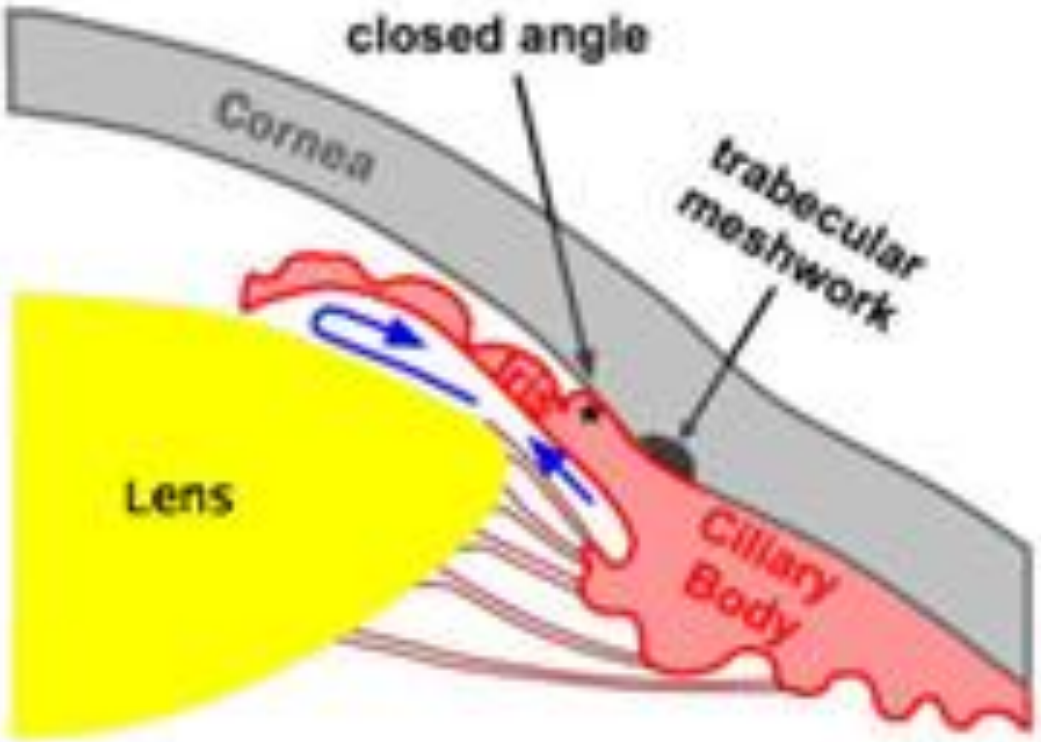
Acute Closed Angle Glaucoma



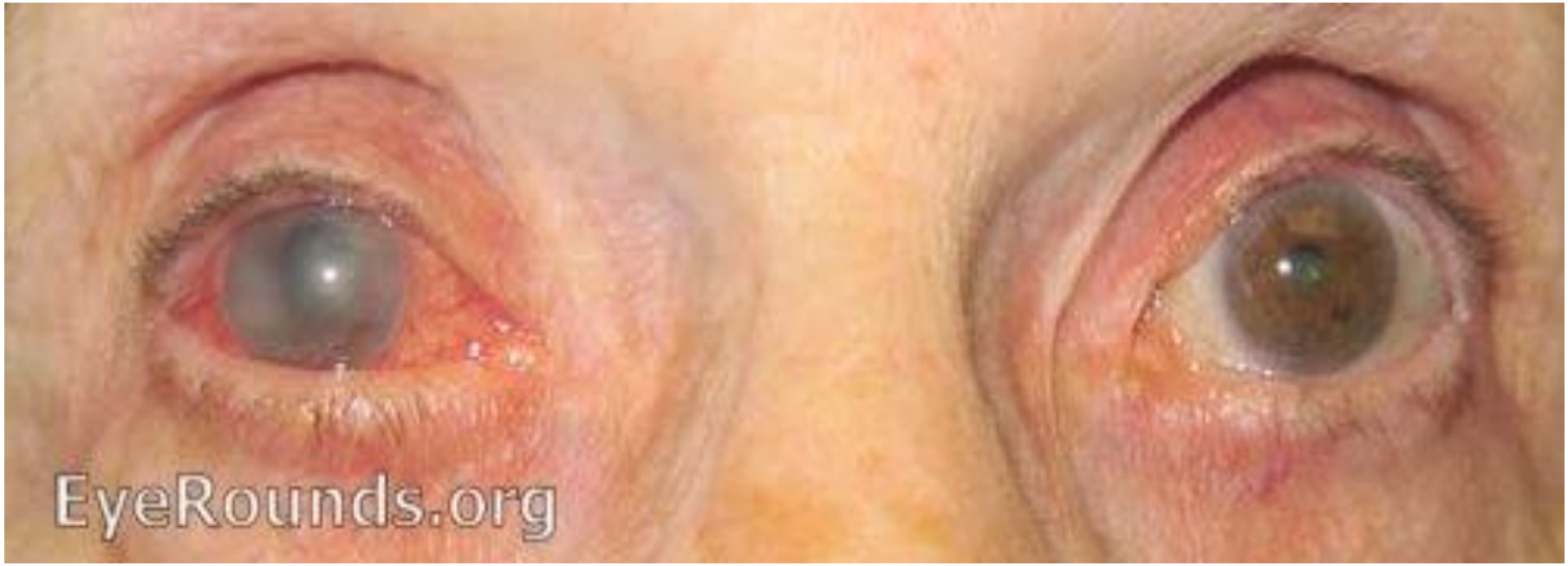
Acute Angle-Closure Glaucoma

- <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 or surgical peripheral iridectomy

Acute Angle-Closure Glaucoma



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Chronic Open Angle Glaucoma

- >90% of all glaucoma
- “silent thief of sight”
  - Progressive loss of retinal ganglion cell axon
- 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, ß-blocker, pilocarpine, laser trabeculoplasty

