Essentials of Ophthalmology

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Learning Objectives

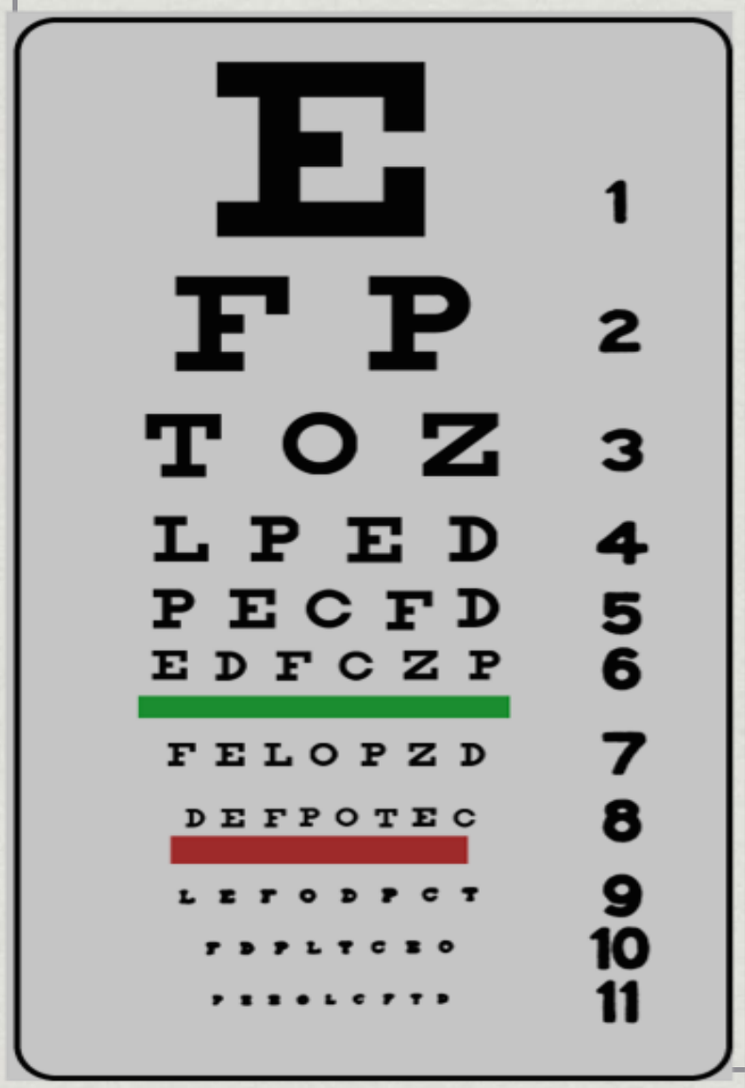
At the conclusion of this presentation, the participant should be able to:

- Understand how to perform the basic eye exam
- Understand the differences between sight-threatening disorders and those that can be managed safely by the primary care physician
- Diagnose common ophthalmic disease

The basic eye exam

- The tools:
  - visual acuity chart (can be your near card)
  - near card (has pupil sizes & ruler)
  - bright light (can use your direct ophthalmoscope)
  - direct ophthalmoscope
  - tonopen*
  - slit lamp*
  - eye drops: topical anesthetic, fluorescein dye, dilating drops

The tools


E
1 20/200
F P
2 20/100
T O Z
3 20/70
L P E D
4 20/50
P E C F D
5 20/40
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6 20/30
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D E F P O T E C
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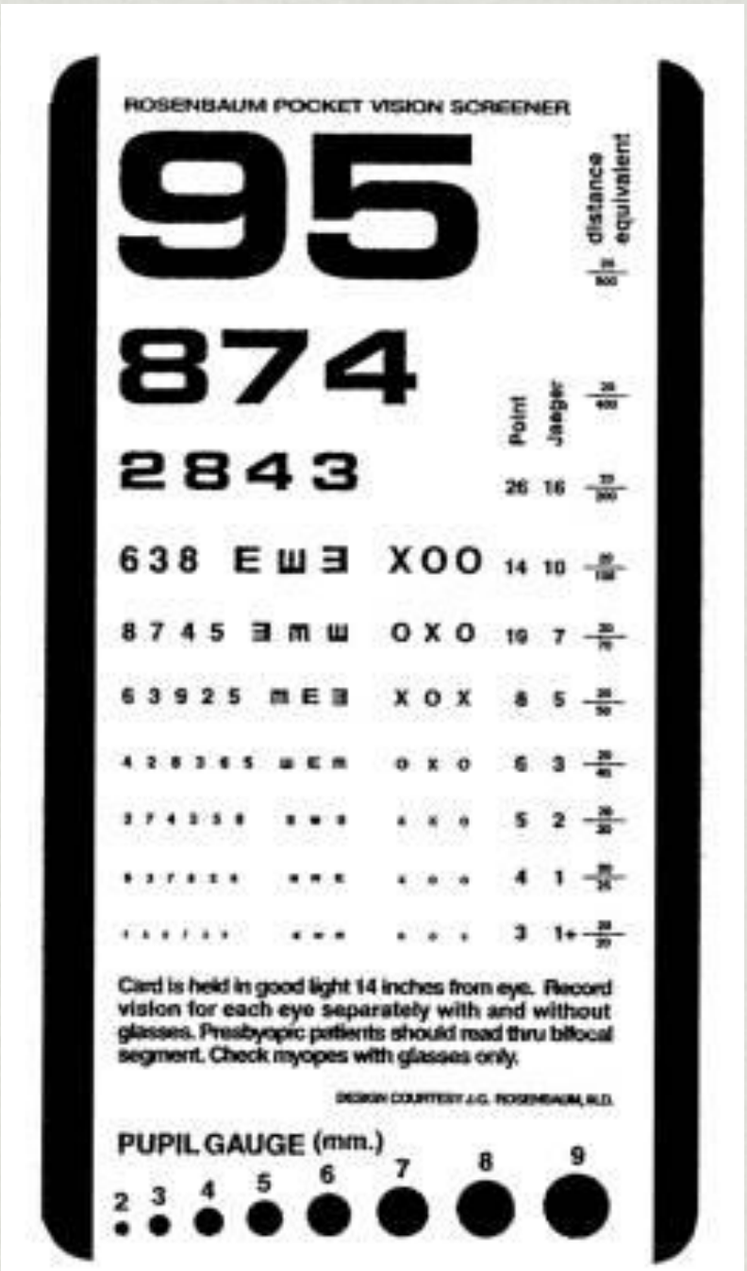
ROSENBAUM POCKET VISION SCREENER
95
distance equivalent
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26 16
638 EШЭ XOO 14 10
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63925 mE∃ XOX 8 5
6 3
5 2
4 1
3 1+
Card is held in good light 14 inches from eye. Record vision for each eye separately with and without glasses. Presbyopic patients should read thru bifocal segment. Check myopes with glasses only.
PUPIL GAUGE (mm.)
2 3 4 5 6 7 8 9


WelchAllyn

The basic eye exam

- History & physical
- History: glasses, contacts, surgery, trauma,
- Symptoms: foreign body sensation (surface problem), itch (allergy), photophobia (uveitis), diplopia (orbital or CN problem), flashes or floaters (retina problem), color vision or distortion (retina problem)

The basic eye exam

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*

The basic eye exam

- Visual acuity
- Pupils
- Alignment & Motility
- Visual fields (VF)
- Intraocular pressure

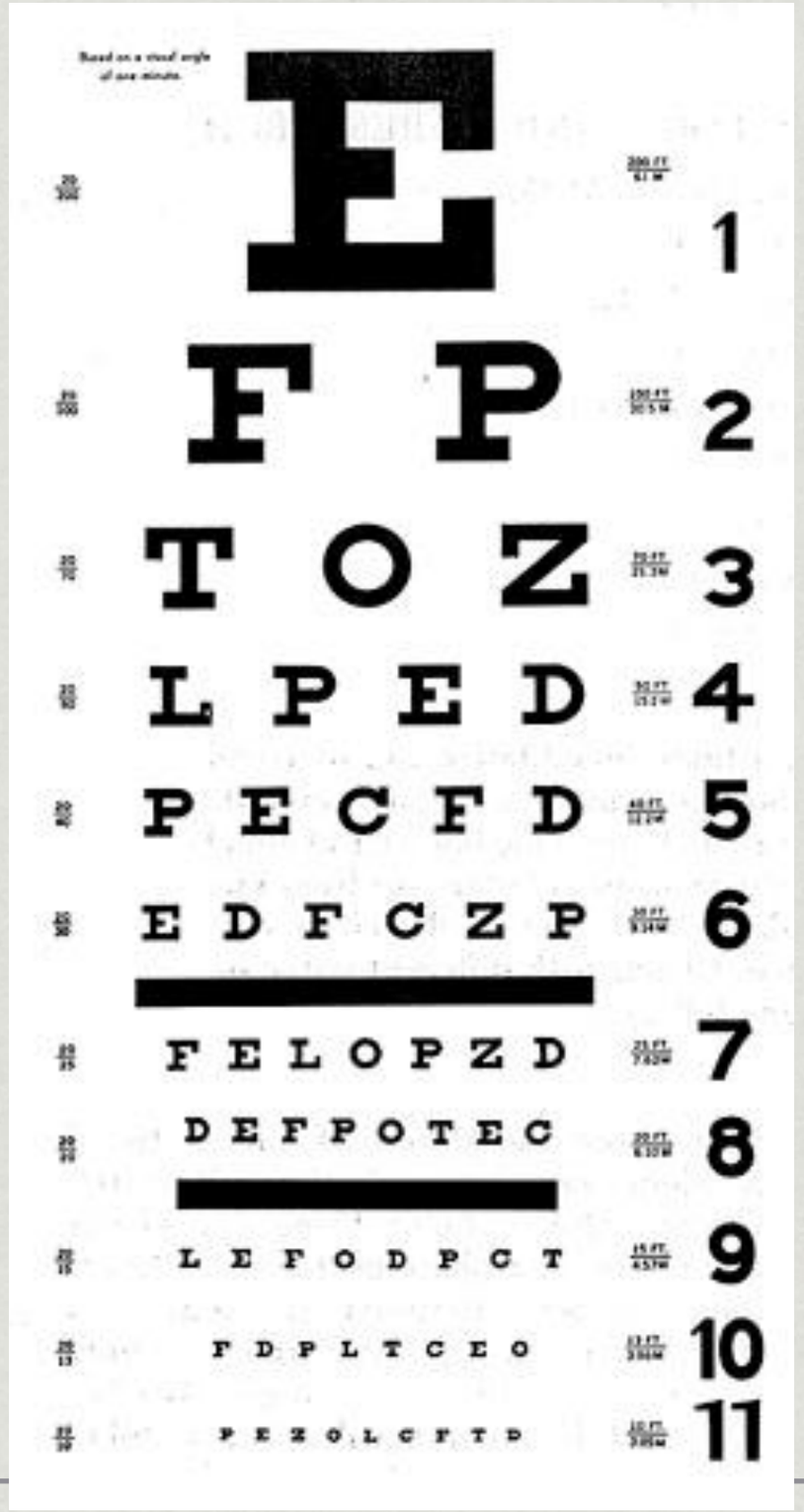
} **VITALS**

- External exam: lids and lashes, conjunctiva, sclera, cornea, anterior chamber, iris, lens
- Dilated fundoscopic exam (DFE): optic nerve, vessels, macula, periphery

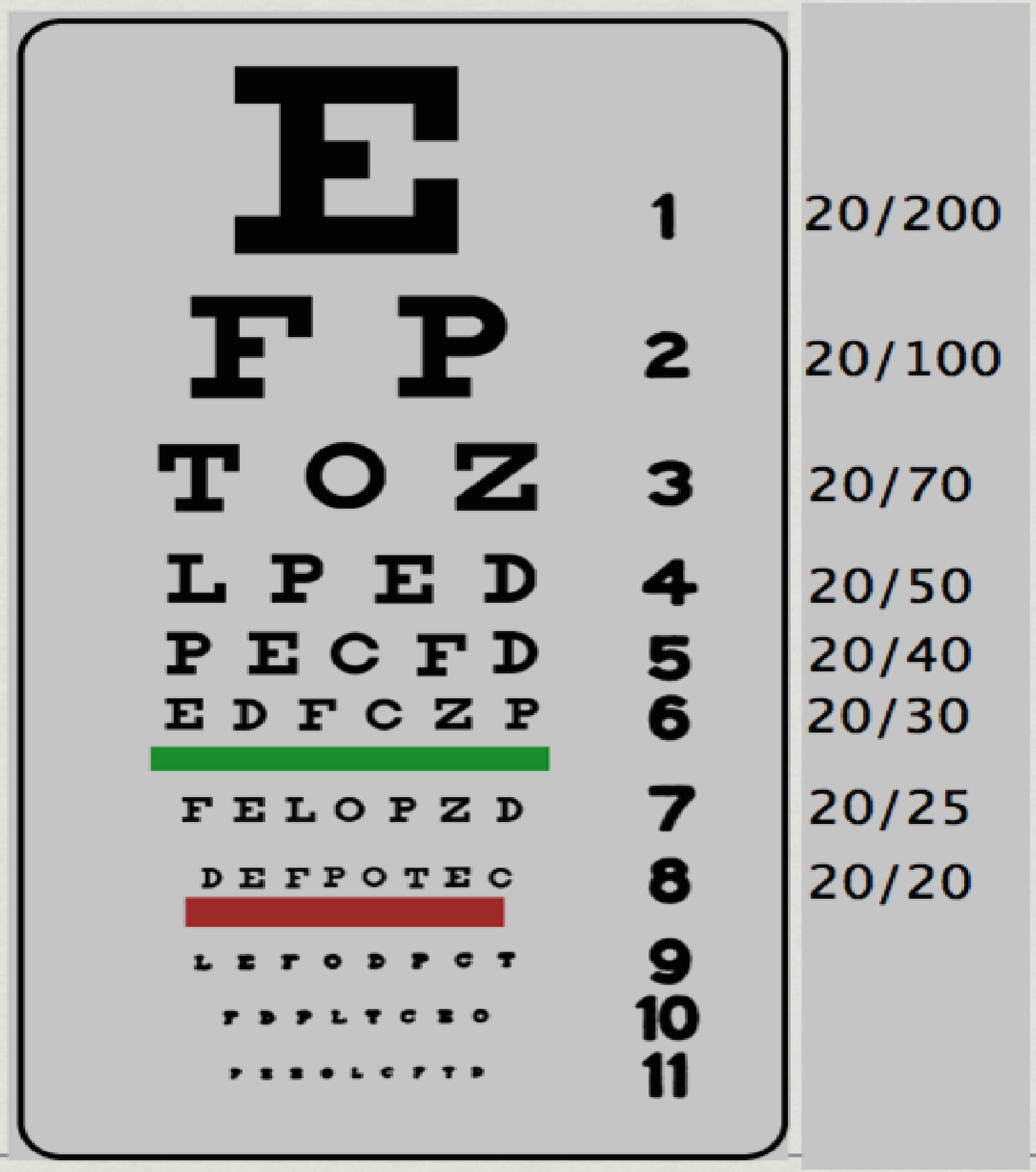
Visual acuity

- Typically measured by Snellen acuity but there are many optotypes (letters, tumbling E, pictures)
- May be tested at any distance
- Recorded as fraction (numerator is testing distance, denominator is distance at which person with normal vision would see figure)

Snellen eye chart



Rosenbaum pocket chart


E 1 20/200
F P 2 20/100
T O Z 3 20/70
L P E D 4 20/50
P E C F D 5 20/40
E D F C Z P 6 20/30
F E L O P Z D 7 20/25
D E F P O T E C 8 20/20
9
10
11

Visual acuity

- Measured without & without glasses (Vacc & Vasc), want to know best corrected acuity
- Occlude one eye, children need to be patched
- 20/20 to 20/400, CF (counting fingers), HM (hand motion), LP (light perception), NLP (no light perception)

Visual acuity

- The pinhole (PH) exam can show refractive error
- Need a pinhole occluder
- Central rays of light do not need to be refracted

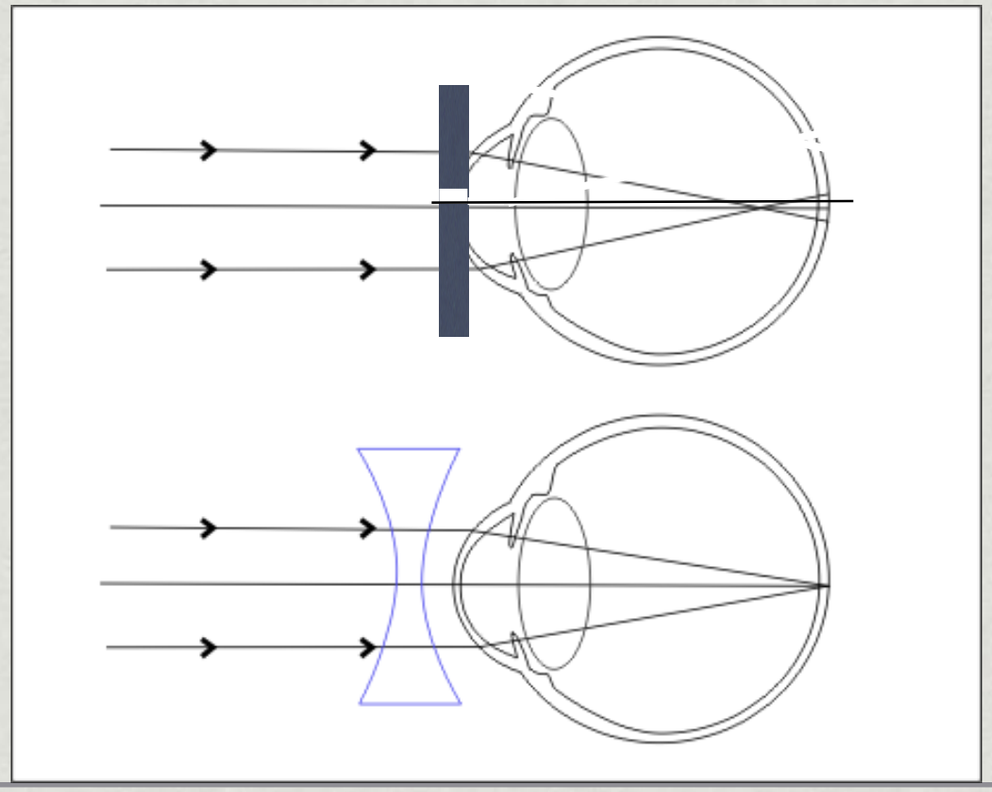


Figure 1 : Pinhole test.

Sensory visual function

- Stereopsis (perception of depth), contrast sensitivity, glare, color vision
- The red desaturation test

Pupillary exam

- Pupil size - measure with pupil gauge on near card
- Anisocoria should be recorded under bright and dim light (greater than 1 mm is abnormal)

Pupillary exam

- Relative afferent pupillary defect (RAPD) or Marcus Gunn pupil (has nothing to do with size of pupils but the comparitive reaction to light)
- Detected with swinging flash light test
- Indicates unilateral or asymmetric damage to anterior visual pathways (optic nerve or extensive retinal damage)

Pupillary exam: APD

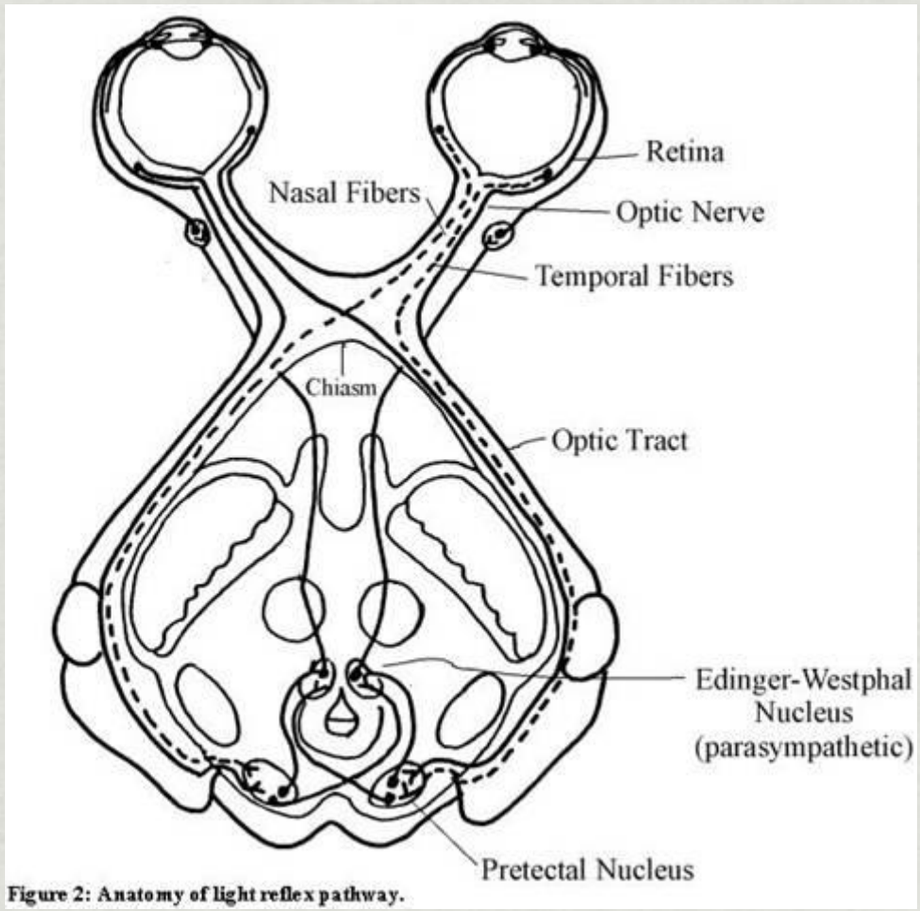
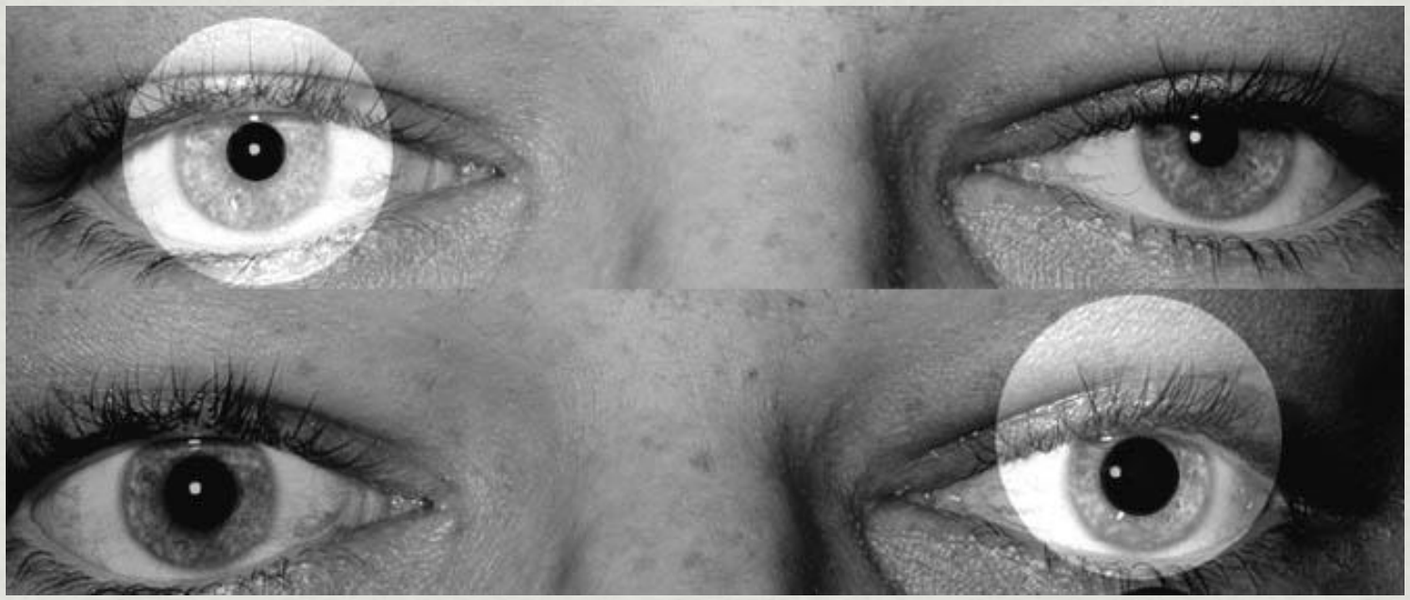