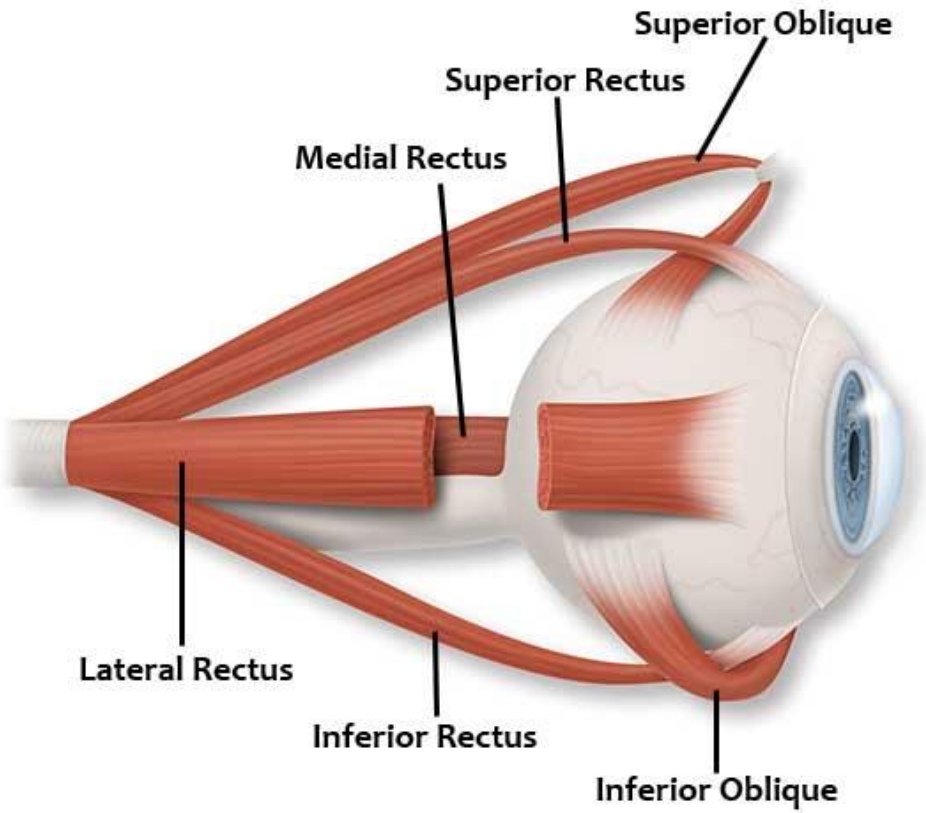
Glaucoma Comparison

TYPES OF GLAUCOMA

Type	Cause/Effect	Symptoms	Comments
Chronic Open Angle Glaucoma	Gradual blockage of drainage channel Pressure builds slowly	Gradual loss of side vision 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 Sudden increase in pressure	Nausea Blurred vision Severe pain 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 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 Cloudy cornea Light sensitivity Excessive tearing	This condition must be treated soon after birth if vision is to be saved.

Extraocular Movement Pathology & Amblyopia

- Strabismus
- Amblyopia



Oculomotor Muscles

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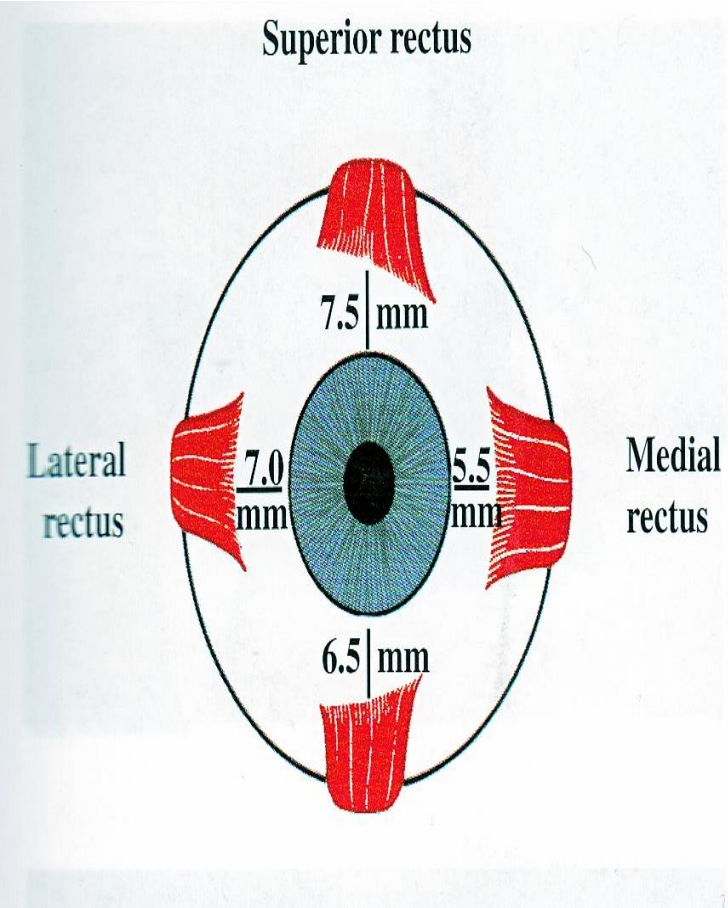
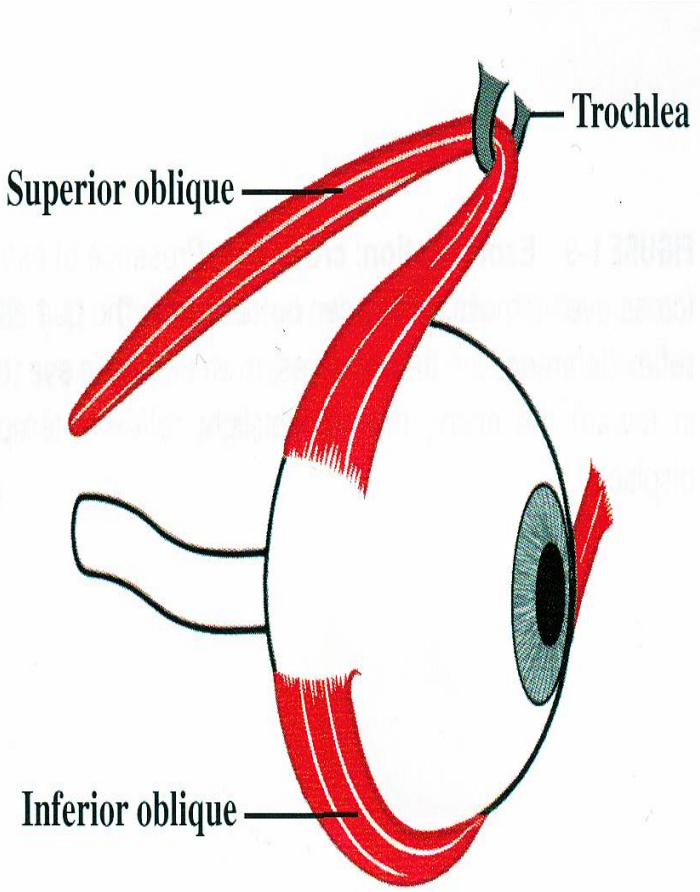
Review of Extraocular Muscles