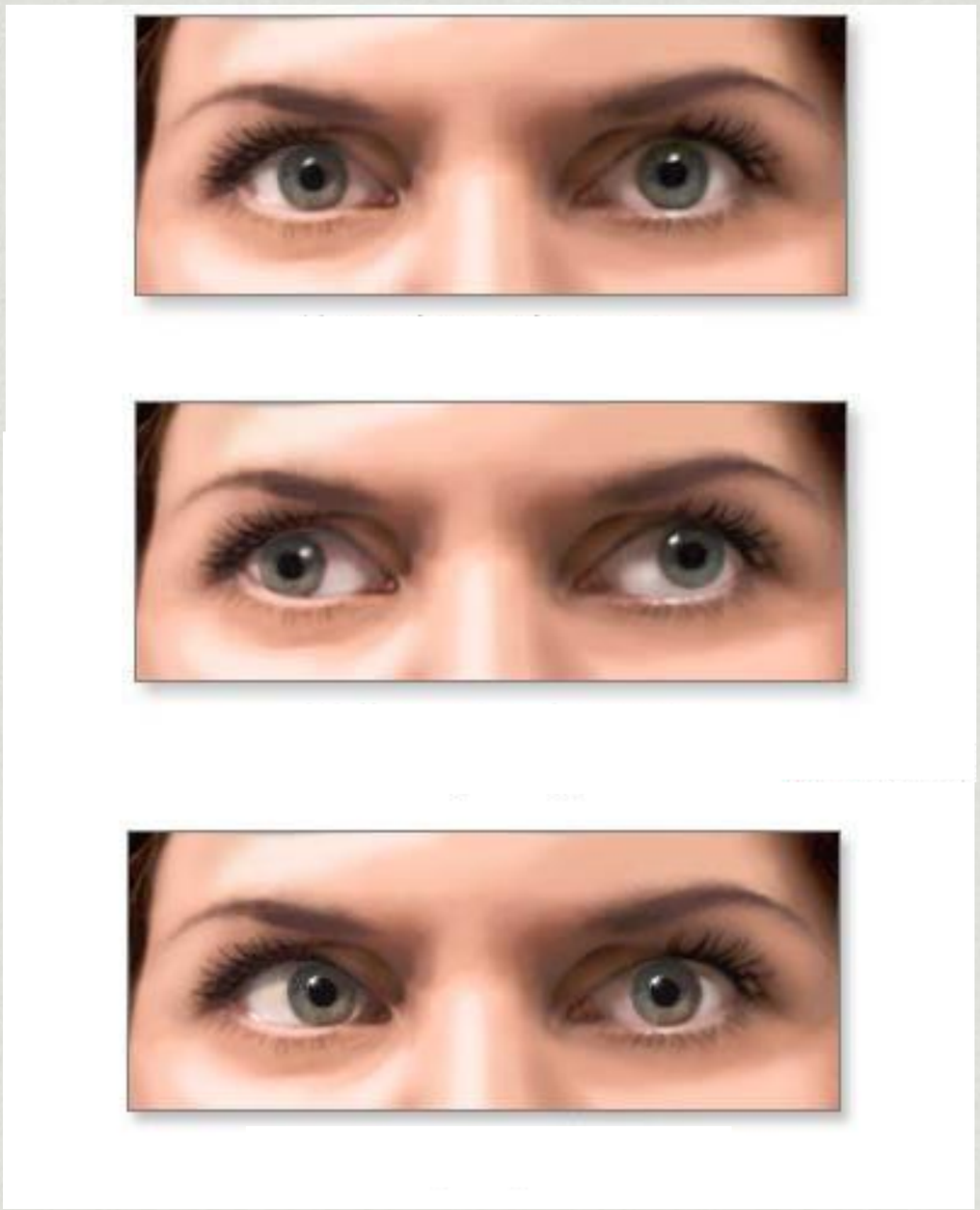
Figure 2: Anatomy of light reflex pathway.



Ocular alignment & motility

- Strabismus is misalignment of the eyes
- Important to recognize in children to prevent development of amblyopia
- Phoria is latent tendency toward misalignment (shows up sometimes)
- Tropia is manifest deviation (present all the time)

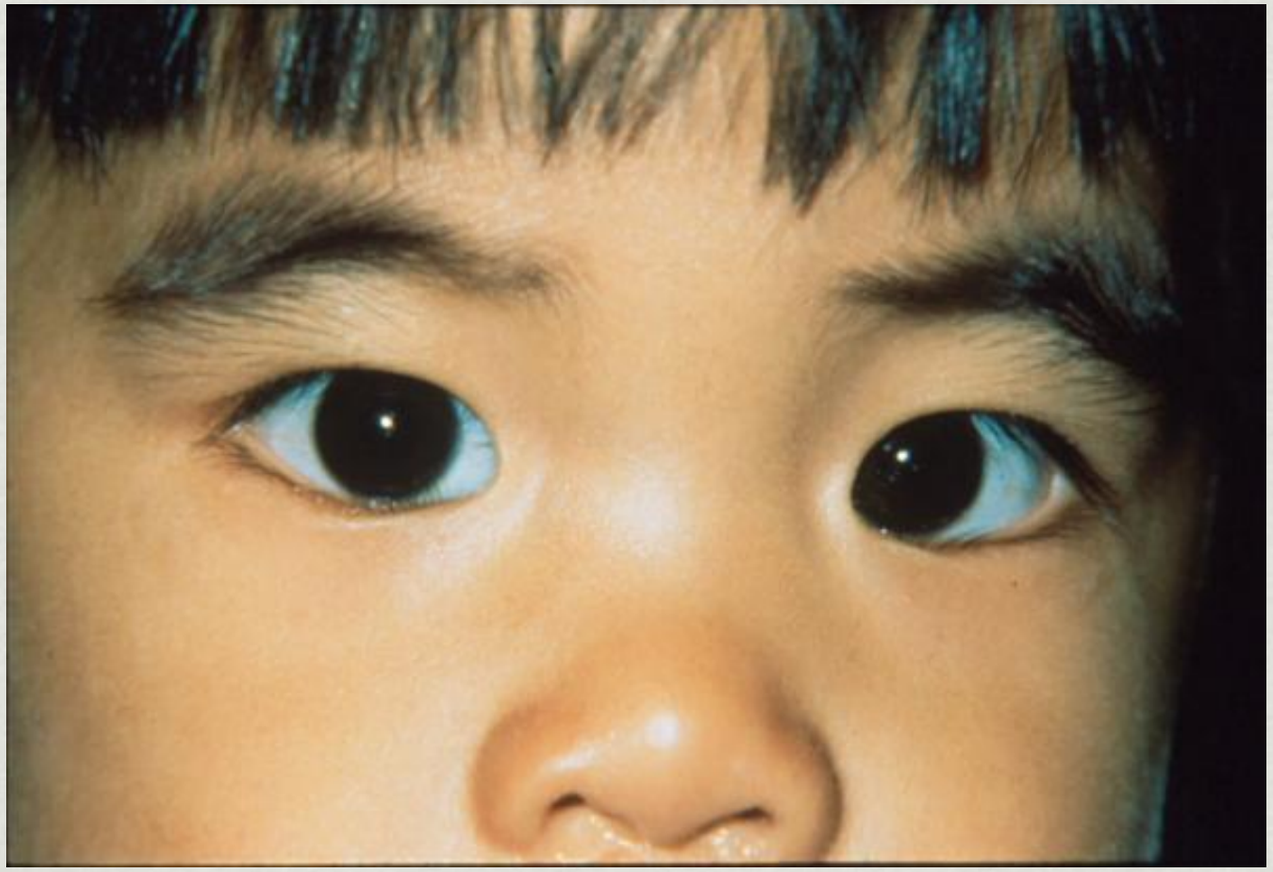
Ocular alignment & motility corneal light reflex



- Normal or straight
- Exotropia (out)
- Esotropia (in)

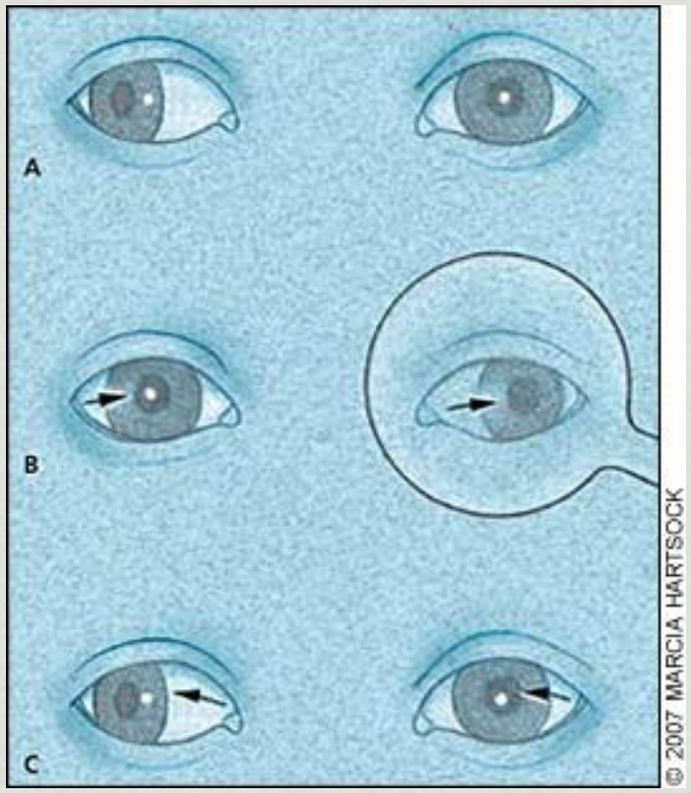
Ocular alignment & motility corneal light reflex

- Be aware of pseudoesotrpoia in children with epicanthal folds



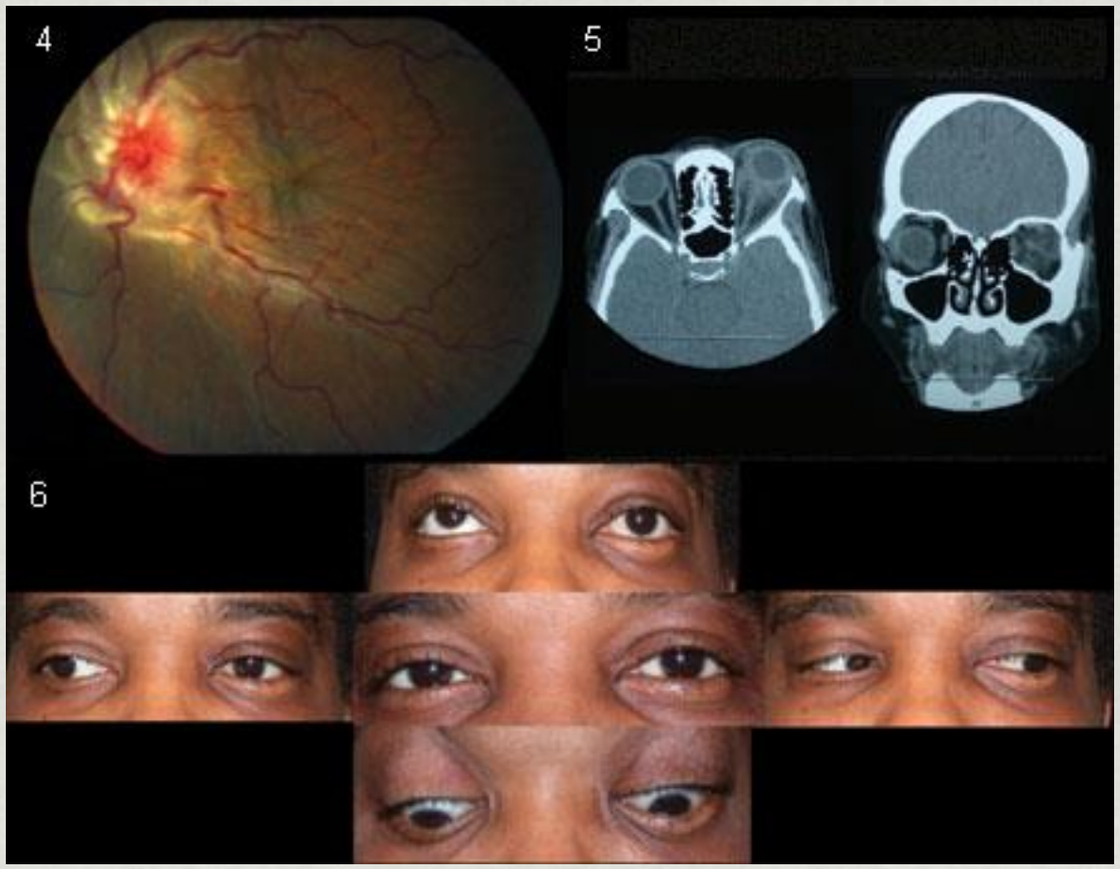
Ocular alignment & motility cover testing

- Cover-uncover or alternating cover testing can reveal strabismus as non-occluded eye fixates on object



Ocular alignment & motility

- Elevation, depression, abduction, adduction



Confrontational visual fields

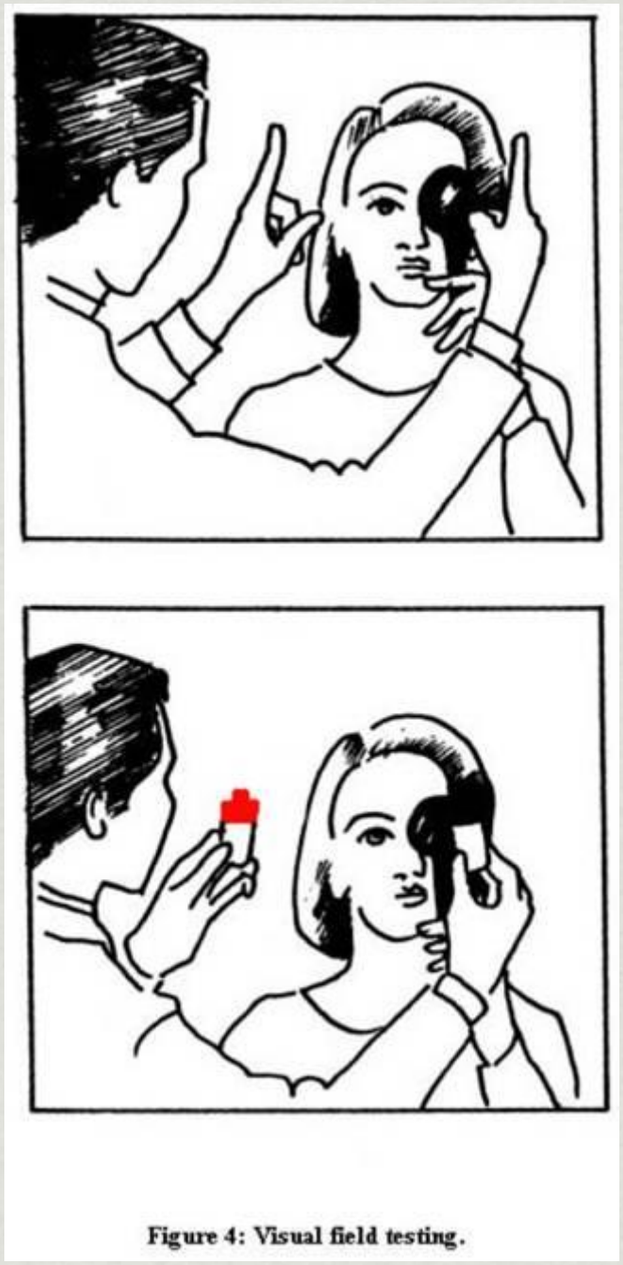
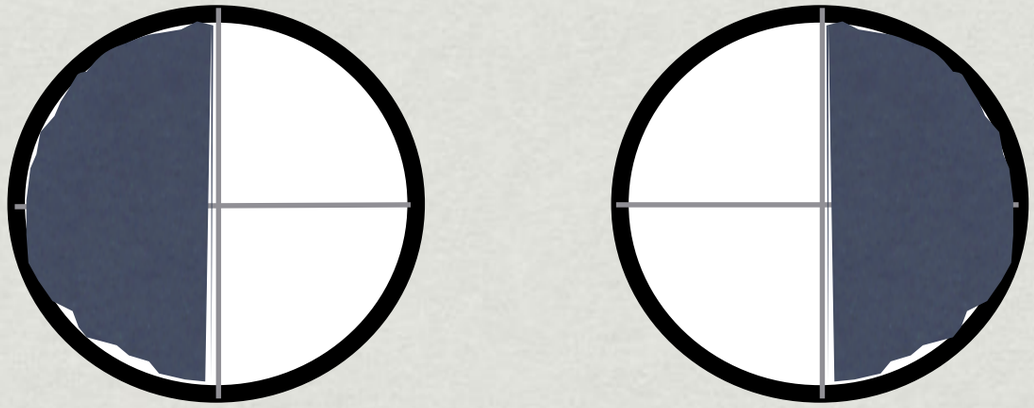


Figure 4: Visual field testing.



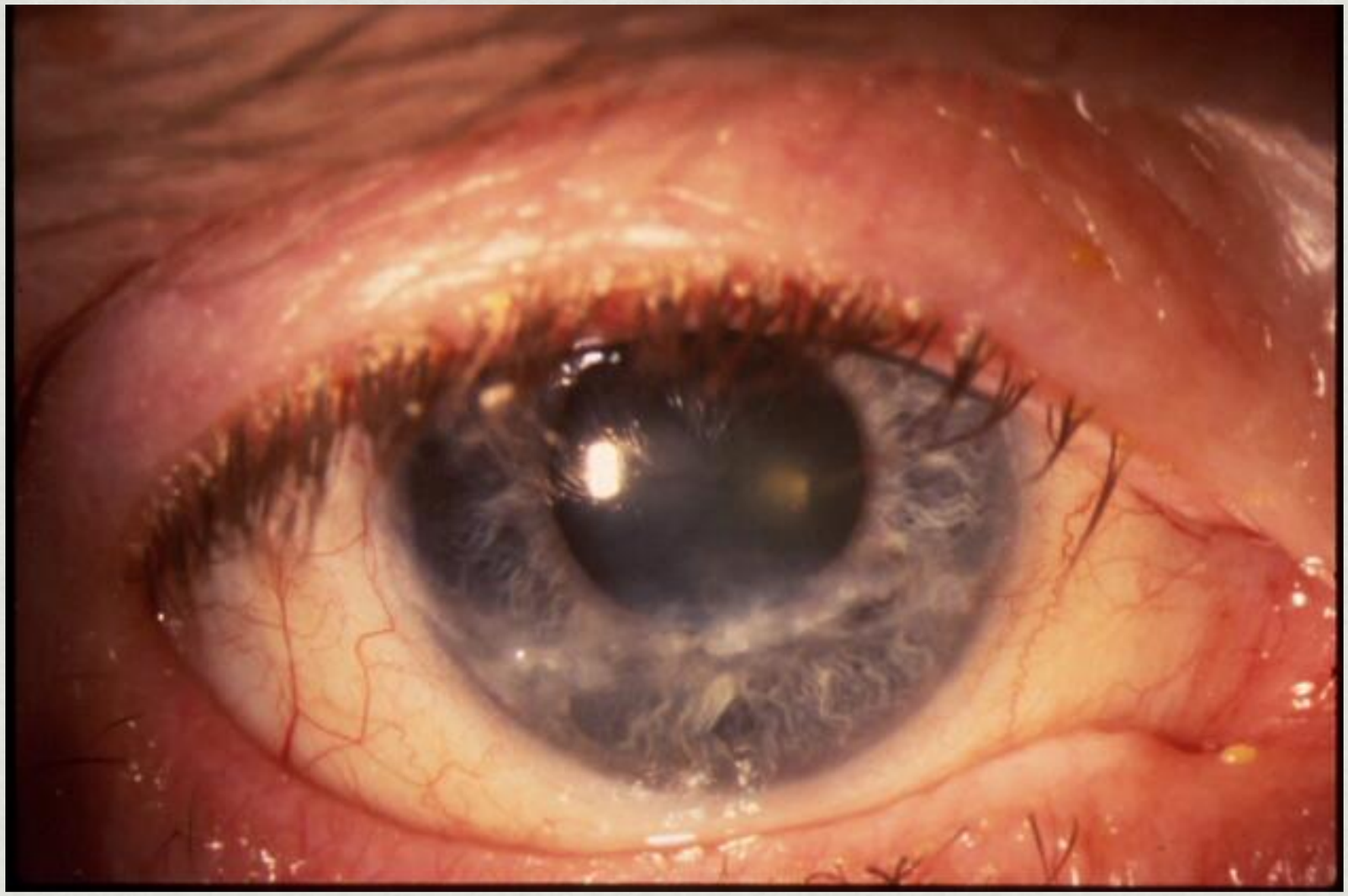
Intraocular pressure

- Measured by tonopen or palpation
- Varies throughout the day, normal is 10-22 (start to worry when pressure is in the 30s and up)
- Palpation may be useful if you suspect angle closure glaucoma (never perform in trauma)

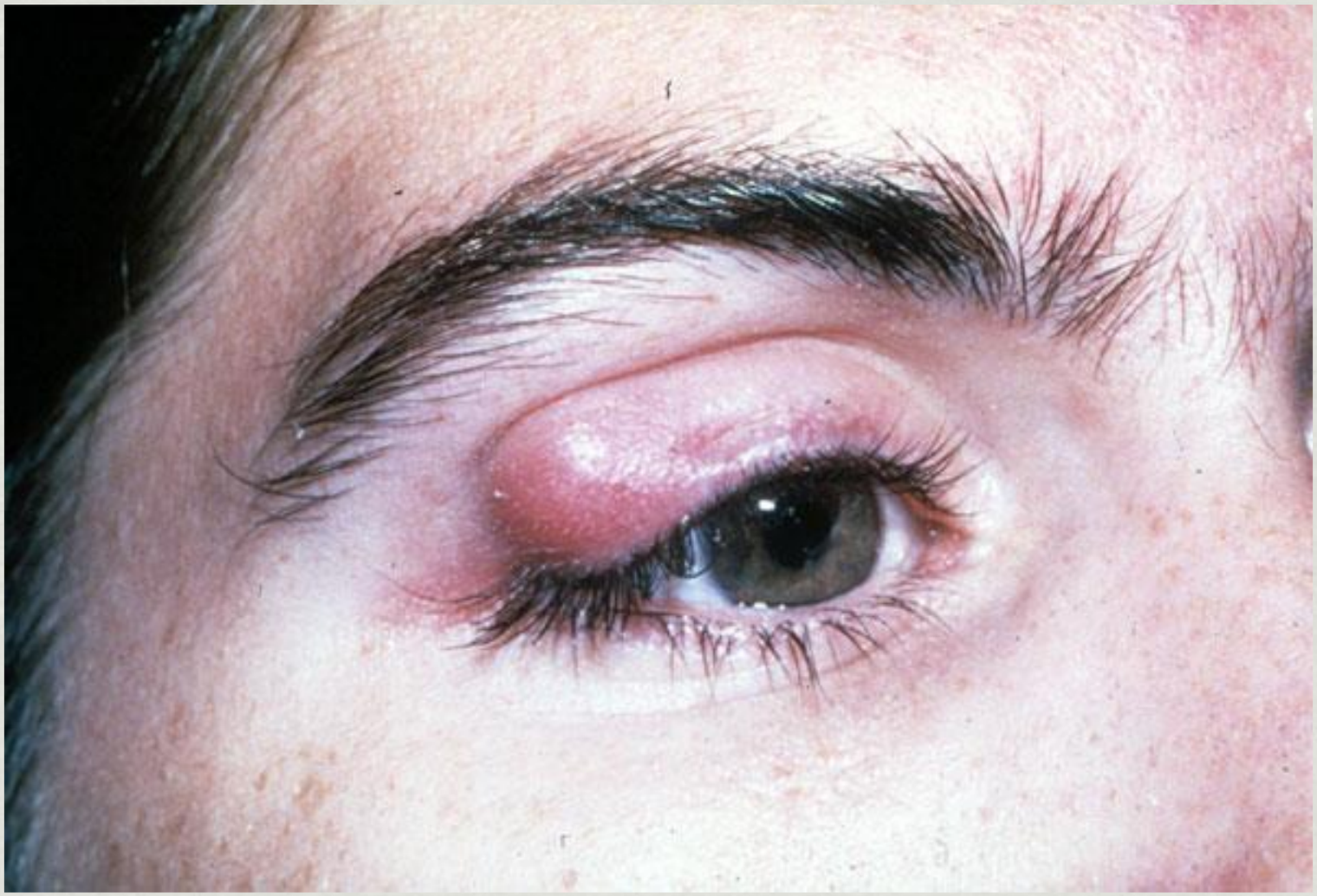
External exam

- Lids & lashes (head, face, orbit, eyelids, lacrimal system, globe)
- Compare symmetry, use your ruler
- Flip the lid; make a lid speculum
- What am I seeing?