Strabismus

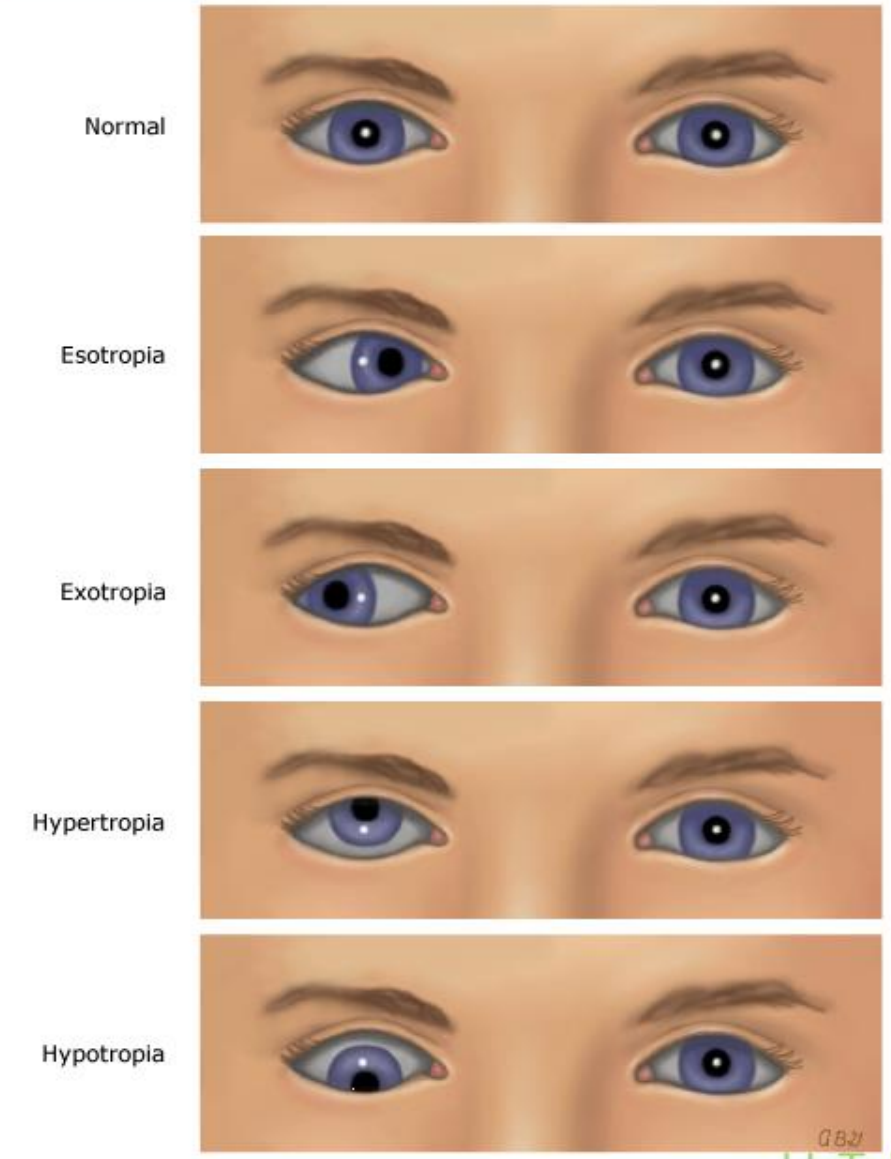
- “crossed eye”
- disorder in which the two eyes do not line up in the same direction, and therefore
  - Do not look at the same object at the same time
  - Produces double vision→ amblyopia
- S/Sx
  - Double vision
  - Eyes that do not align in the same direction
  - Uncoordinated eye movements
  - Loss of vision or depth perception
- Causes:
  - problem has to do with muscle control

Strabismus

- PE:
  - cover/uncover
  - cover/cross-cover
  - Hirschberg corneal light reflex
- Tx:
  - Goals
    - Improve ocular alignment
    - Improve binocularity
  - Address vision impairment
    - refractive error correction with prescription of glasses or contact lenses
    - occlusion therapy
    - pharmacologic or optical penalization of the preferred eye
  - Surgical procedures
    - improve ocular alignment include recession, resection, and transposition of the extraocular muscles

Strabismus

Direction of eye deviation in different types of strabismus



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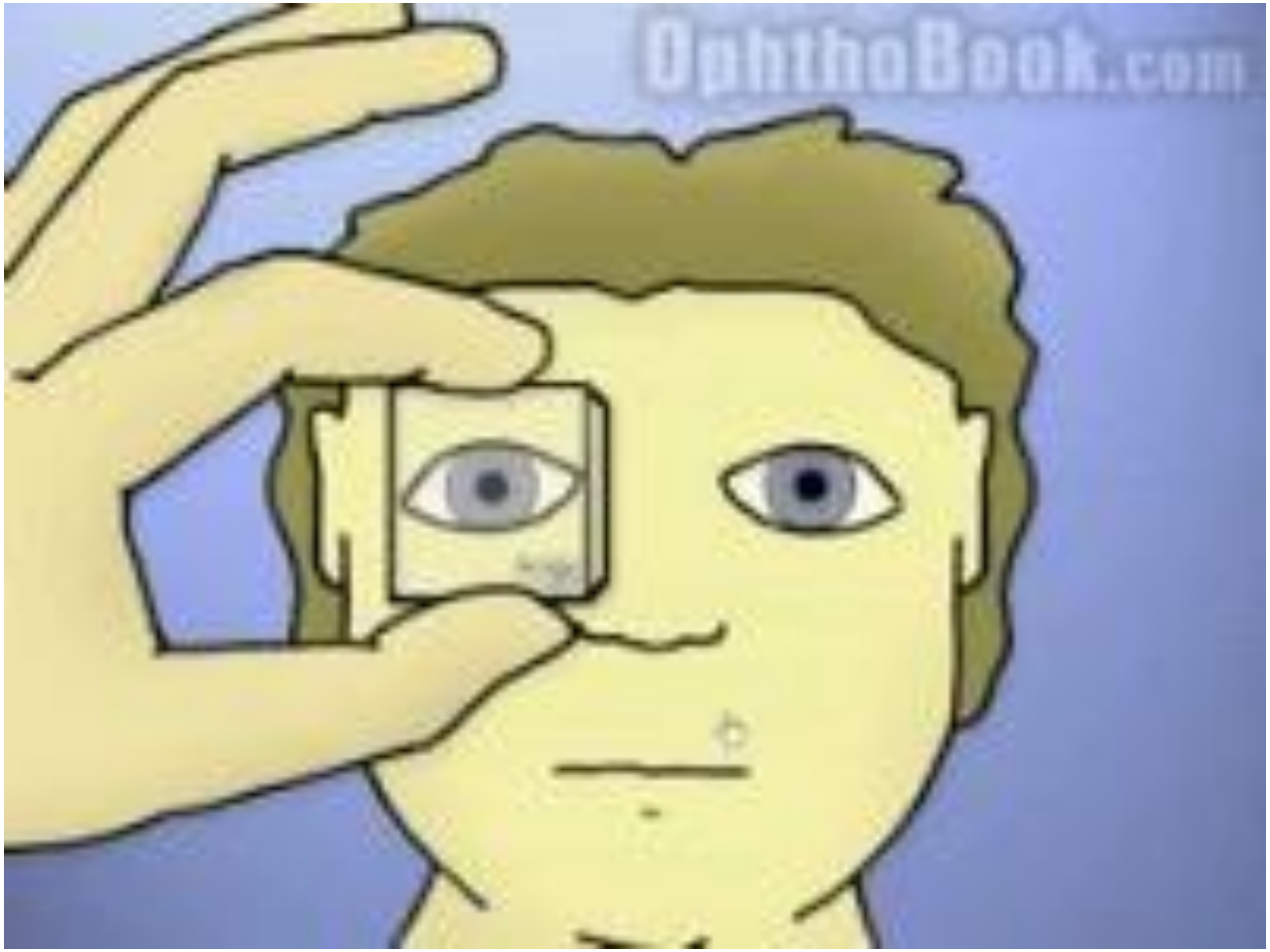
Tropias vs. Phorias