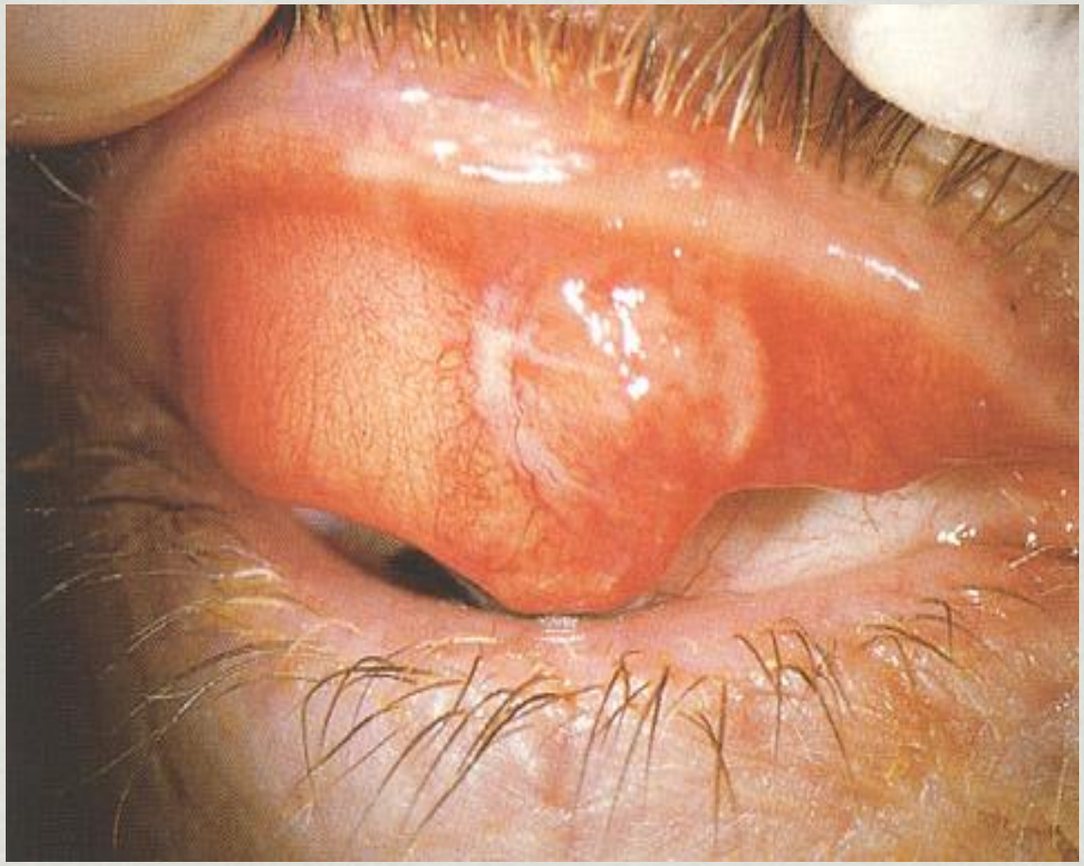
Blepharitis



Case 1



Chalazion



Treatment

- warm compresses
- lid hygiene
- surgical incision and curettage
- steroid injection
- pathological examination for suspicious lesion

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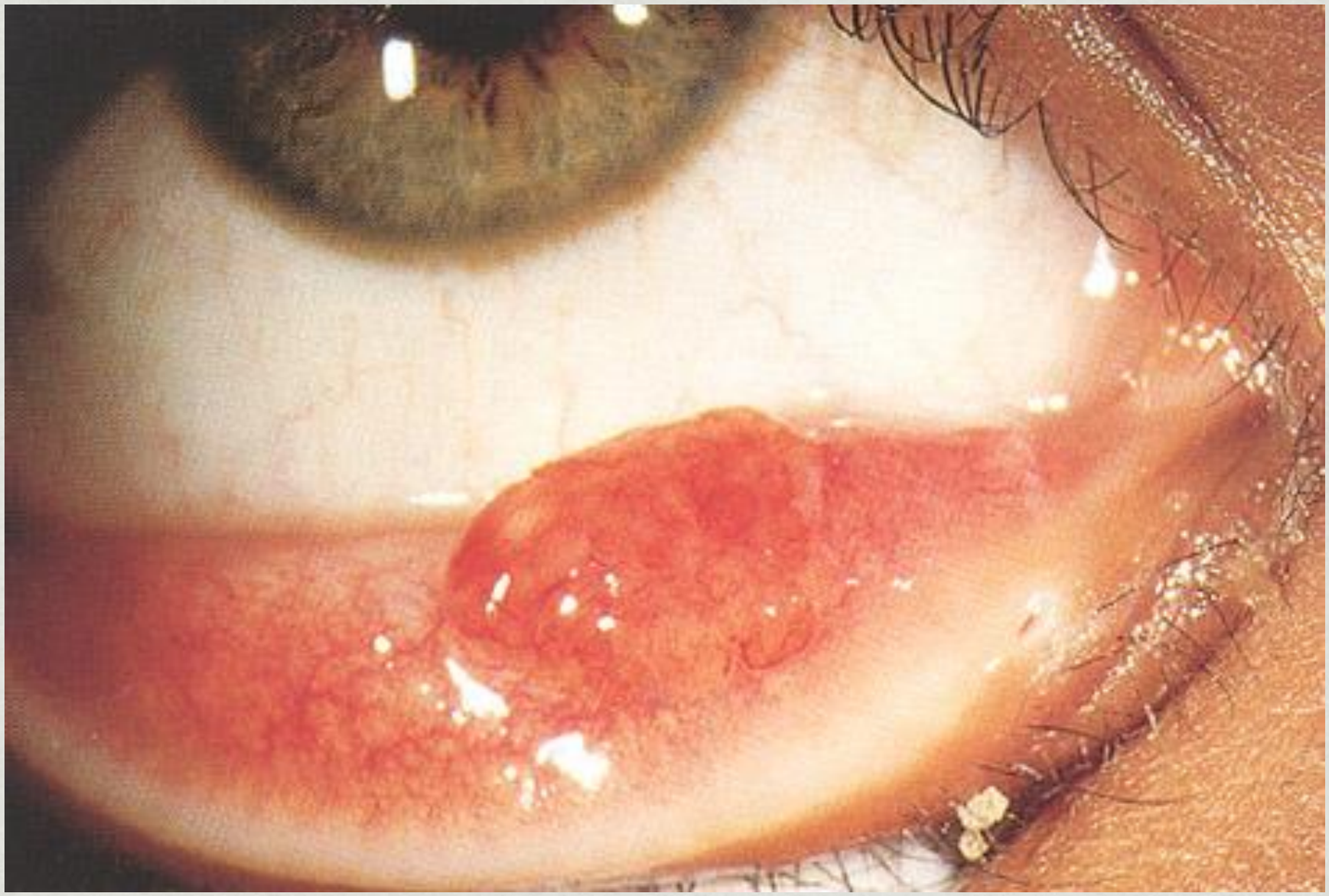
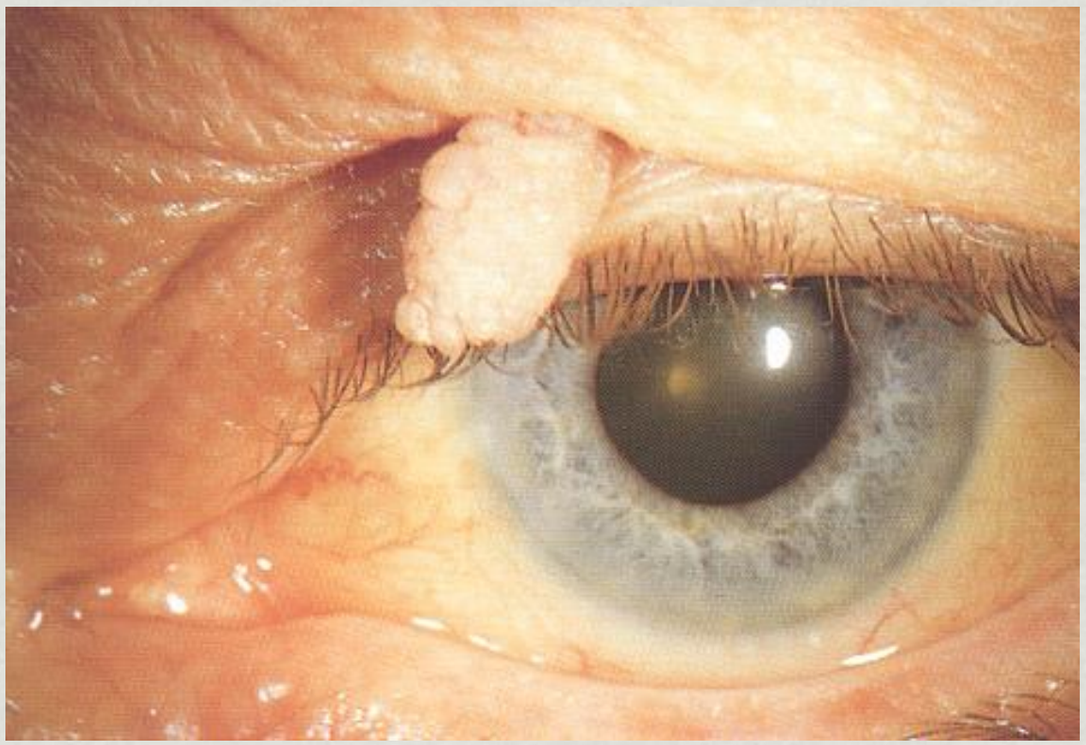
Chalazion



Acrochordon



- Shave excision
- Gentle cautery to base

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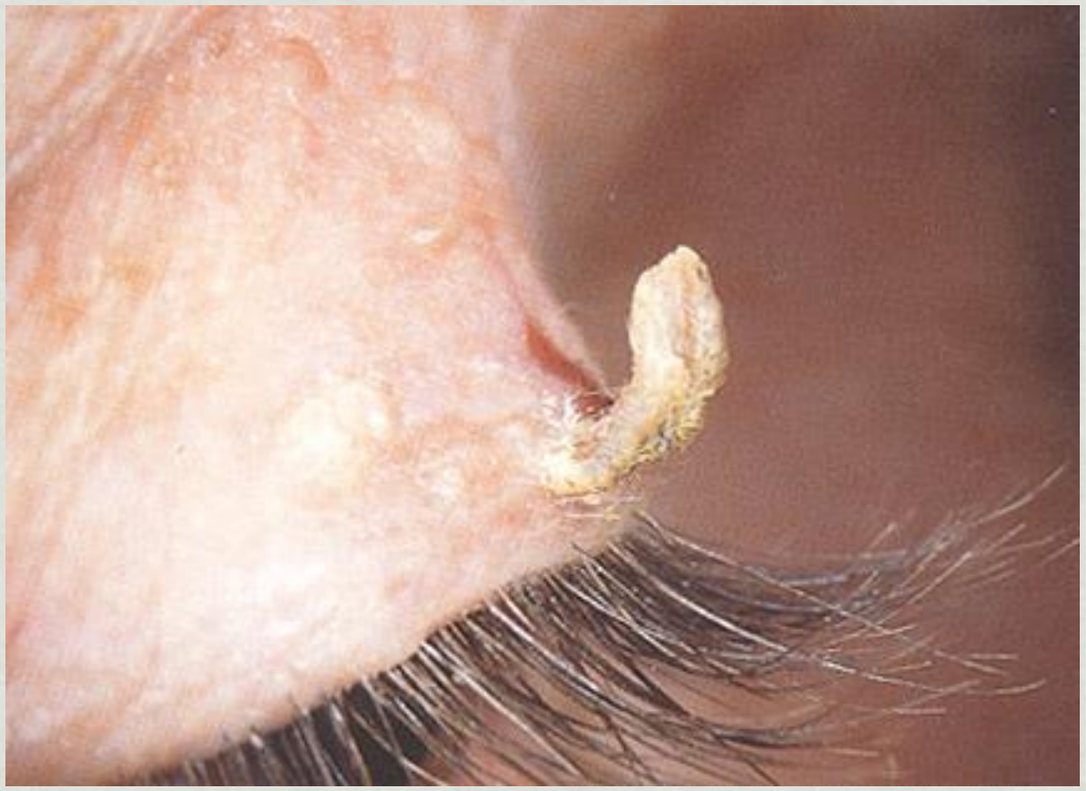
Cutaneous Horn



- Descriptive term
- Exuberant hyperkeratosis
- Biopsy of base

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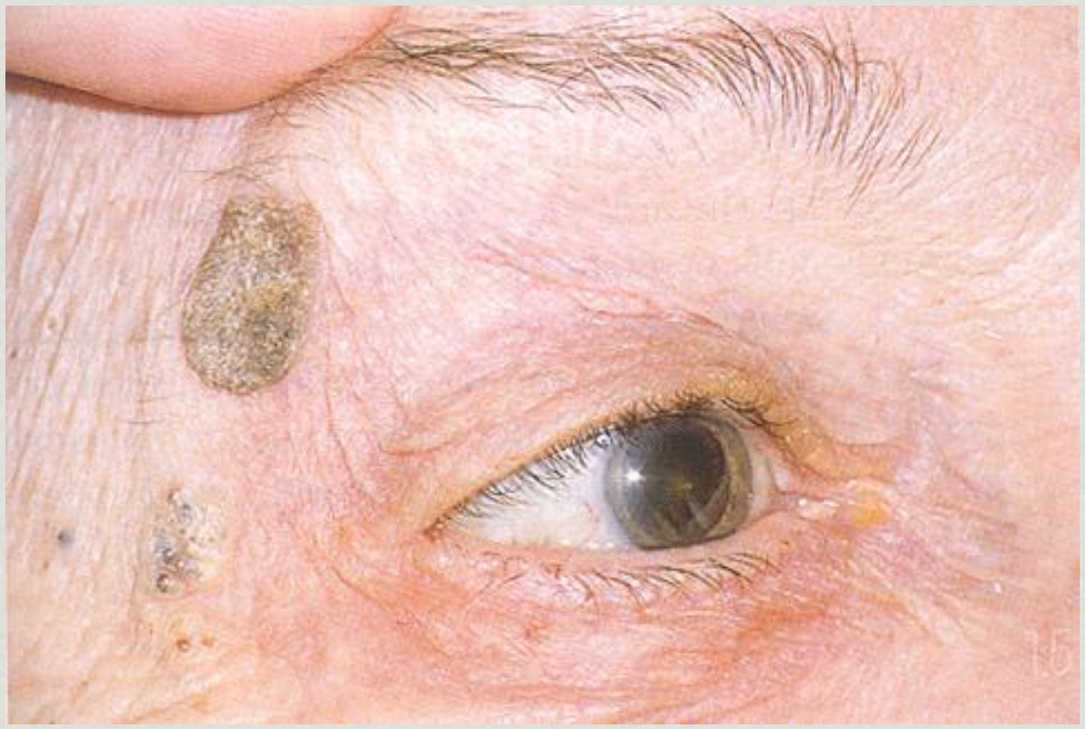
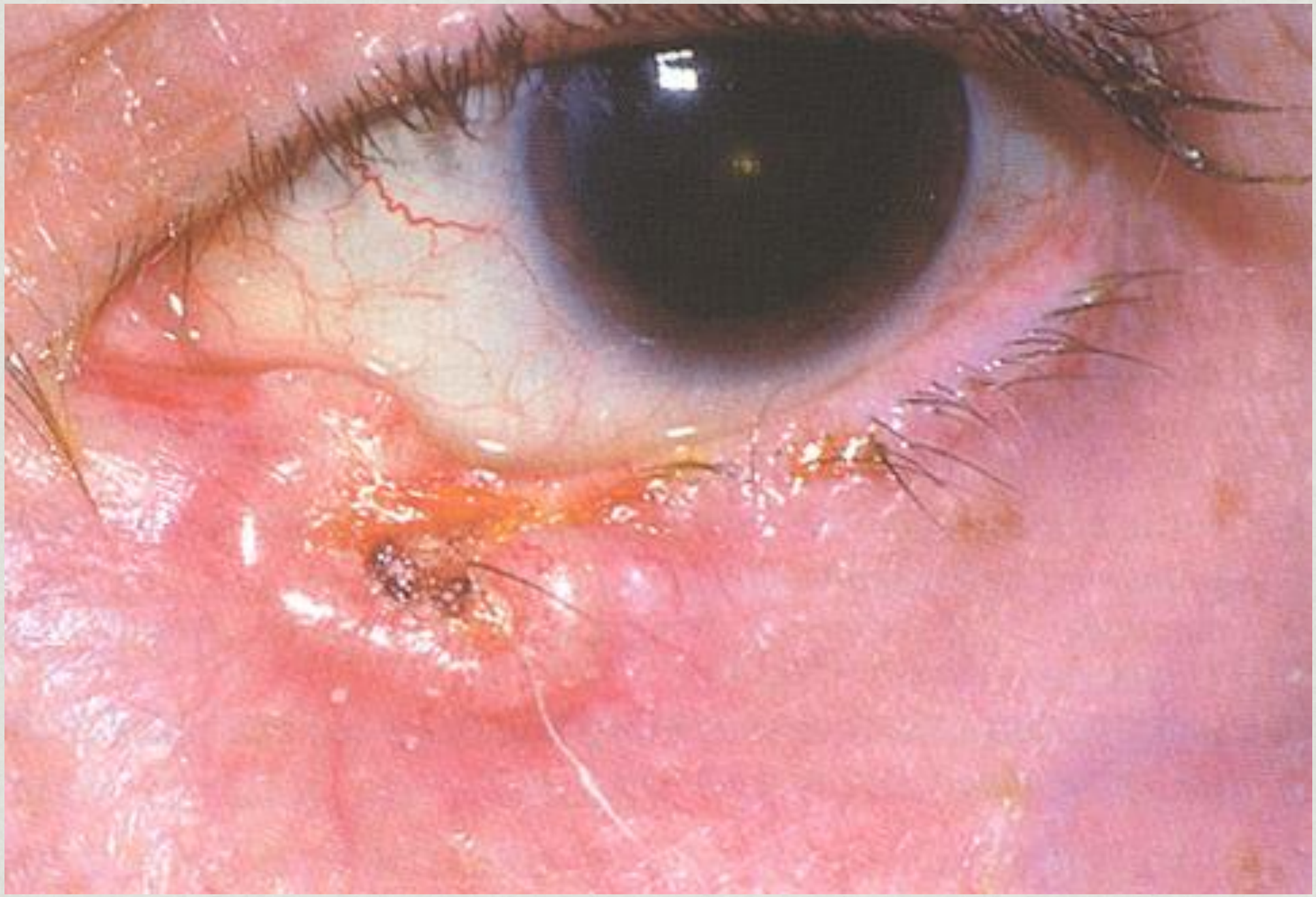
Seborrheic Keratosis



- Waxy, stuck-on
- Shave at dermal-epidermal junction
- Rapid reepithelization

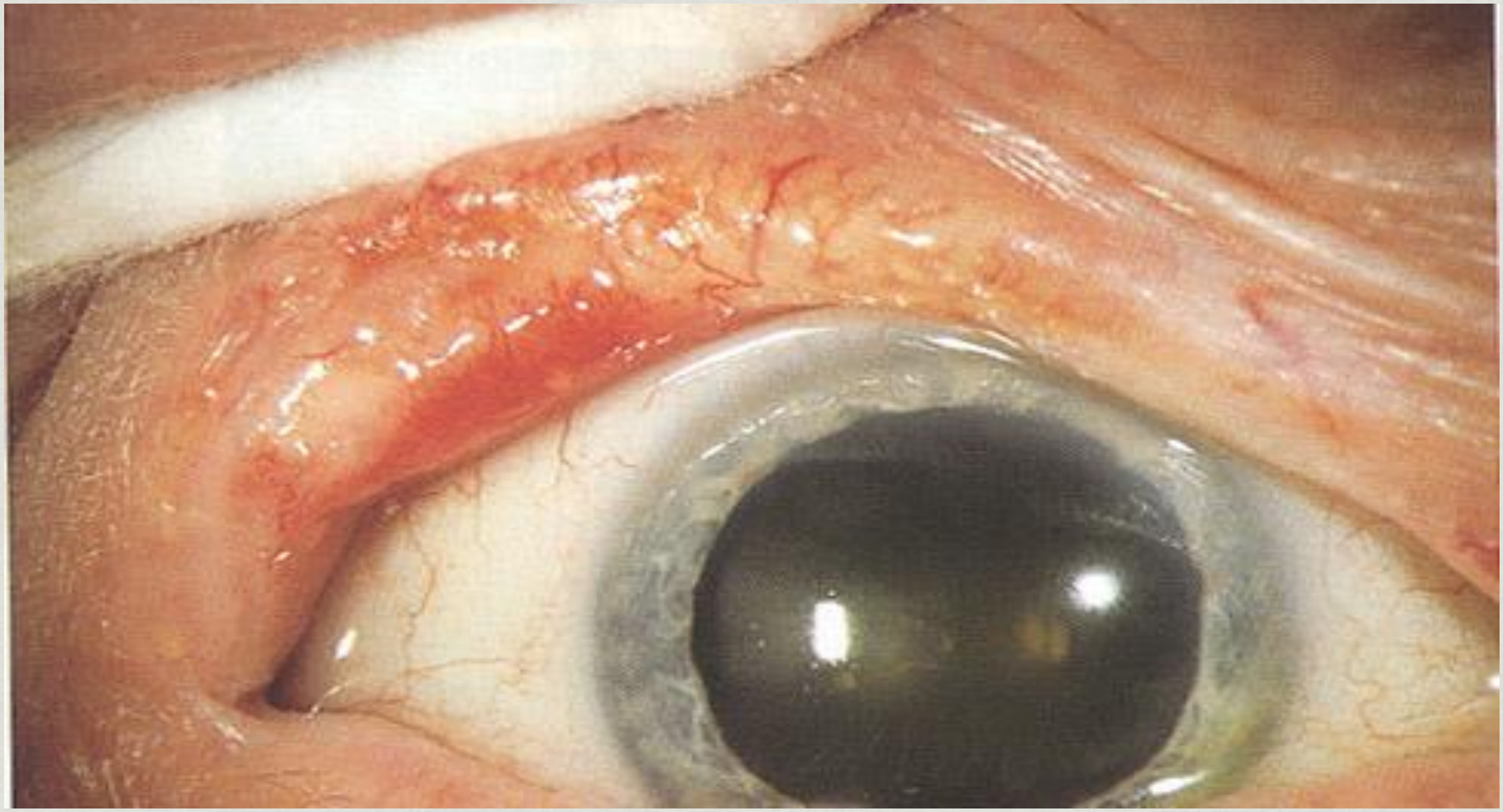
Case 2



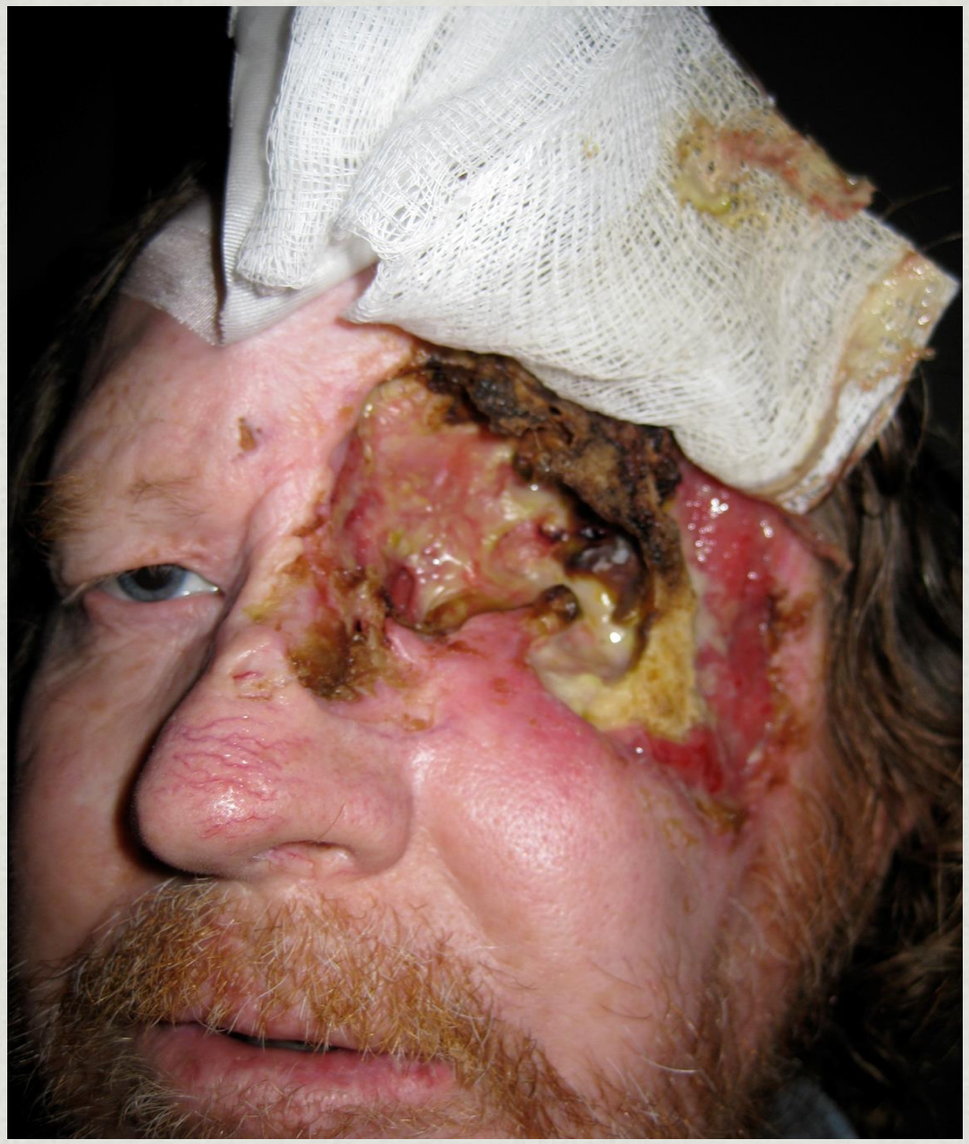
Basal Cell Carcinoma

- Management
  - Biopsy
  - Surgical Excision
    - Incisional biopsy
    - Excisional biopsy
    - MOHS surgery
- Cryotherapy - high recurrence
- Radiation - palliative