Amblyopia

- functional reduction in visual acuity caused by abnormal visual development early in life
  - “lazy eye”
- loss or lack of development of central vision in one eye
- Patching forces the eye to work
- Results from
  - Strabismus (50%)
  - Deprivational (5%)
    - Congenital cataract
  - Refractive (15%–20%)
  - Combined Strabismus & Refractive (30%)

Amblyopia Video

Tumor of the Eye

- Retinoblastoma

Retinoblastoma

- Most common primary intraocular malignancy of childhood
  - 1 in 15,000 to 1 in 16,600 live births in U.S. and Northern Europe
- S/Sx:
  - Leukocoria- white appearing pupil when trying to visualize red reflex (54%)
  - Strabismus (19%)
  - Deterioration of visual acuity (4%);
  - Red and irritated eye with glaucoma
  - Newly developed squint
- PE:
  - Abnormal red reflex
- Imaging:
  - CT or MRI

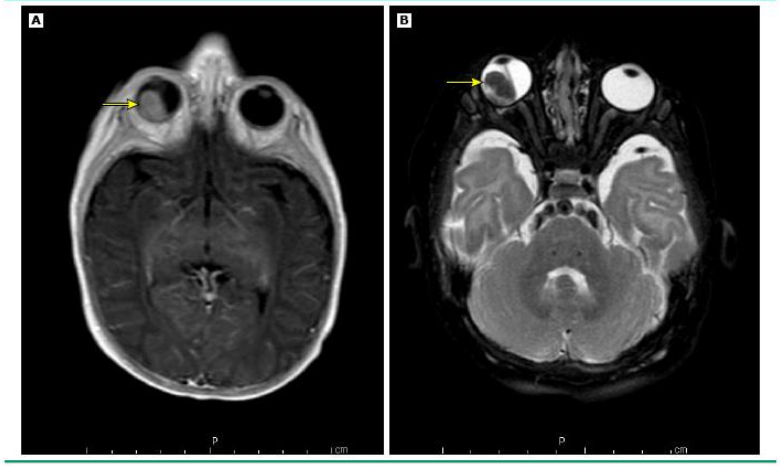
Retinoblastoma

- 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

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

Retinoblastoma on magnetic resonance imaging



Axial images of magnetic resonance imaging of the brain and orbits in a child with retinoblastoma. The tumor (arrows) appears bright on postcontrast T1-weighted image (panel A) and dark compared with the vitreous on the fat-suppressed T2-weighted image (panel B).

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Questions