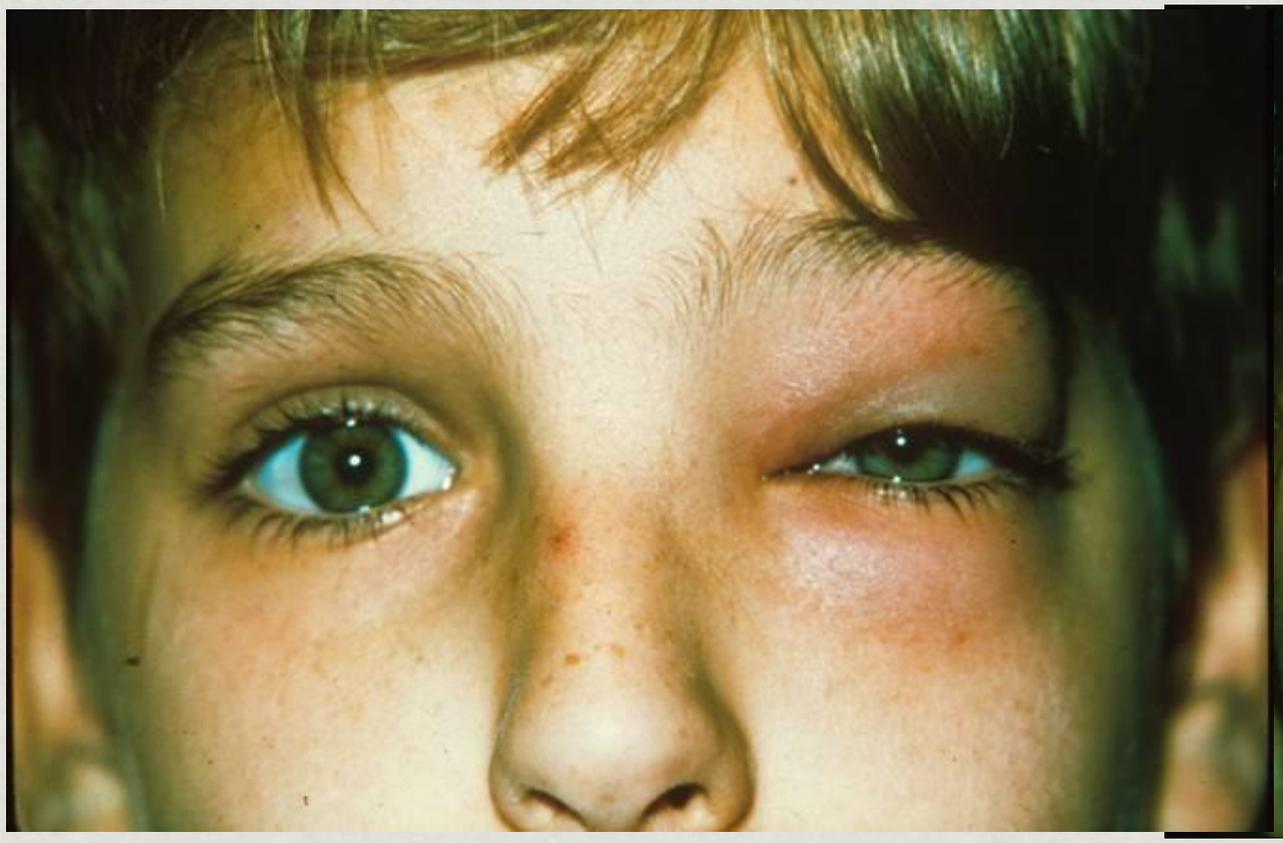
Squamous Cell Carcinoma

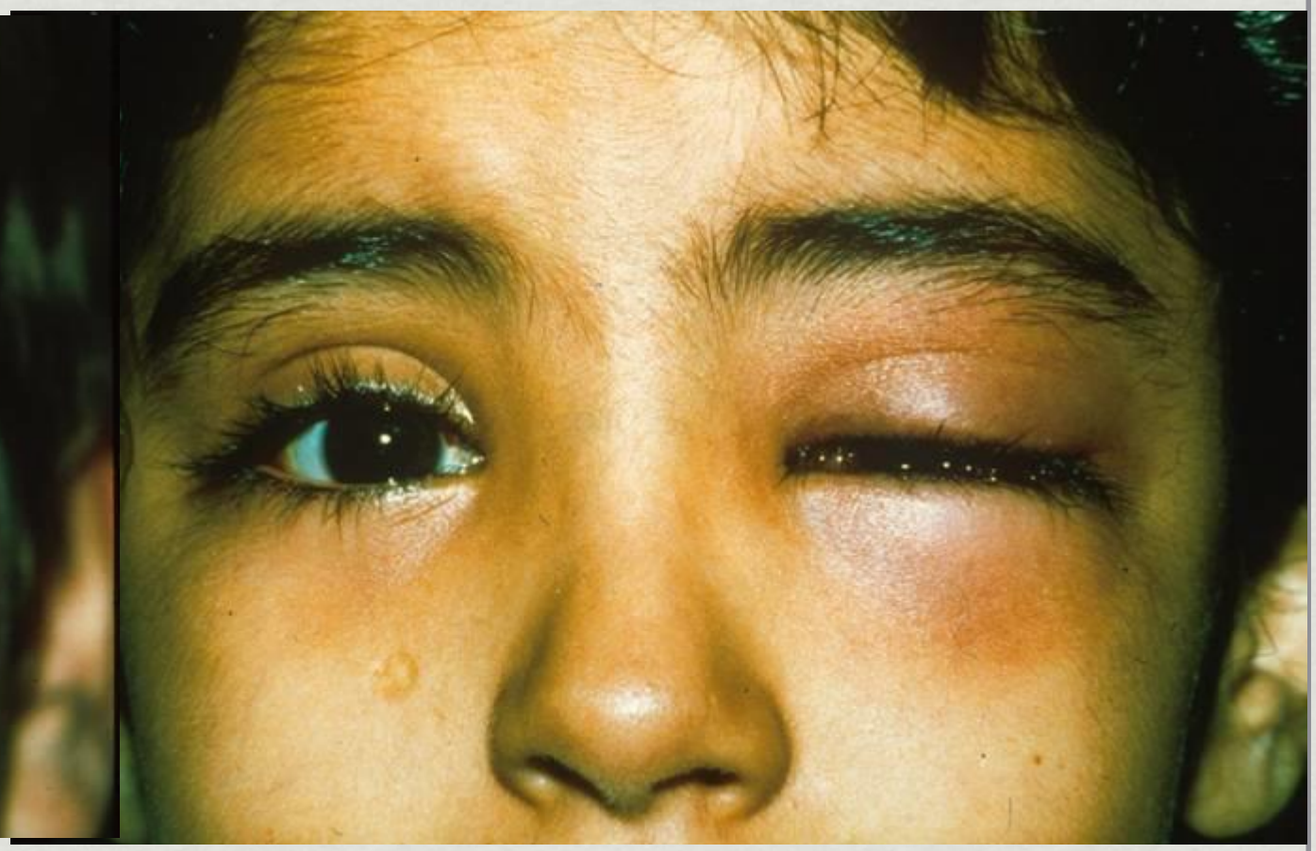


Squamous Cell CA



Pre-Septal versus Orbital Cellulitis





Cellulitis: PreSeptal vs. Orbital

- Children: most common
- Associated lid swelling (upper and lower)
- History of URI or sinus infection
- Both may have temp and elevated WBC

Preseptal

- Eye Exam normal
- Patient does not appear “toxic”
- Can treat with oral antibiotics and close observation
  - Unless in NEONATE!! Then hospitalize

Orbital

- A dangerous infection requiring prompt treatment
- Orbital Signs:
  - Decreased vision
  - Proptosis
  - Abnormal pupillary response and motility
  - Disc swelling

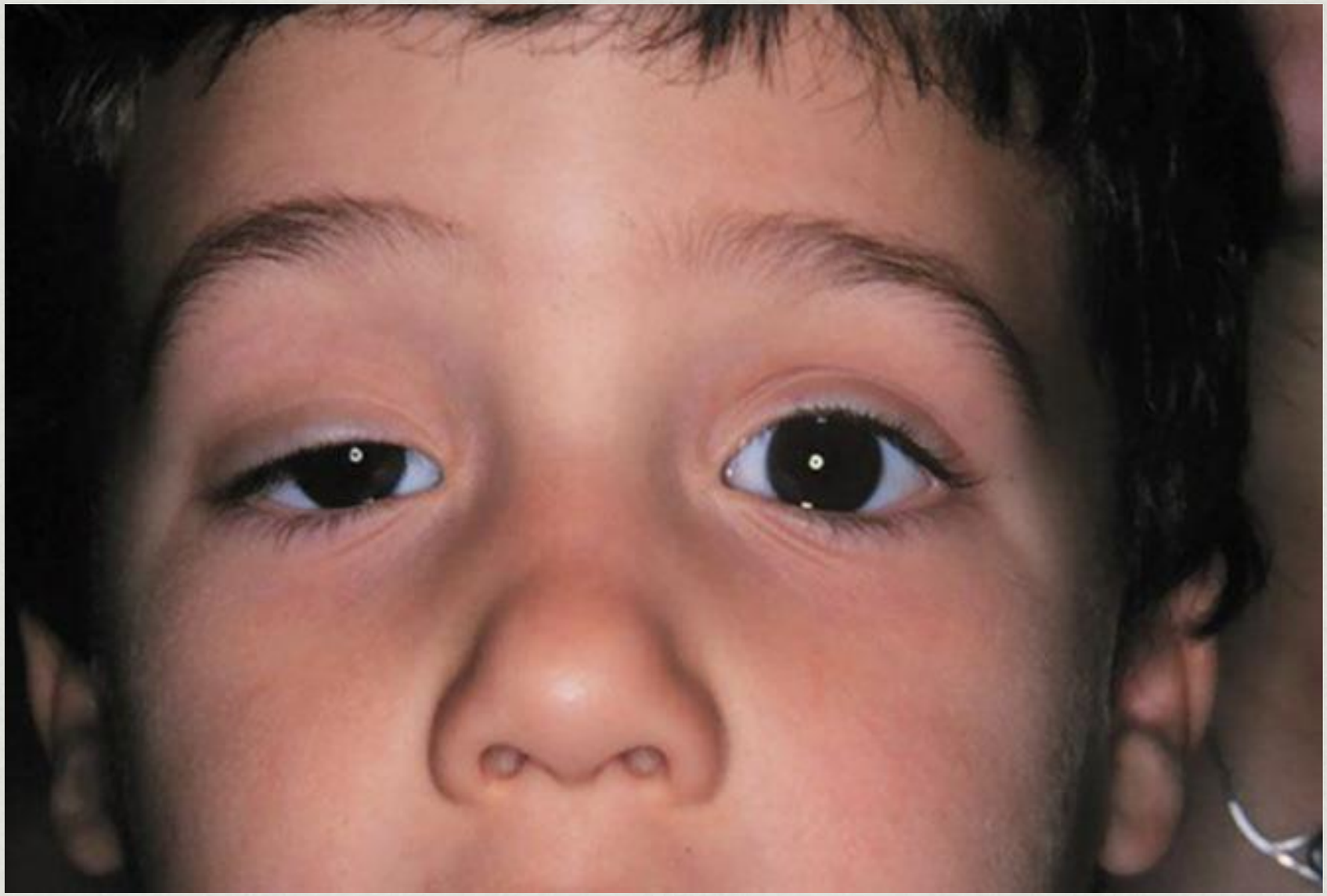
Orbital Cellulitis: Ancillary Tests

- CT or MRI: Look for Sinus infection or orbital abscess
- Blood cultures
    - Conjunctival swabs of no diagnostic value
- ENT consult

Orbital Cellulitis Treatment

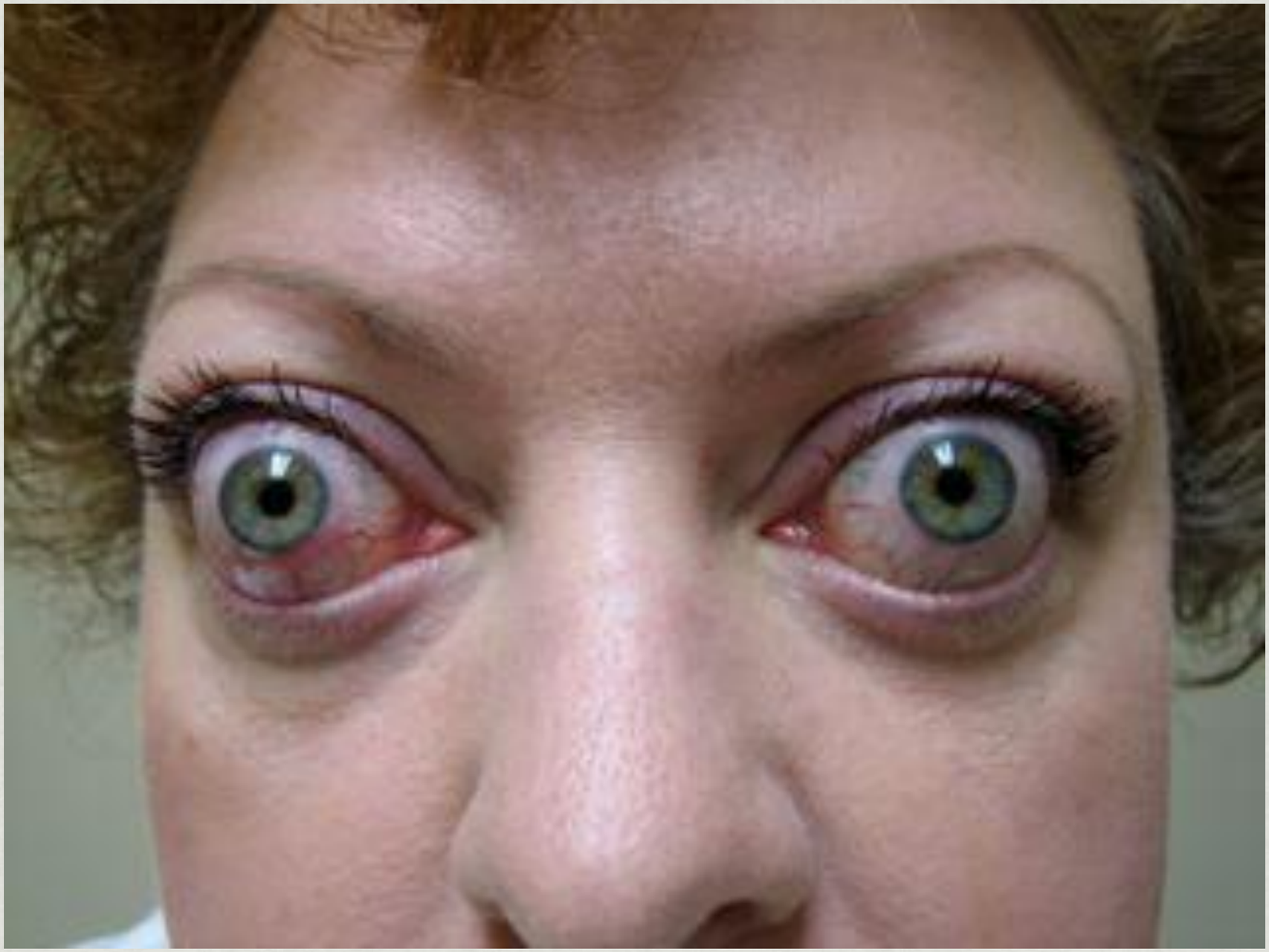
- Prompt drainage of orbital or sinus abscess
- Systemic IV antibiotics
  - Haemophilus, Staph and Strep
  - Semisynthetic PCN/ Cephalosporin

Ptosis

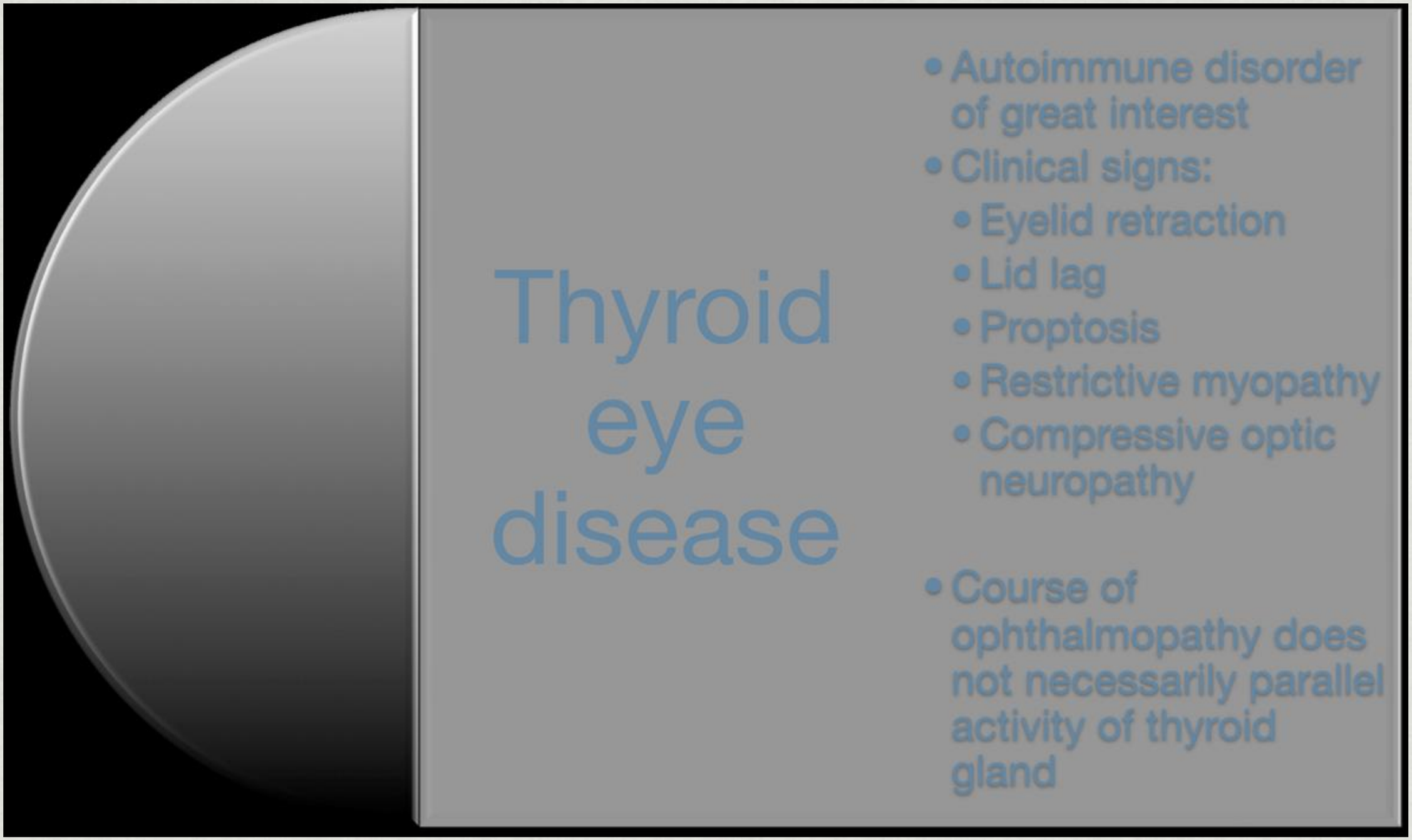


Dermatochalasis

Case 3



Inflammations



Concurrent or recently treated thyroid dysfunction

- Graves -- 90%
- Hashimoto -- 3%
- Presence of circulating antibodies: TSH-R, TBII, TSI, antimicrosomal

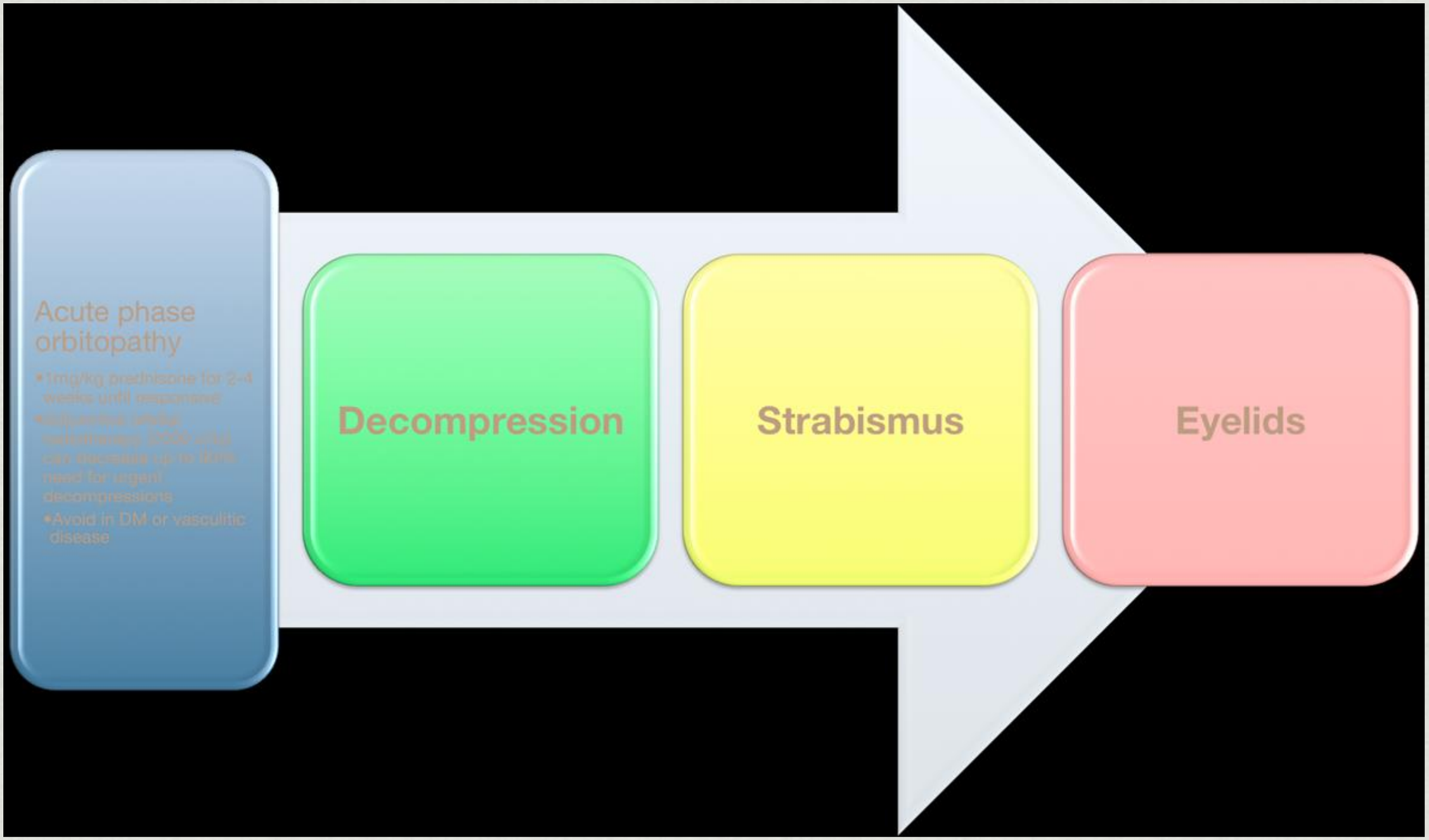
Radiographic evidence

- Medial > Inferior > Superior Rectus

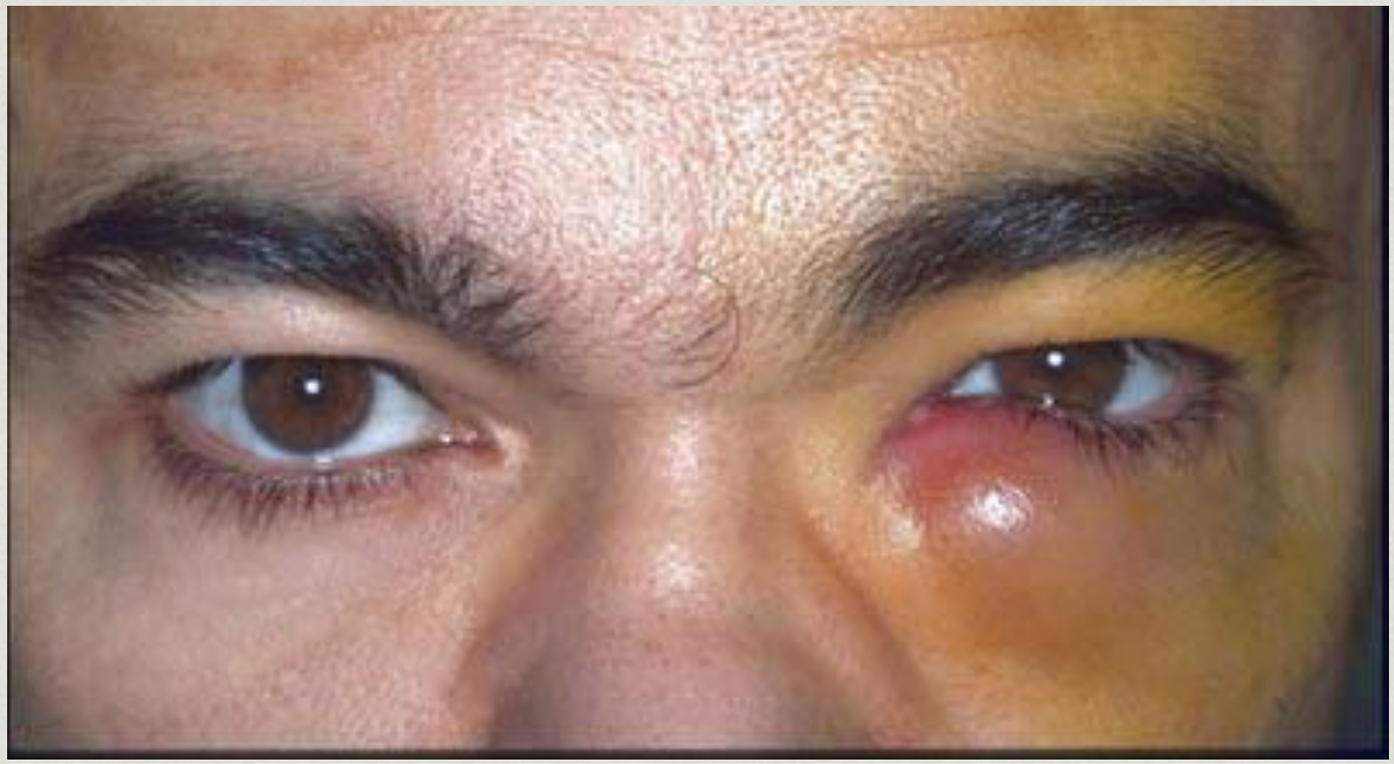
Typical orbital signs

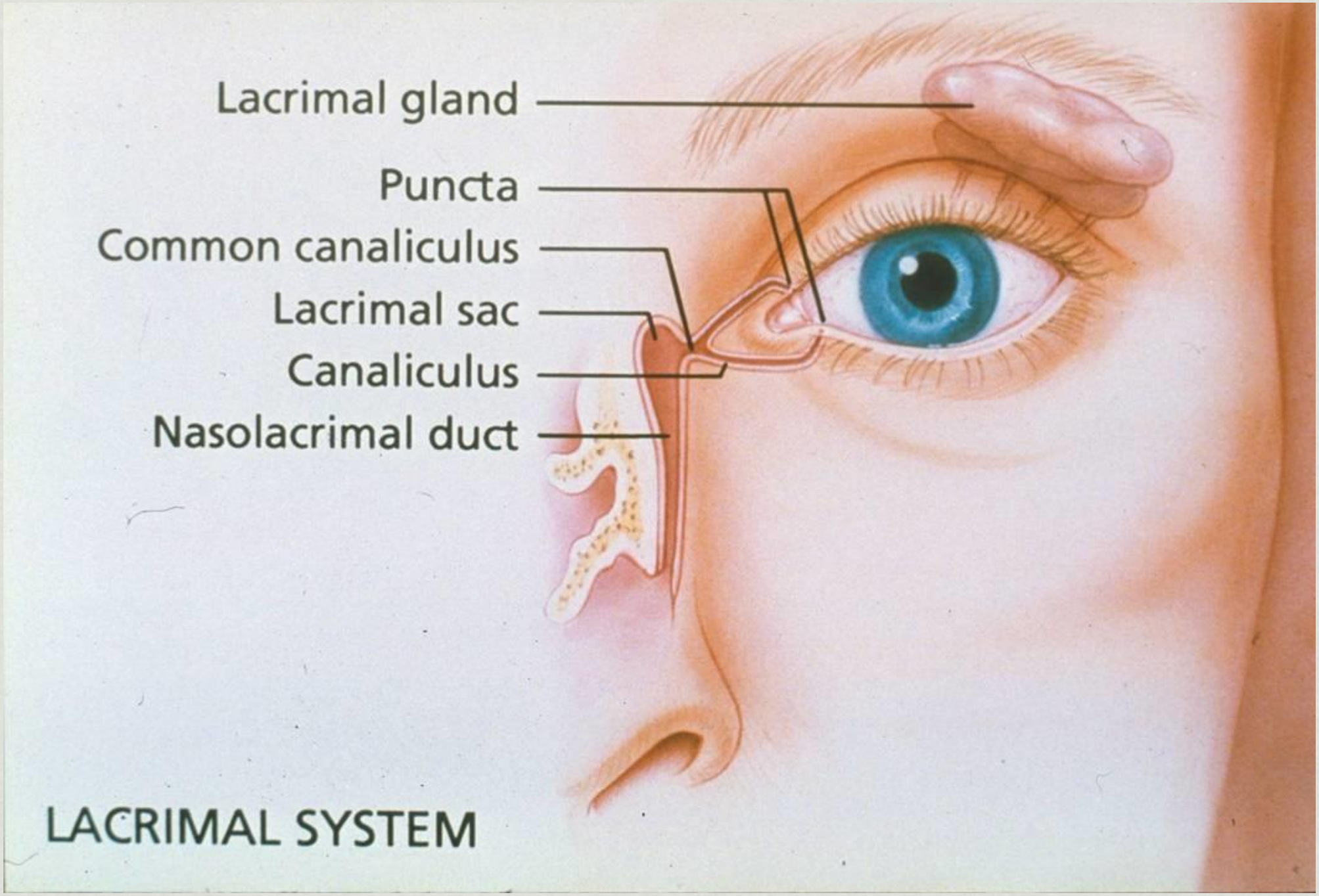
- Eyelid retraction with temporal flare
- Proptosis
- Restrictive strabismus
- Compressive optic neuropathy
- Fluctuating eyelid edema/ erythema
- Chemosis / Caruncular edema

Thyroid Eye Disease



Dacryocystitis

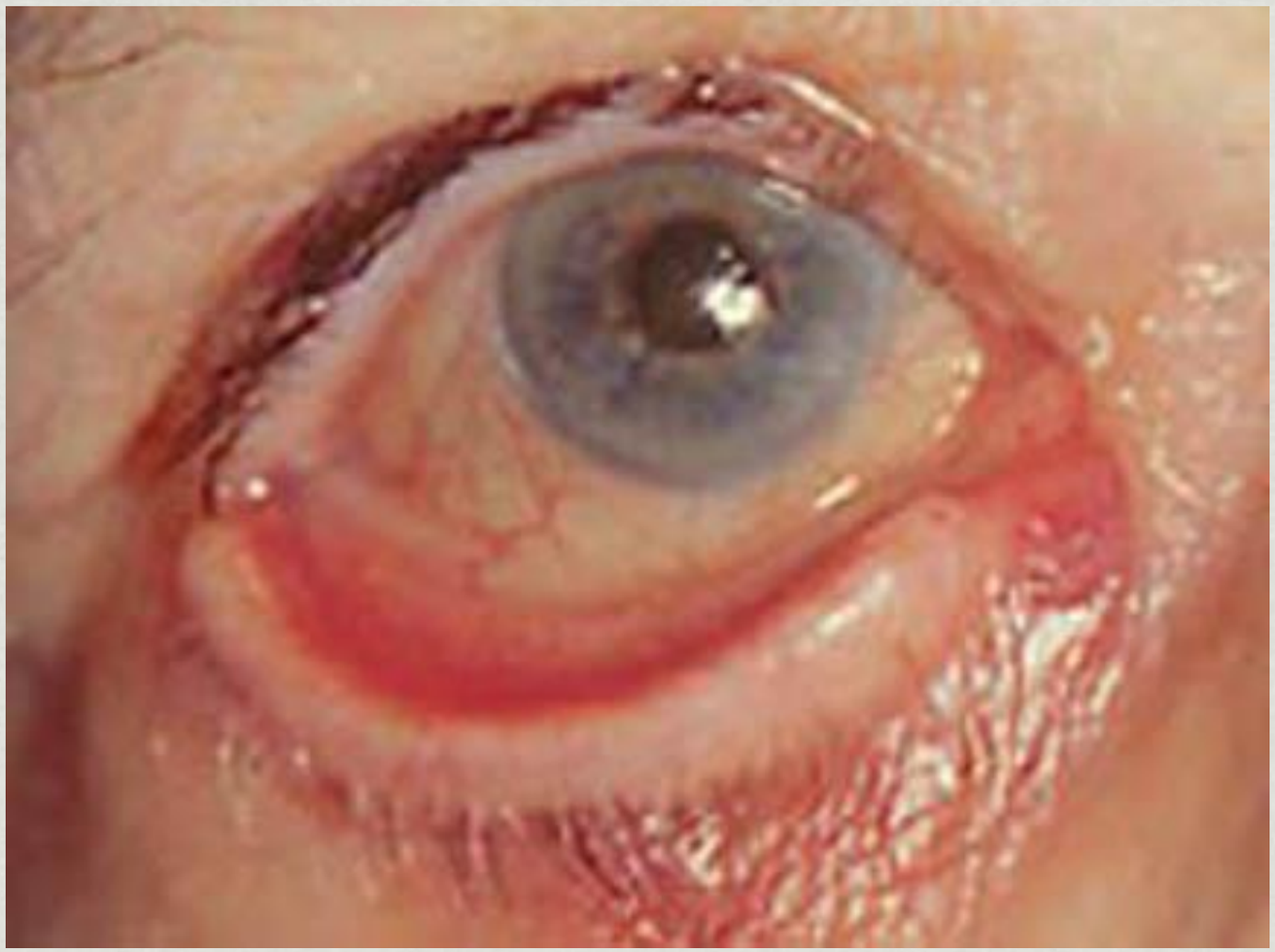



Lacrimal gland
Puncta
Common canaliculus
Lacrimal sac
Canaliculus
Nasolacrimal duct
LACRIMAL SYSTEM

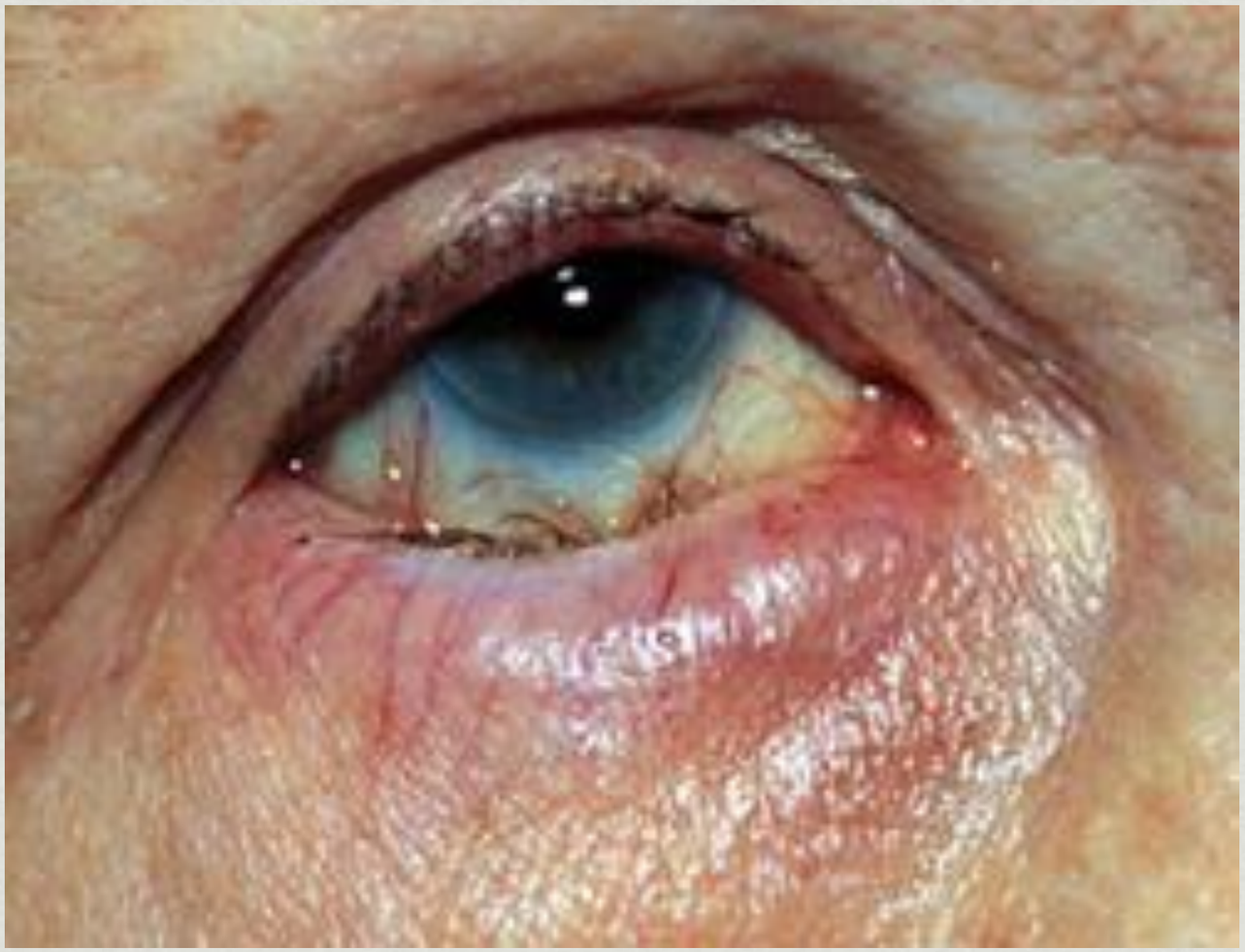
Nasal-lacrimal duct Obstruction

- Epiphora (Tearing)
- Recurrent bacterial conjunctivitis
- Often history of facial trauma
- TREATMENT: DCR

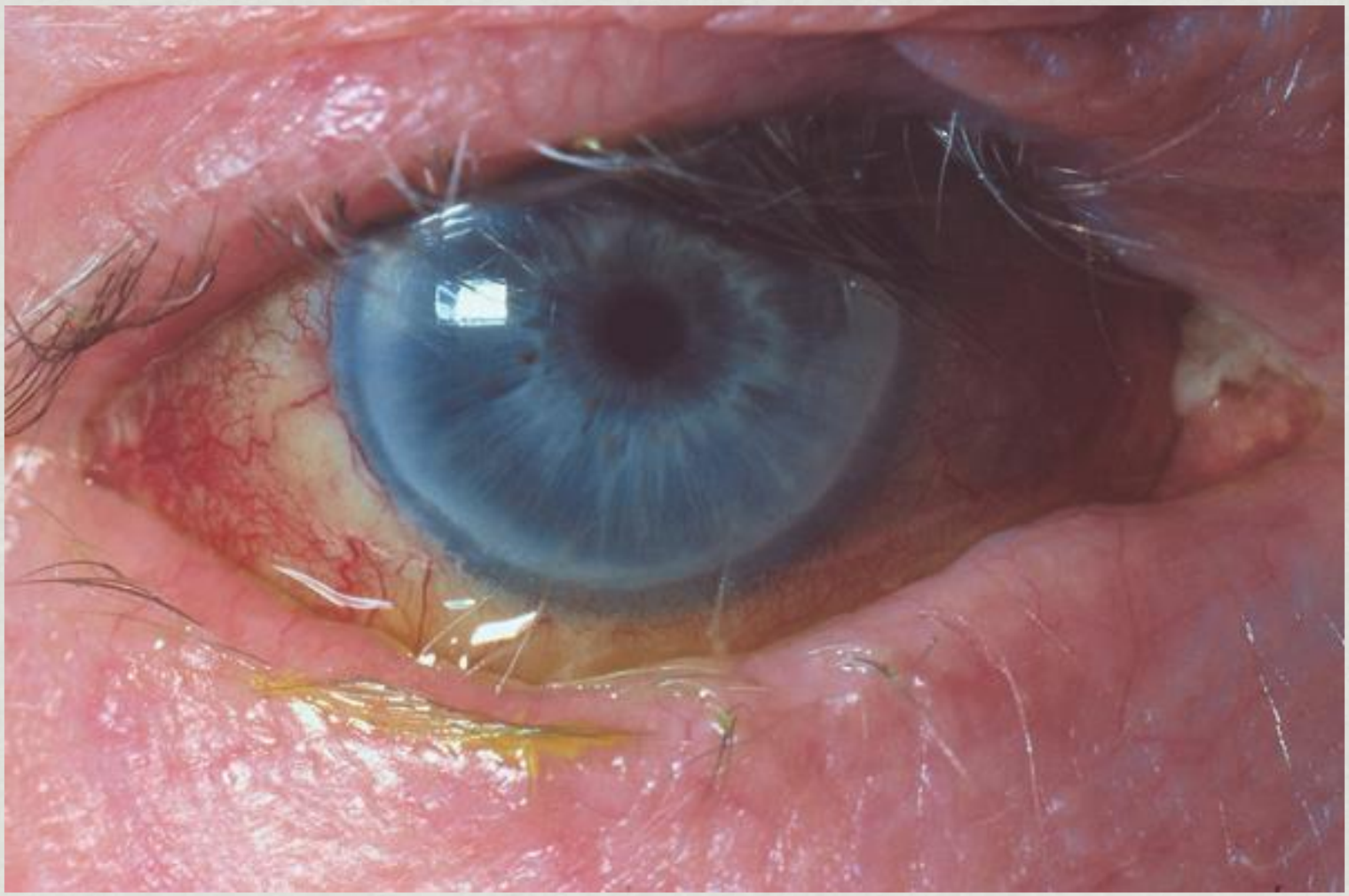
Ectropion



Entropion



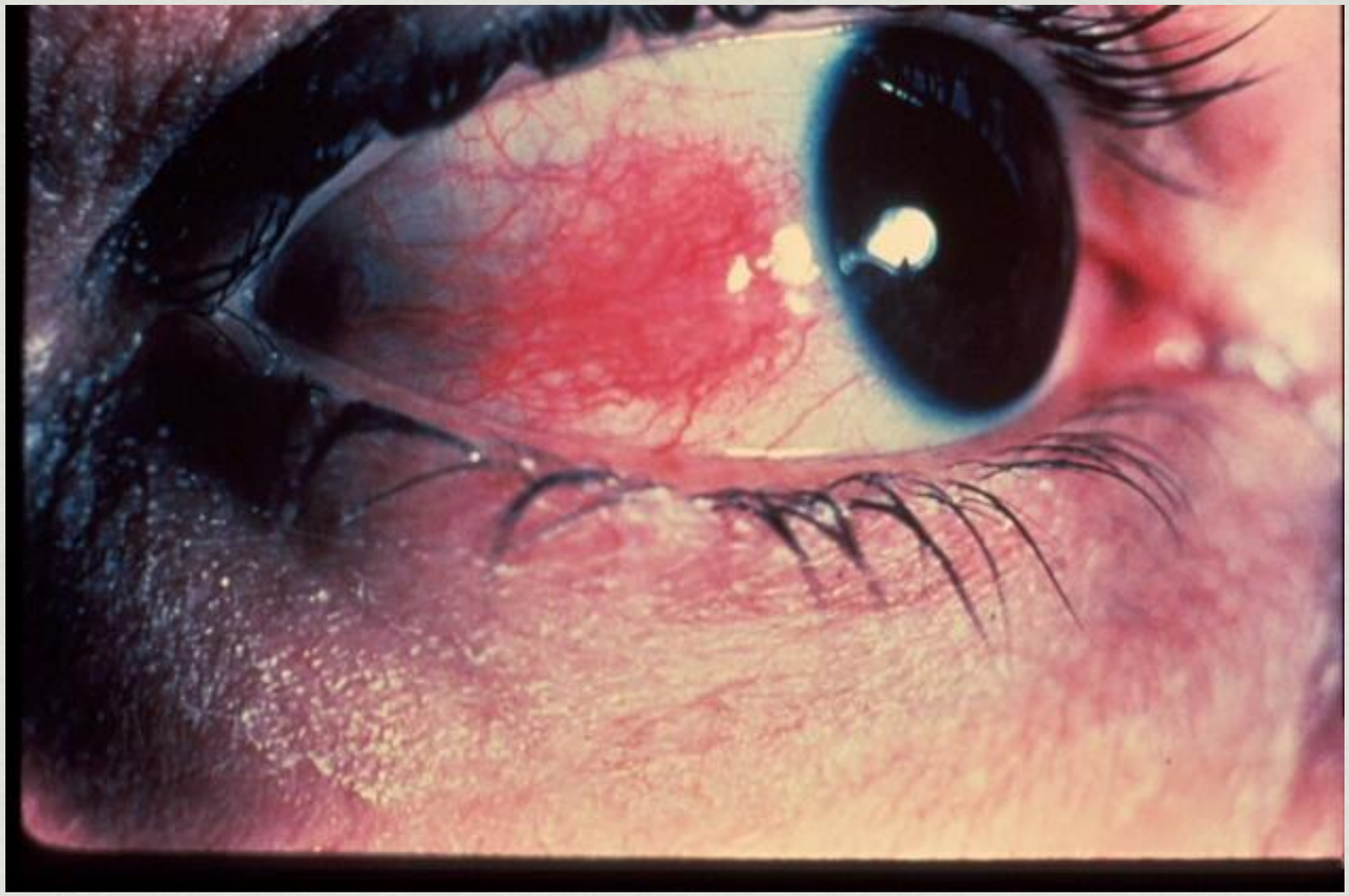
Trichiasis



Conjunctiva & Sclera

- Look at the bulbar (the eye) & palpebral (inside of the lids) conjunctiva
- Injection & erythema; what is the distribution
- Discharge; watery, mucous or membranous
- What do I see?

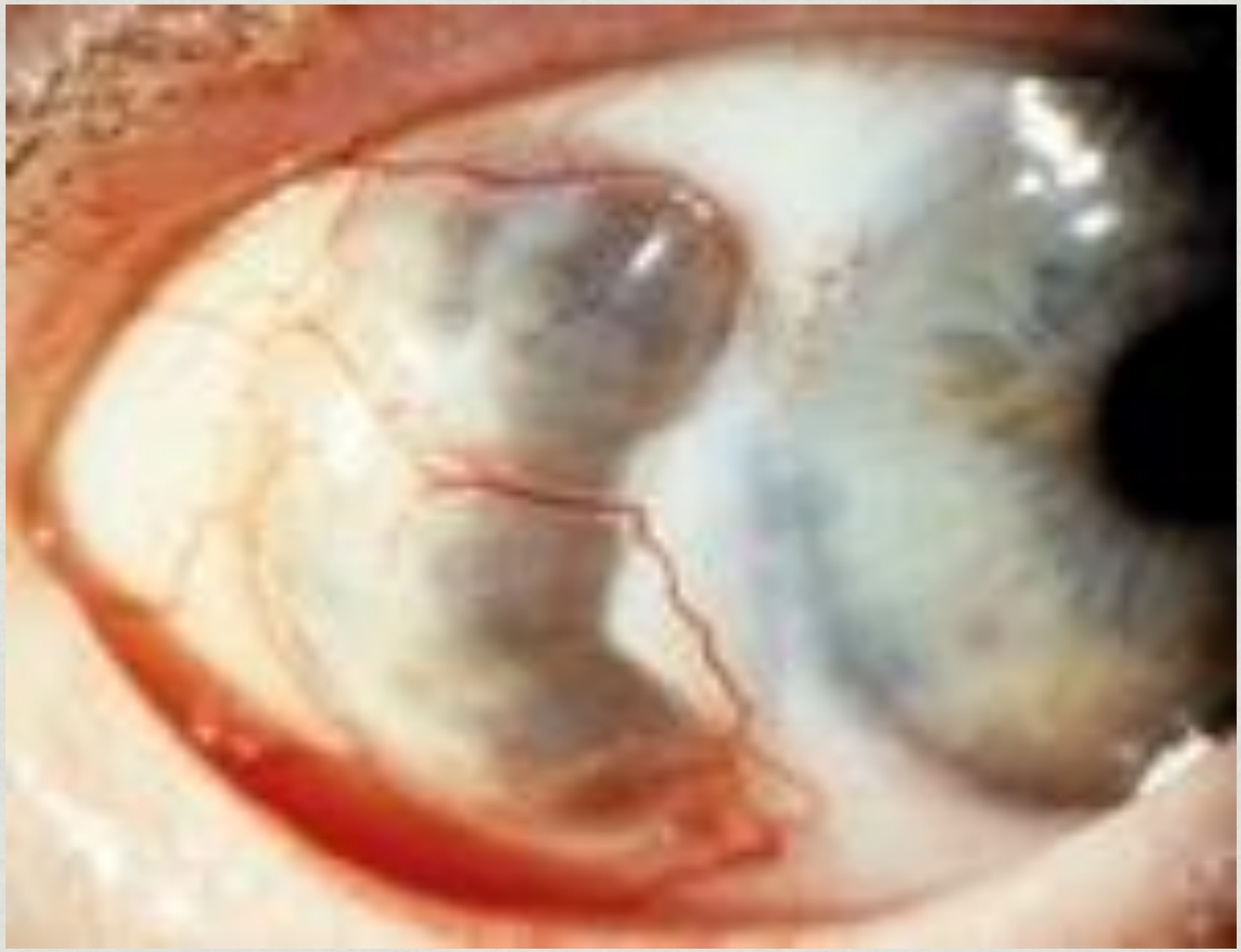
Scleritis or episcleritis



Scleritis

- Red painful eye with decreased vision
- Often associated with underlying collagen vascular disease
  - RA, Lupus
- Diffuse, Nodular, Necrotizing forms
- REFER!!
  - Requires systemic immunosuppression
  - Indocin, Prednisone, Cyclosporin, Cytoxan

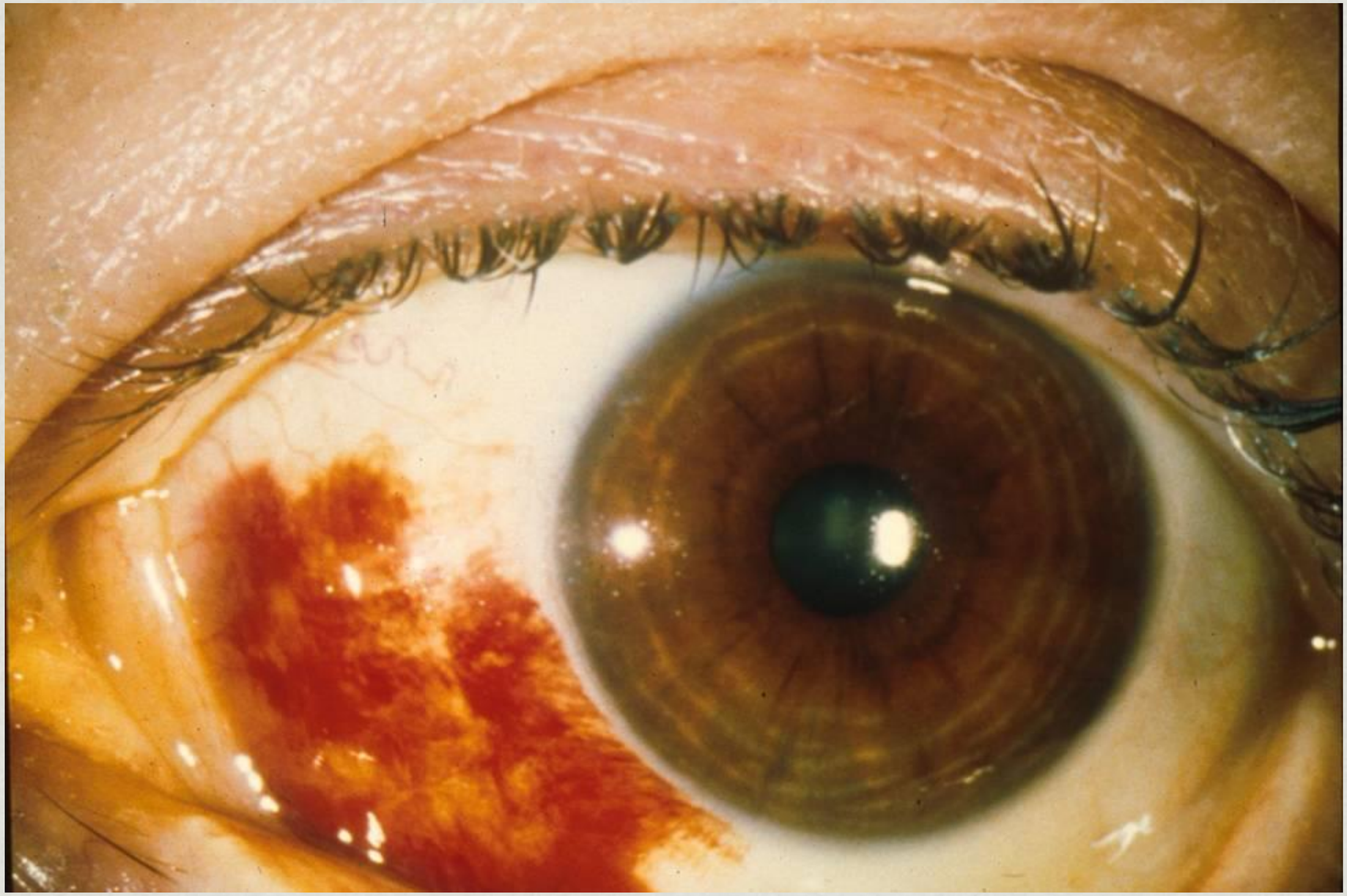
Rheumatoid Arthritis



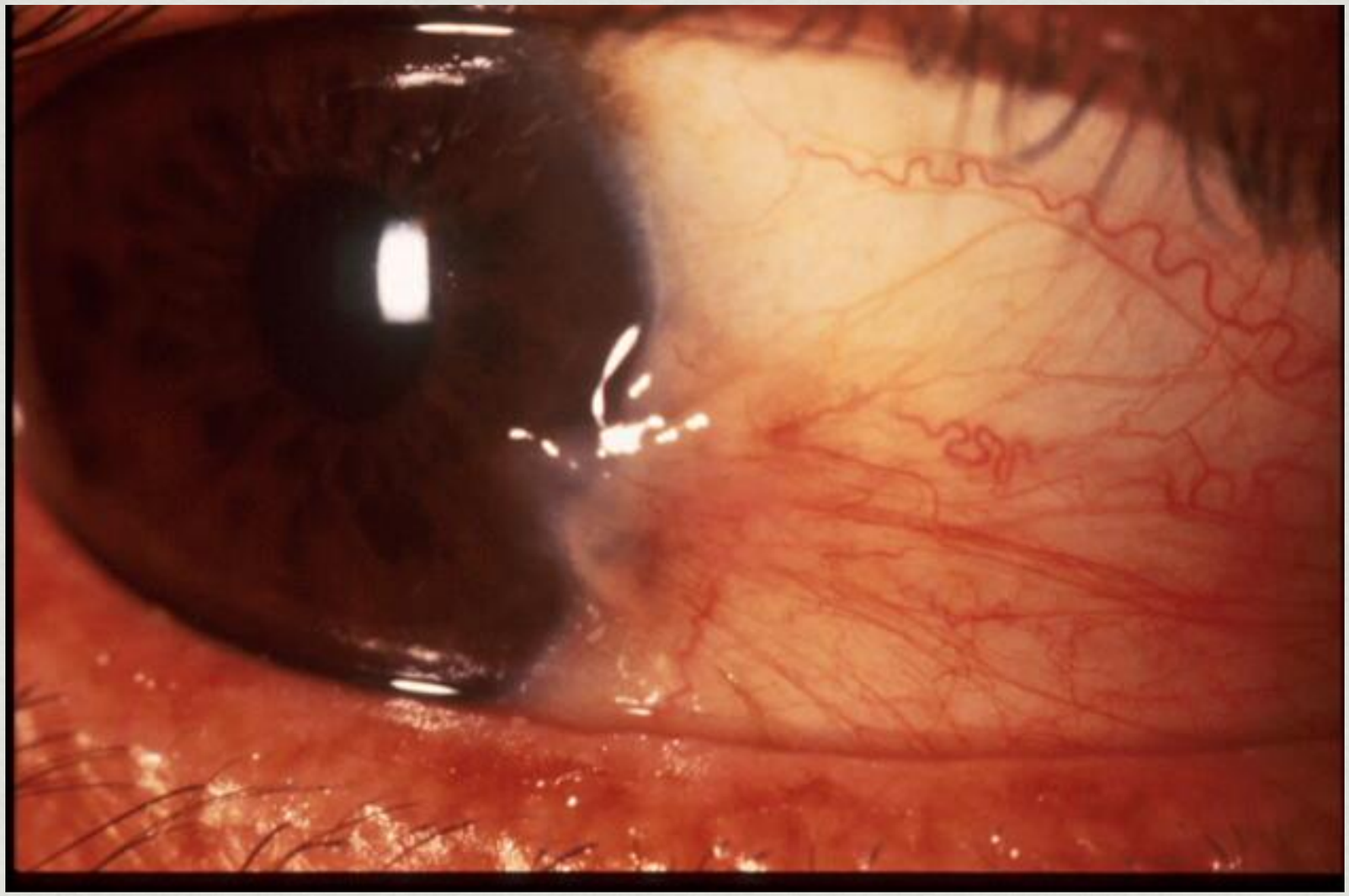
Subconjunctival Hemorrhage

- Dramatic but harmless
    - Sneezing,coughing, straining,eye rubbing
- Associated with anticoagulation
    - Aspirin
- If no obvious cause and associated with bruising or repetive than:CBC, Platelet count, Bleeding time, PT/PTT

Subconjunctival Hemorrhage



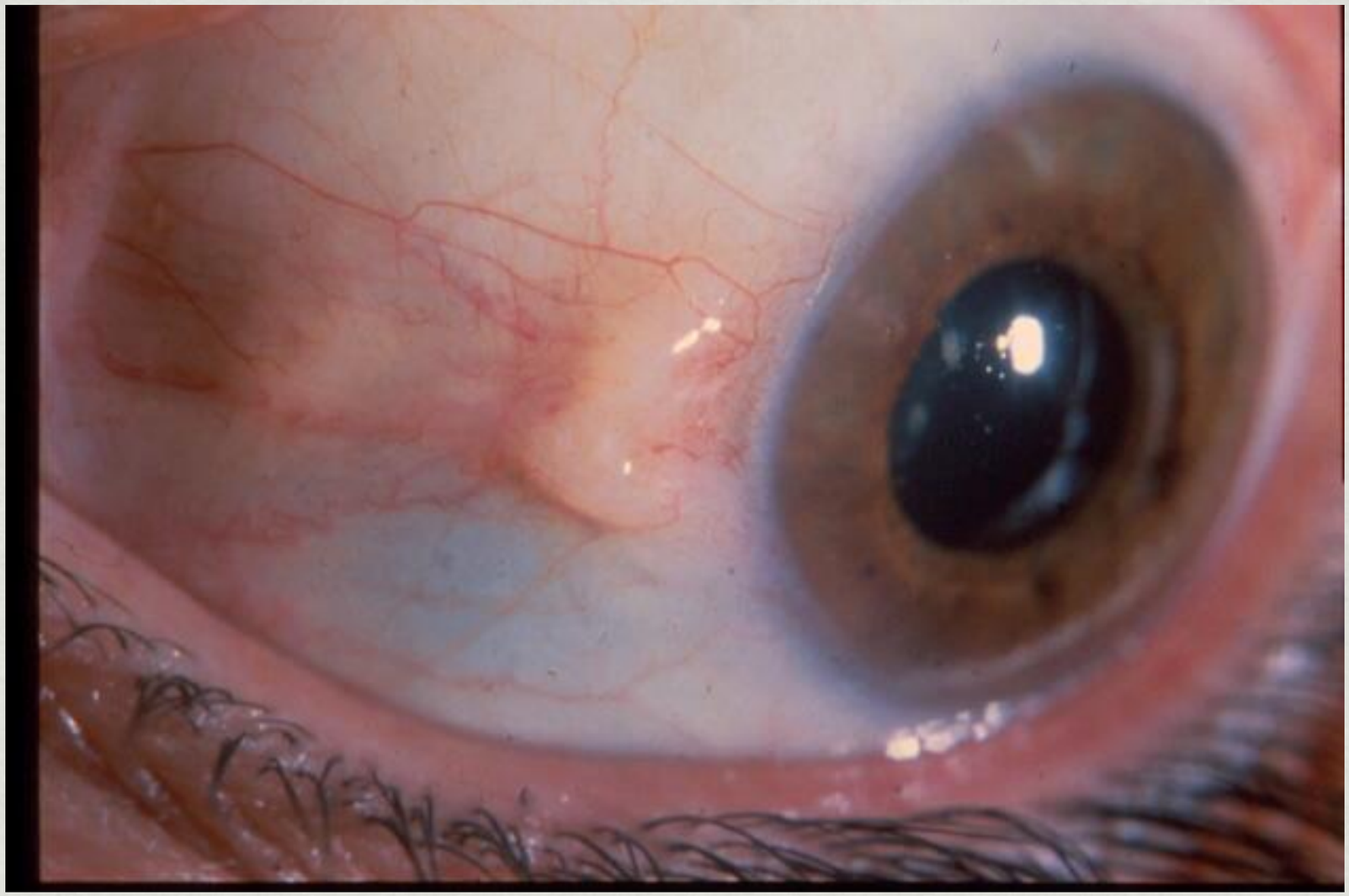
Pterygium



Pterygium

- Latin for wing
- Benign fibrovascular tumor (UV induced)
  - Elastoid degeneration (wrinkle)
- Often become inflamed
- Treatment:
  - Artificial Tears, Sunglasses, **Short term** use of vasoconstrictors
  - Refer if large or conservative Rx fails
    - Conjunctival Autograft with Tisseel Glue

Pingueculum

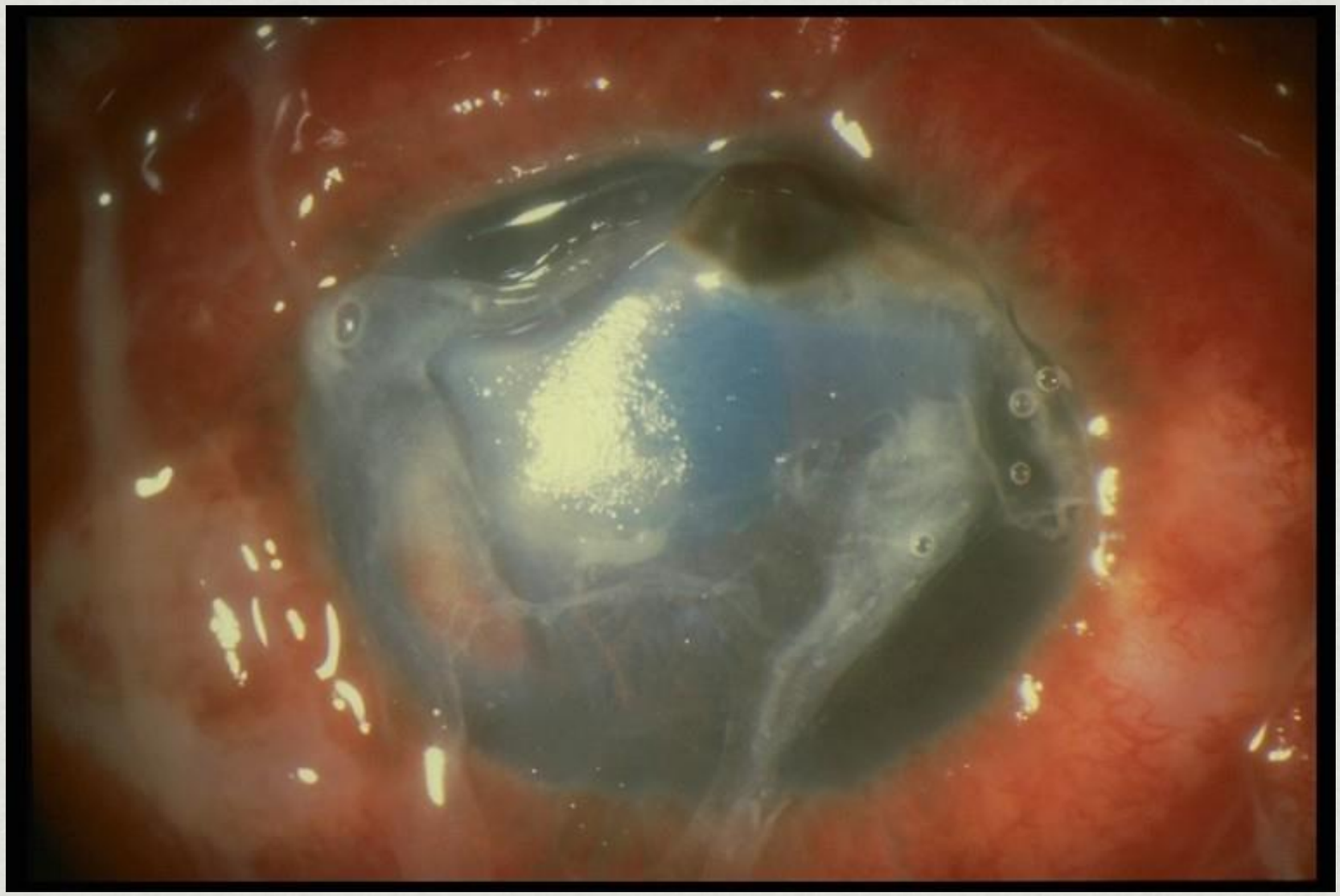


Bacterial Conjunctivitis

Conjunctivitis: Bacterial

- Redness and mucopurulent discharge
  - Minimal discomfort
  - Vision minimally affected
- Treatment
  - Will resolve without treatment
  - Polytrim (polymixin-trimethoprim) q 2 hours the first day then QID for 1 week

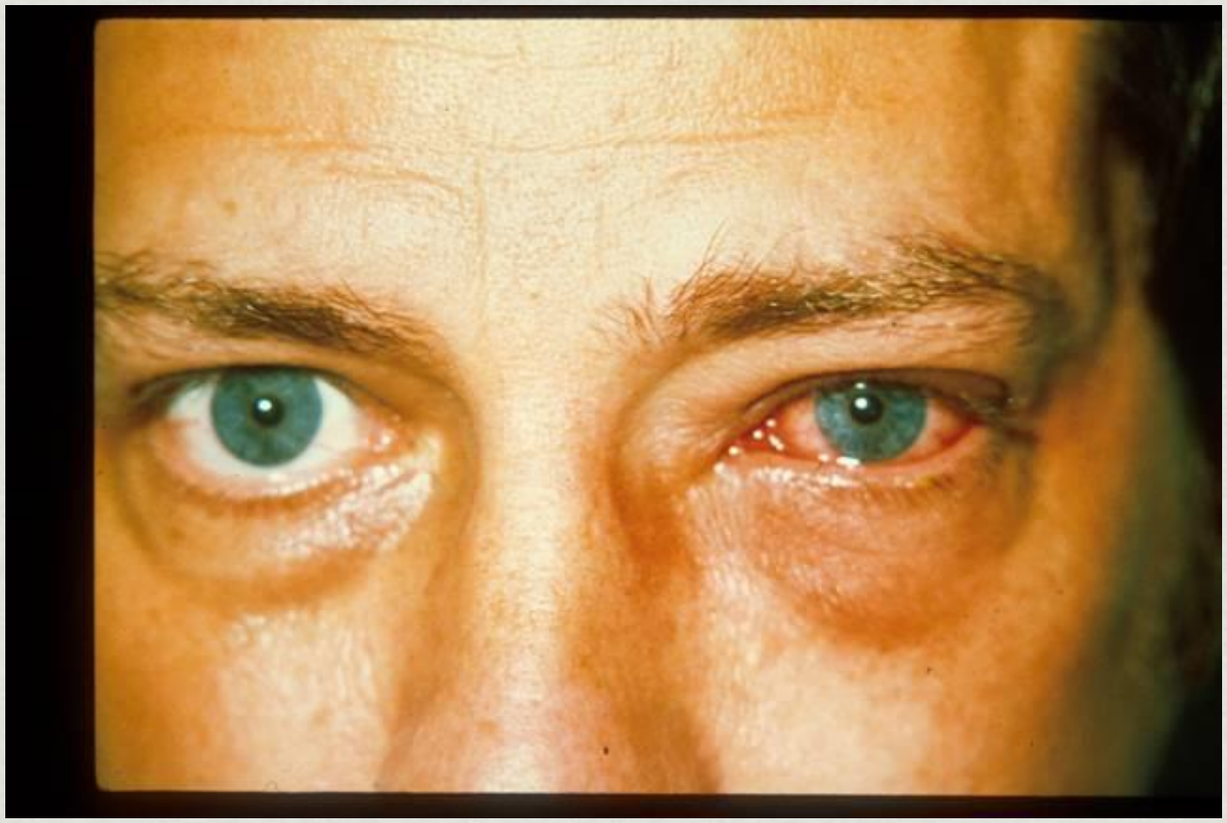
Gonoccocal Conjunctivitis



Hyperacute Purulent Conjunctivitis

- Sudden onset with rapid progression
- Bilateral

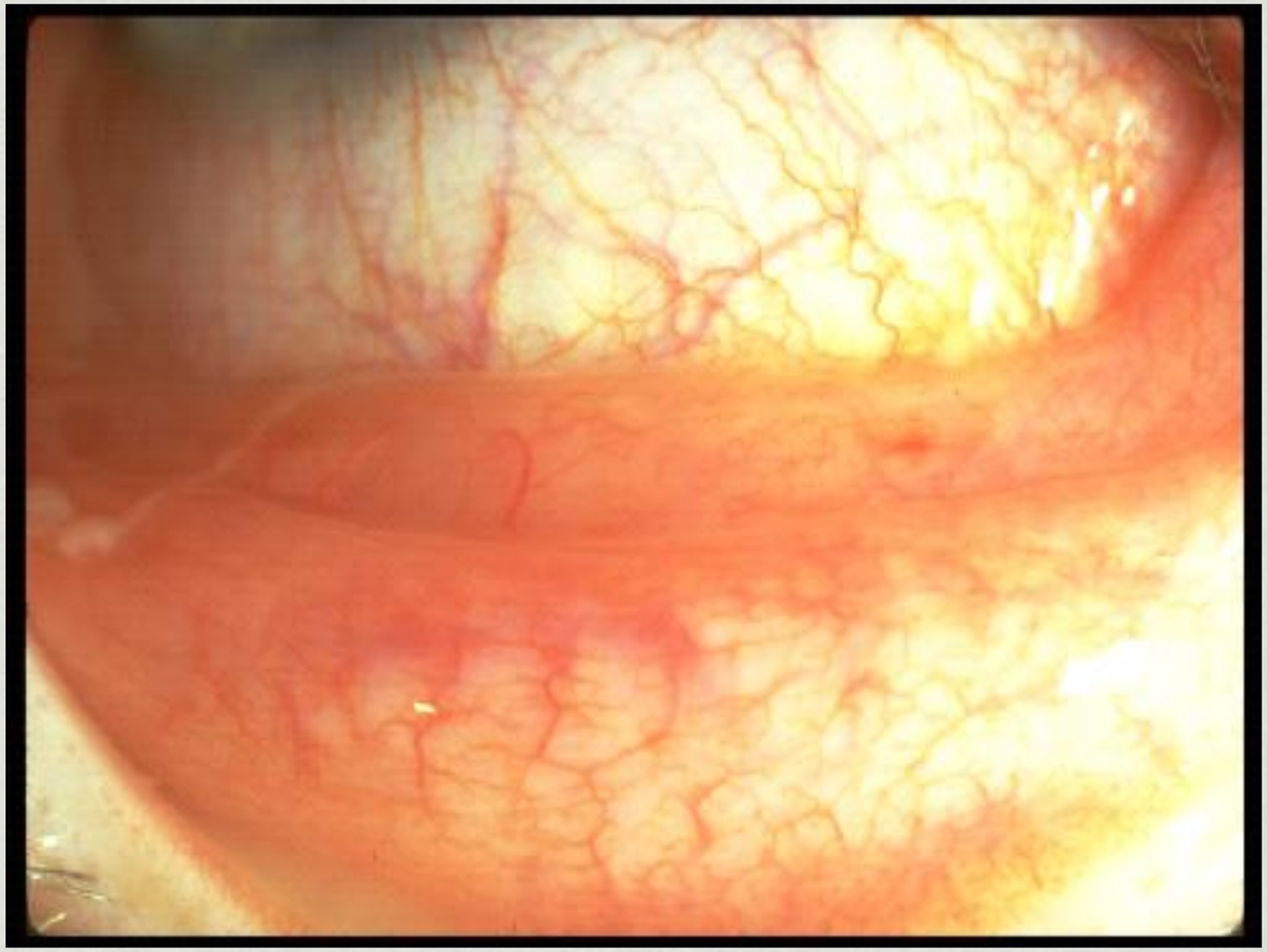
Case 4



Conjunctivits: Viral (EKC)

- URI
- History of contact
  - VERY CONTAGIOUS
- Sx’s: Photophobia, redness, watery discharge
  - Bilateral but asymmetric
  - Preauricalar node
  - Treatment: None--Avoid Topical Steroids!!

Allergic Conjunctivitis (Hay fever)



Conjuntivitis: Allergic

- ITCH
- SEASONAL
- Bilateral
- Mucopurlent discharge, no pre-auricular node
- Redness, Chemosis

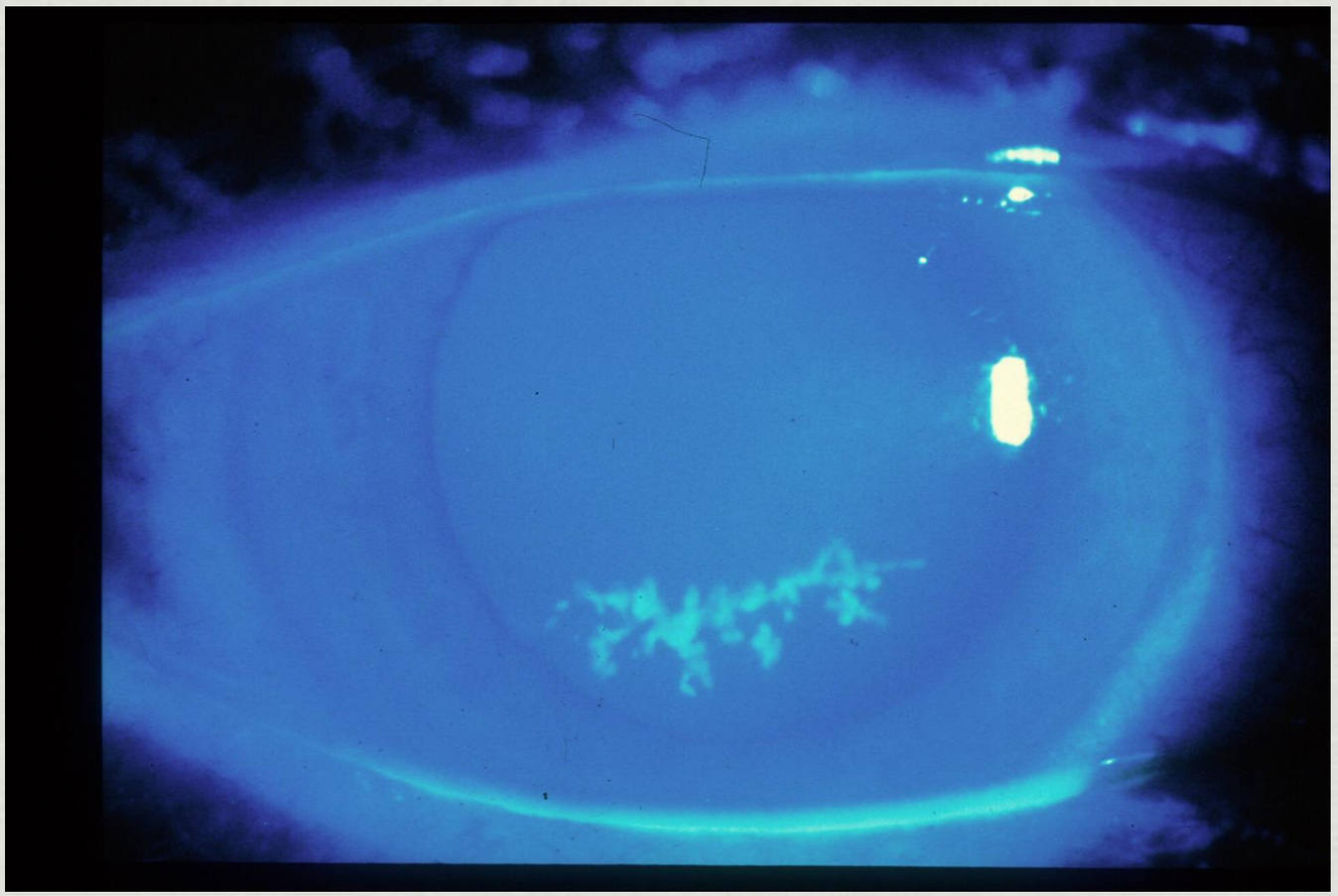
Allergic Conjunctivitis: Treatment

- Avoidance
- Associated with Dry Eye
  - Wash eyes out with tears
- Cold Compresses
- Ocular antihistamines/mast cell stabilizers
  - Patenol, Alocril, Zaditor

Cornea

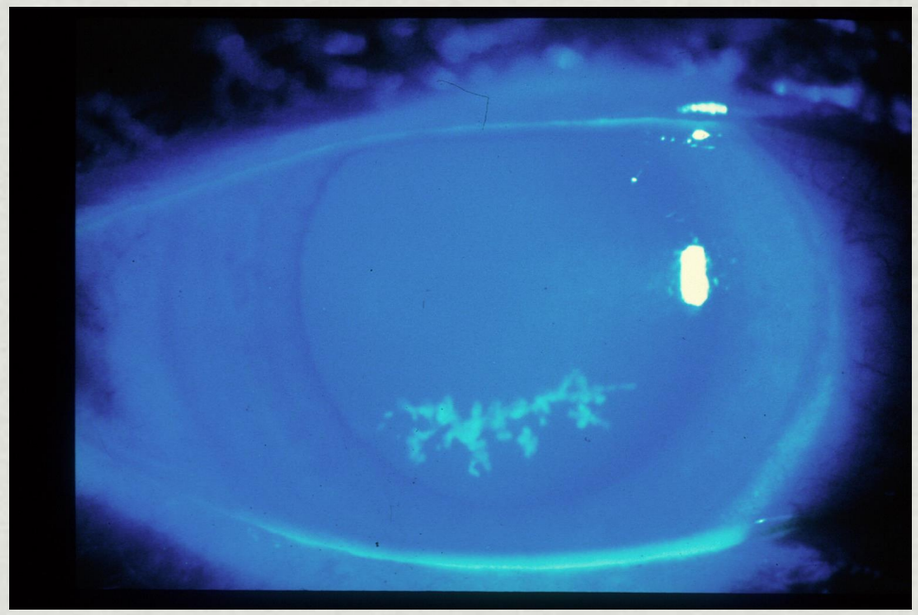
- Clarity
- Haze, or scars (including surgical)
- Pterygium
- Epithelium (use fluorescein dye & a cobalt blue filter to examine the epithelium for defects including punctate erosions, abrasions, ulcers, dendrites)
- What do I see?

Case 5



Abrasion

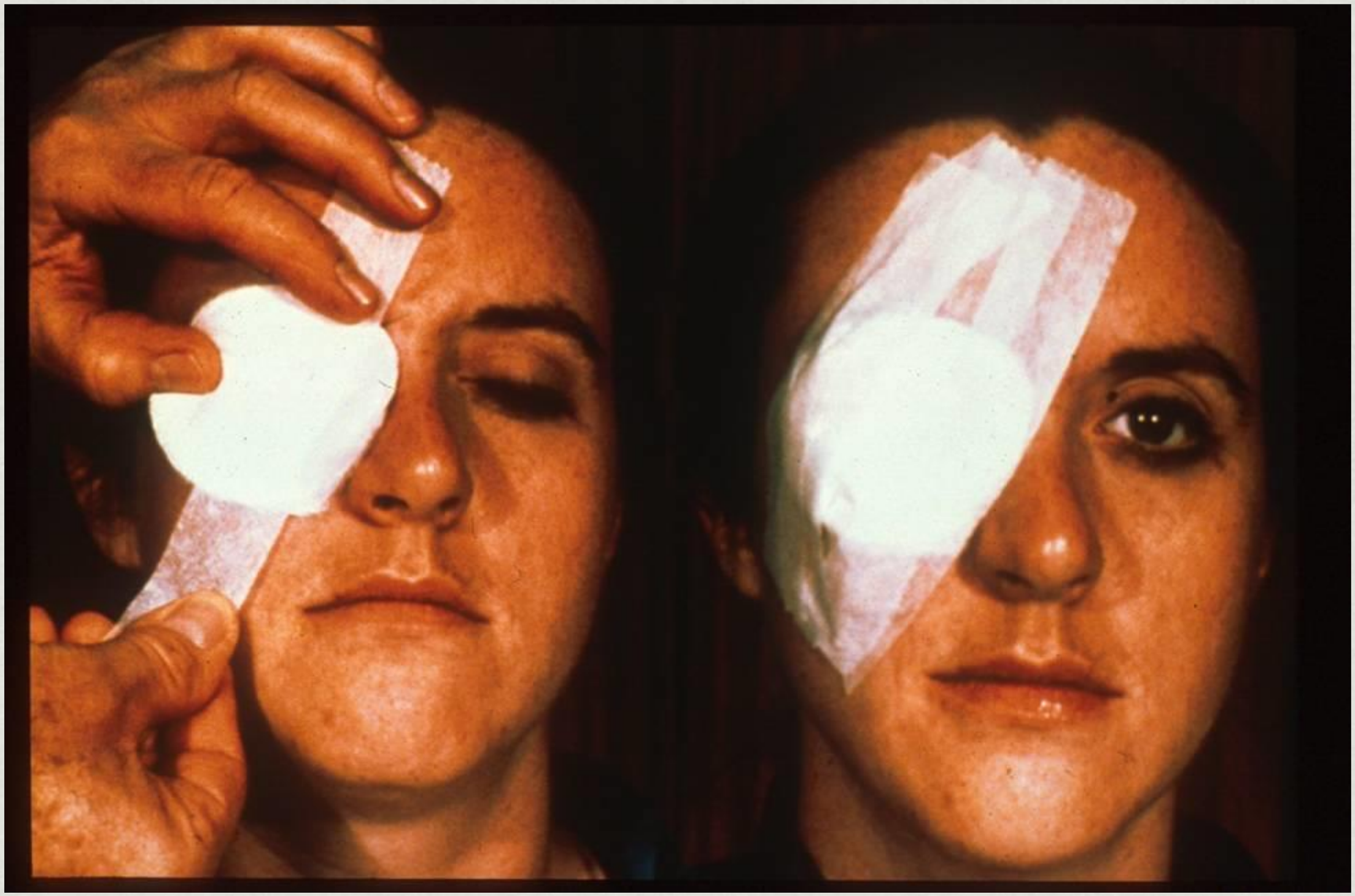
- History of Trauma or Contact Lens wear
  - Very Painful: More pain nerves per mm than any other location
- Diagnosis:
  - Drop of Proparacaine
  - Flouroscein lights up epithelial defect



Treatment

- Relief of Pain and Rapid Visual Rehabilitation
  - Antibiotic ointment, dilation, patch
  - Bandage Contact lens
    - With Antibiotic Drops
    - Topical NSAID: Acular or Voltaren
- Recommend Follow-up (Infection)

Patching



Dry Eye

- Postmenopausal women
- Sometimes associated with Arthritis
  - Lupus, RA, Sjorgren's
- Often related to climate/humidity
- Exacerbated by systemic medications
  - Diuretics (HCTZ), antihistamines, and anti-depressant

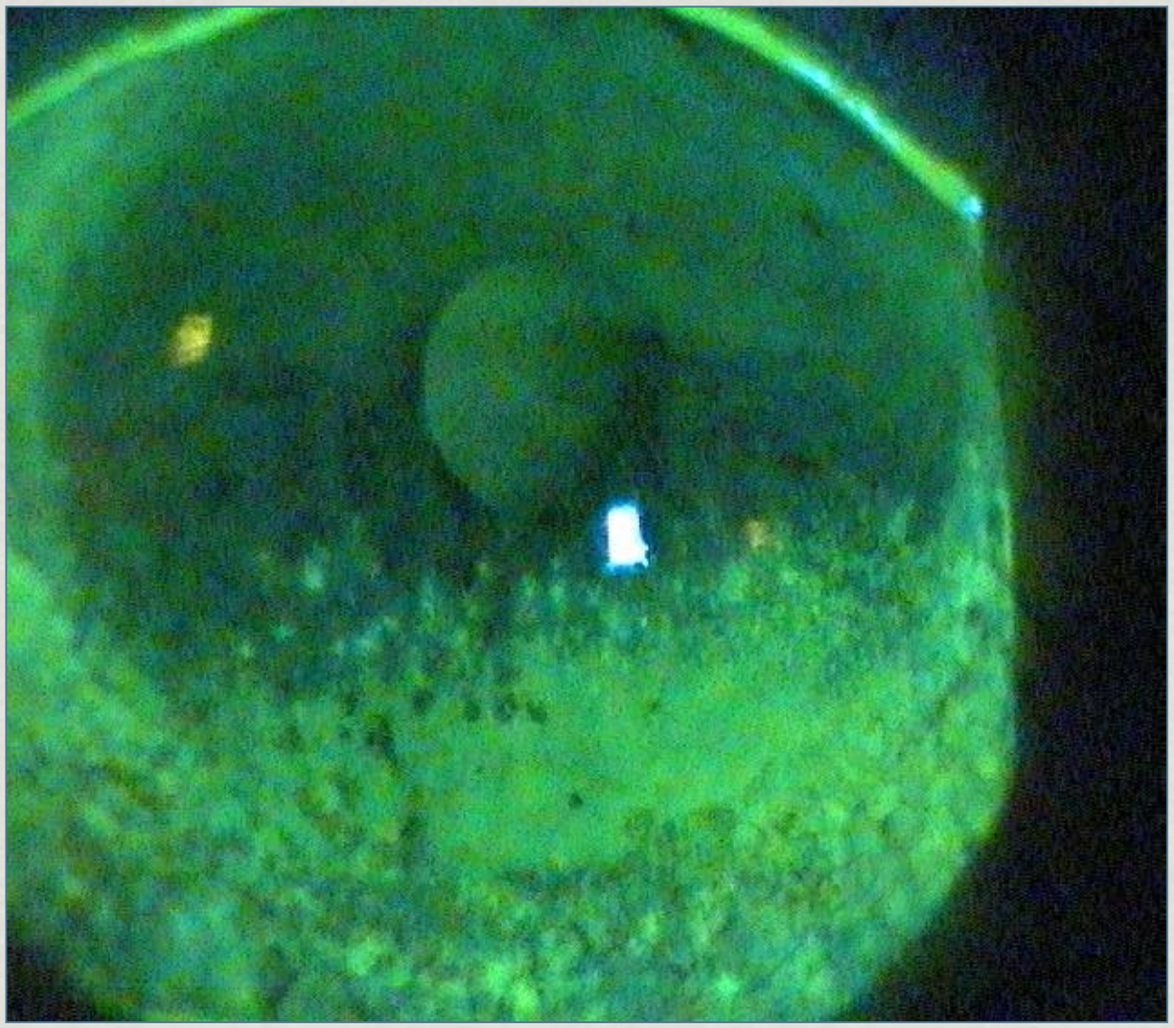
Dry Eye: Symptoms

- Foreign body sensation
- Photophobia
- May complain of redness
- Associated blepharitis or allergic conjunctivitis is common

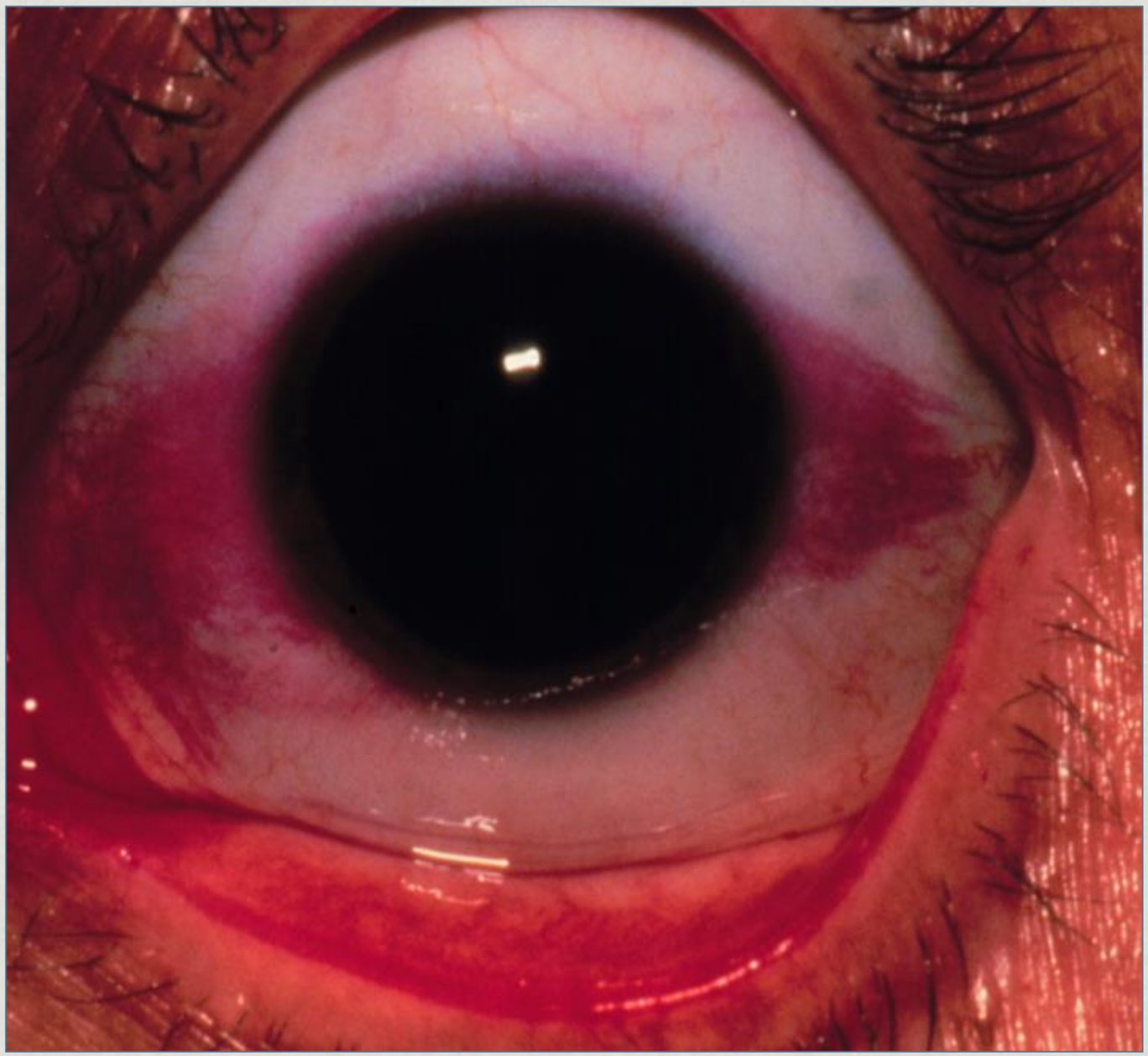
Dry Eye: Diagnosis

- Schirmer's test
- Fluorescein staining
- White, quiet eye is common

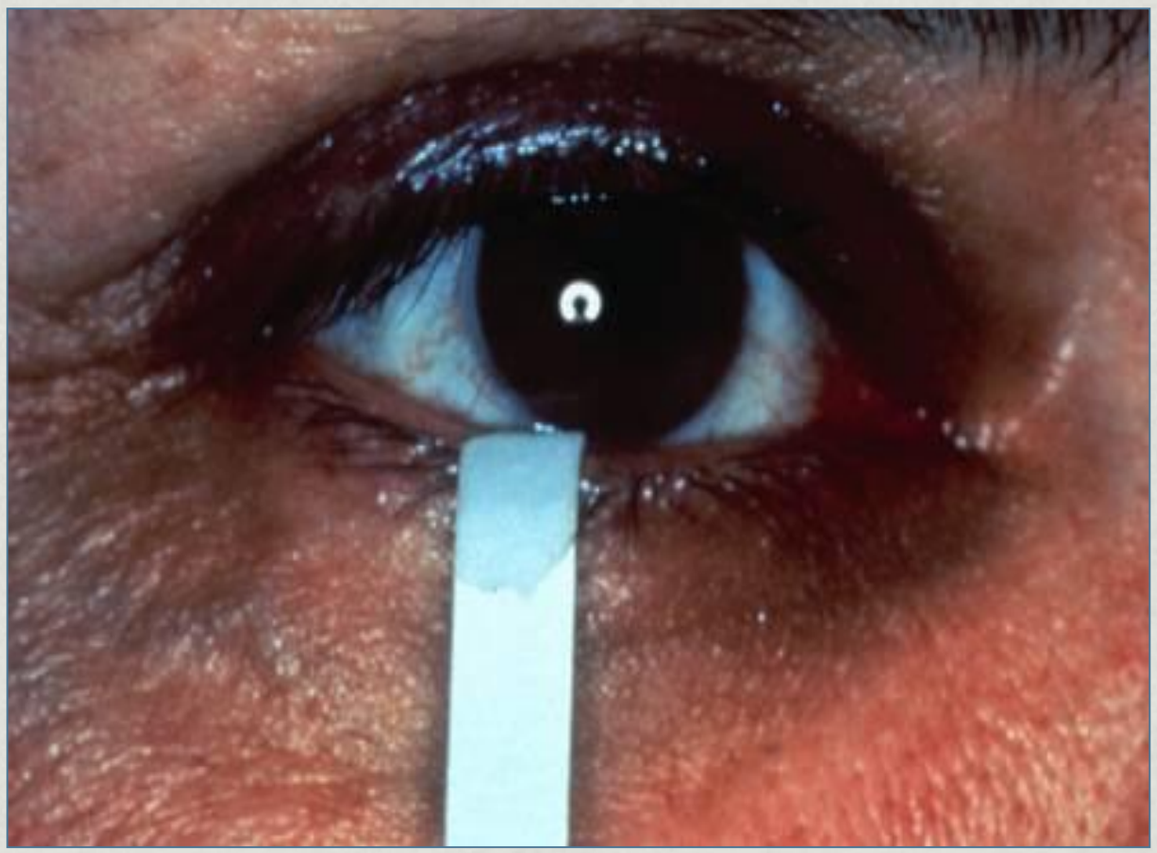
Flourescein Staining



Rose-Bengal



Schirmer Test



Without anesthesia

- Measures reflex tear secretion

With anesthesia

- Eliminates stimulated tearing

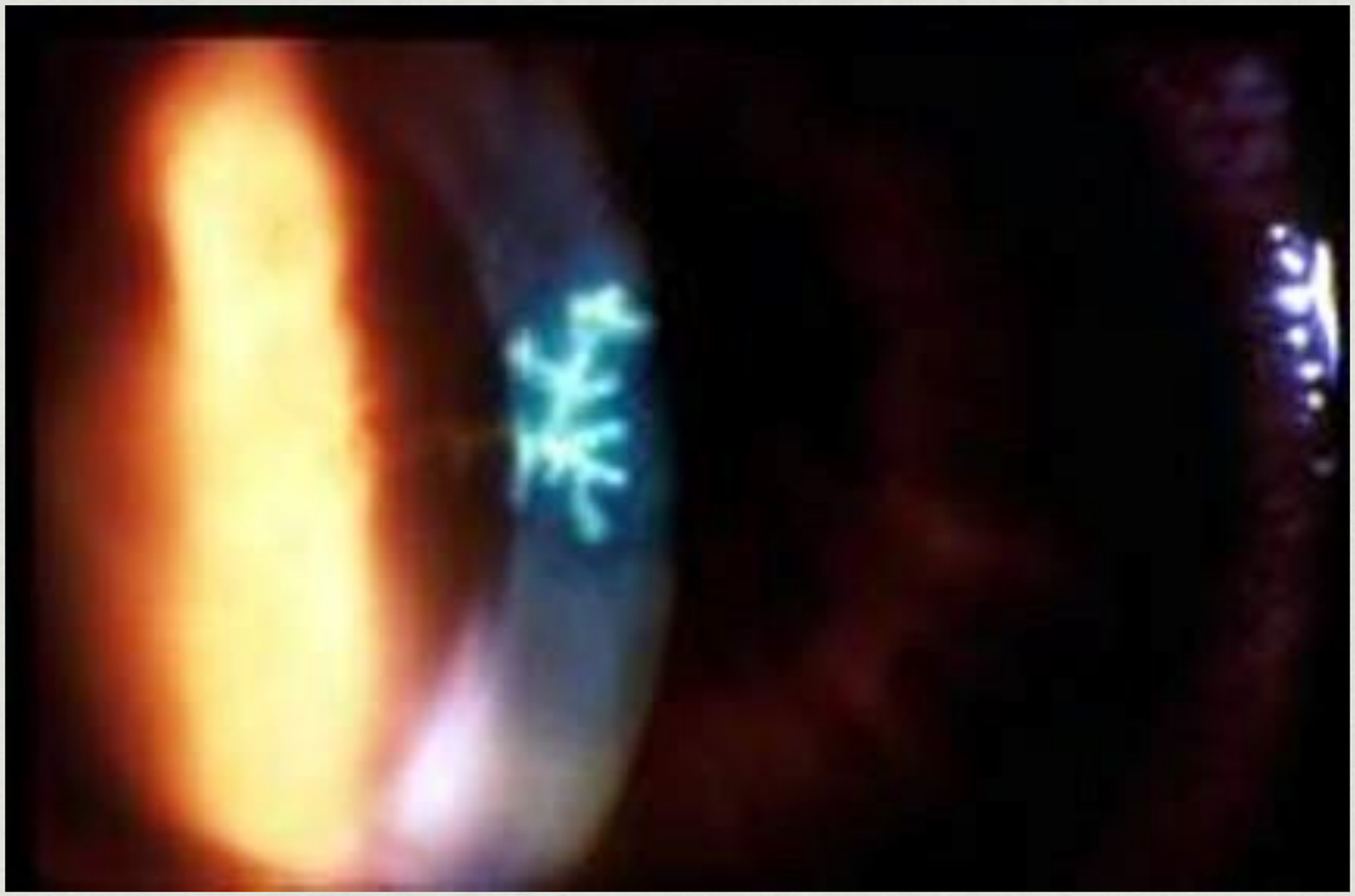
Dry Eye: Treatment

- Artificial Tears: (Genteal,Theratears,Systane)
  - Watch for preservative toxicity (BAK)
- Saturation therapy
- Preservative free drops
  - If using more than 4/day
- Consider punctal occlusion or Restasis (Cyclosporine)

Restasis

- Cyclosporine (.05%) in lipid vehicle
- Treats surface inflammation
  - Inhibits T-cell infiltration of lacricmal gland
- Burns on instillation
- Administer BID (1 vial for the day)

Dendrite



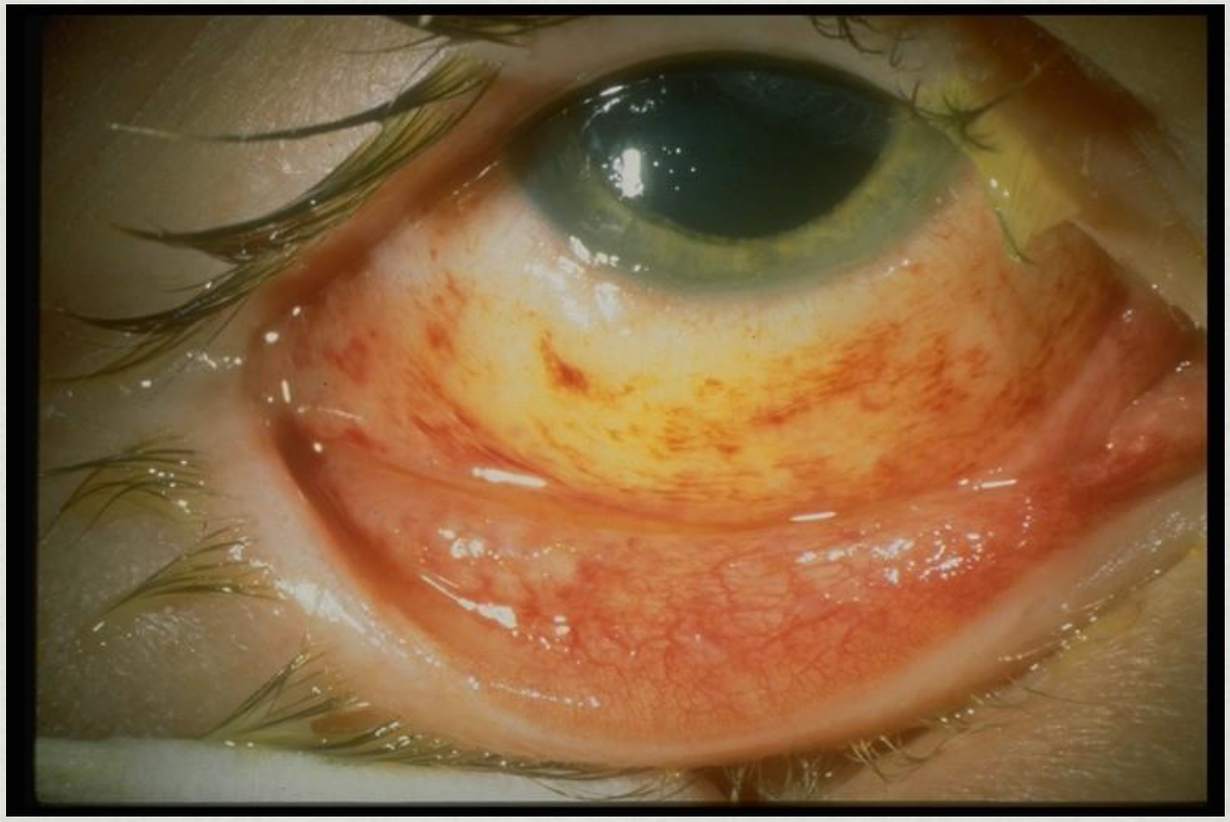
Treatment of HSV Keratitis

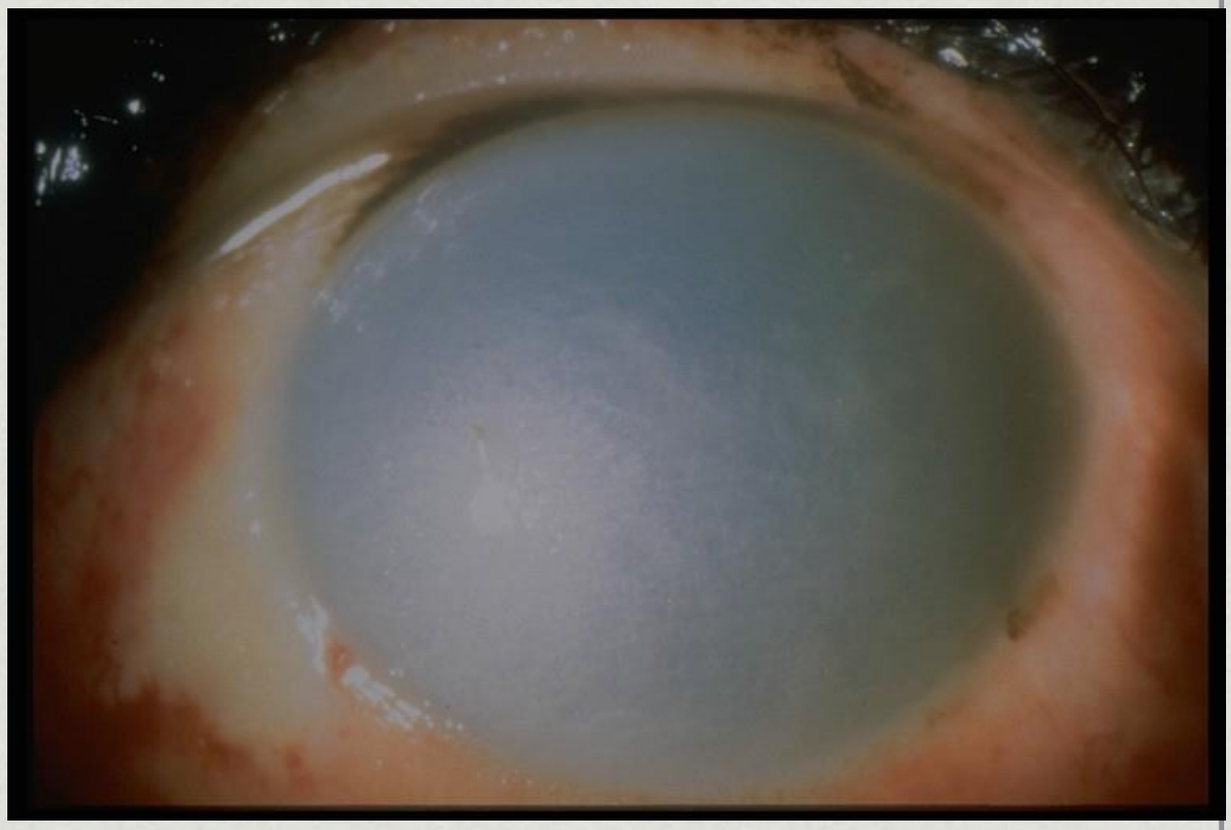
- Topical Antivirals (Viroptic) Trifluridine
- Systemic Acyclovir or Famvir if immunosuppressed or extensive associated skin lesions

Chemical Injuries

- Acid or Alkali?
  - Cation determines speed of penetration
    - NH_4^+, Na^+,K^+,Ca^{++} (OH)
- Battery Explosions
  - Chemical plus blunt force trauma
  - Foreign body

Chemical Injuries



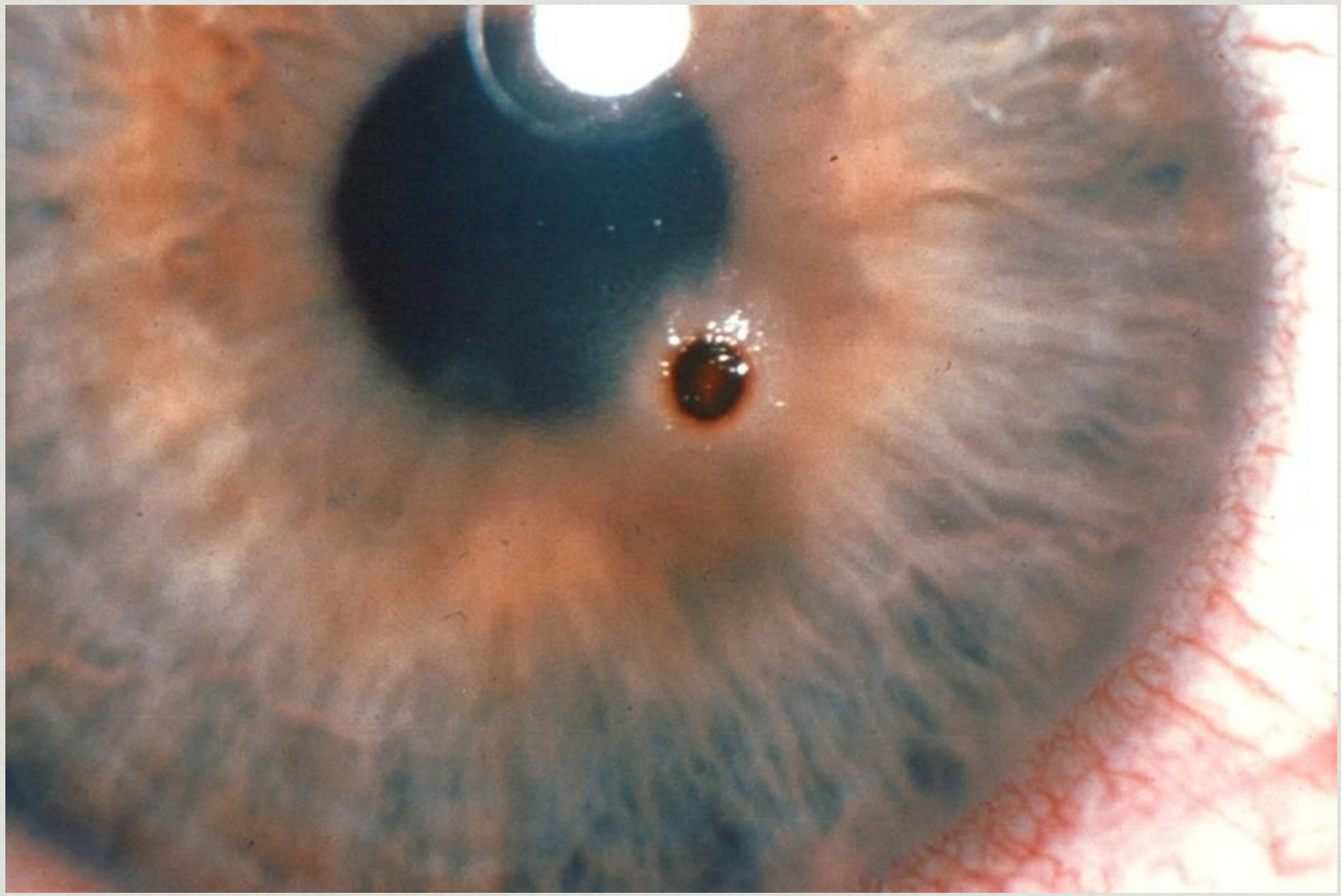


Chemical Injuries

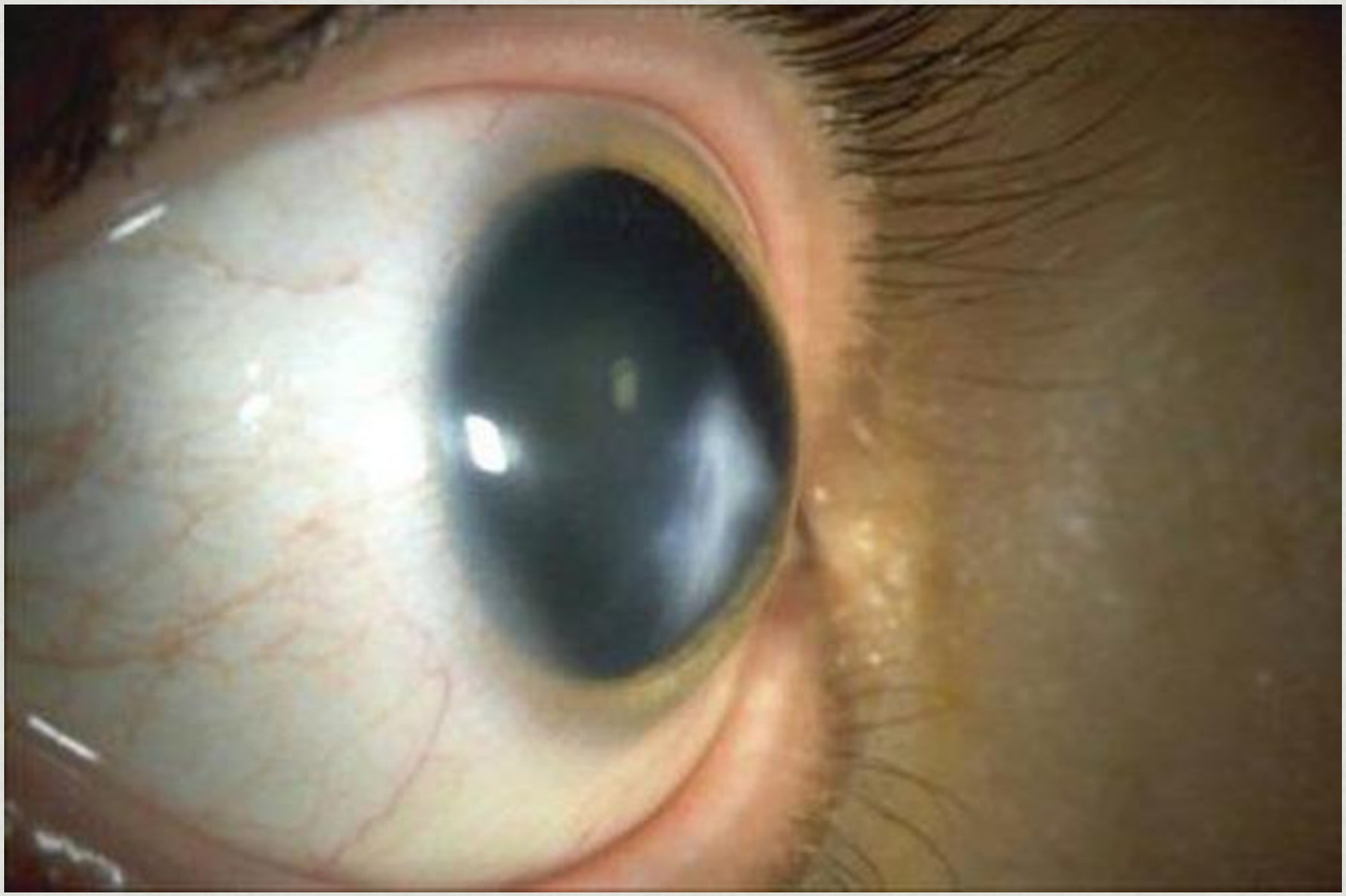
- Irrigate, Irrigate and Irrigate
  - Topical anesthetic, 7th nerve block helpful
- Prognosis determined by:
  - Type of chemical (acid vs. alkalai)
  - pH
  - Length of exposure
  - TIME BETWEEN EXPOSURE AND IRRIGATION

REFER as soon as possible

Corneal foreign body



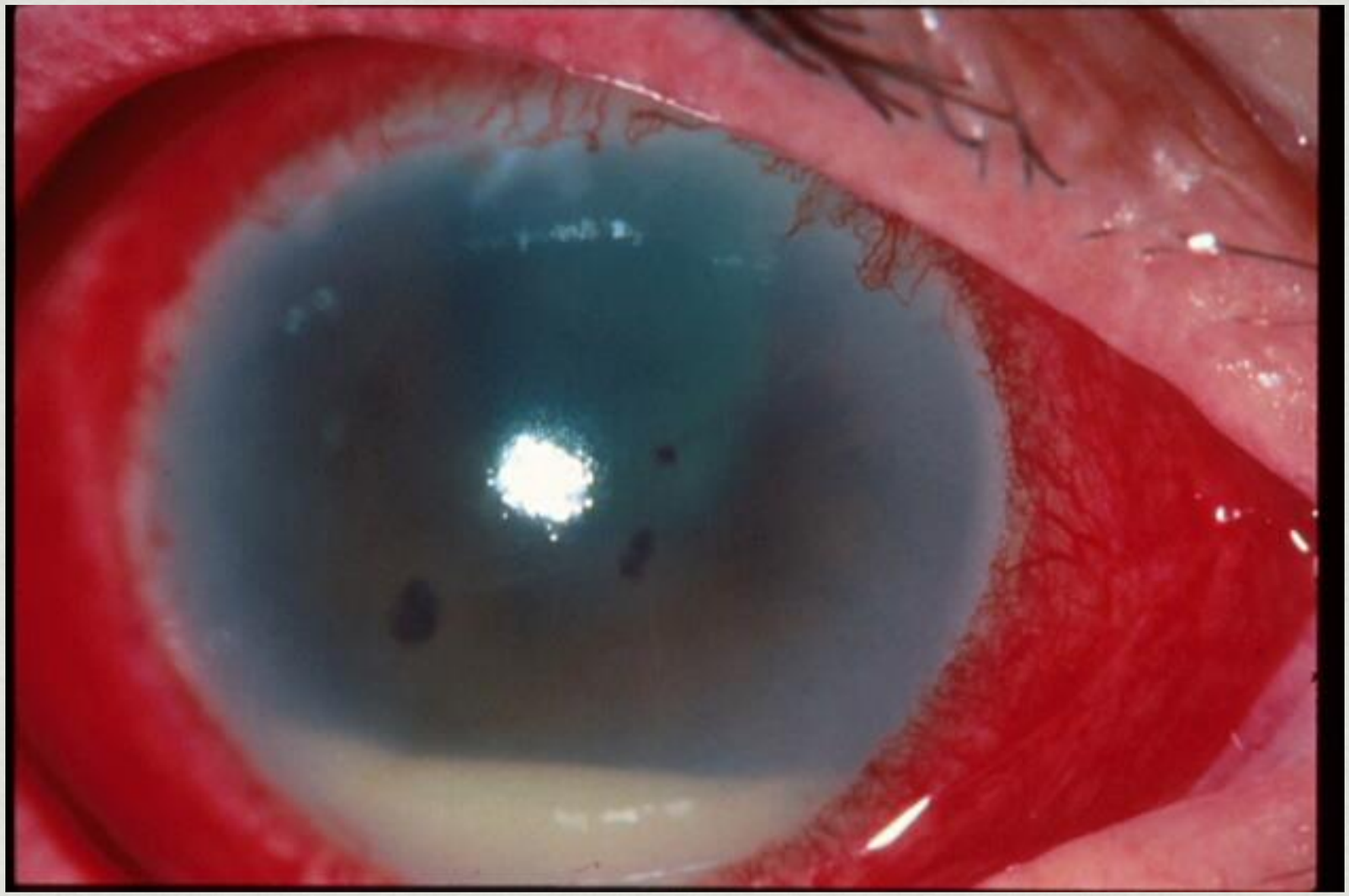
Corneal scar



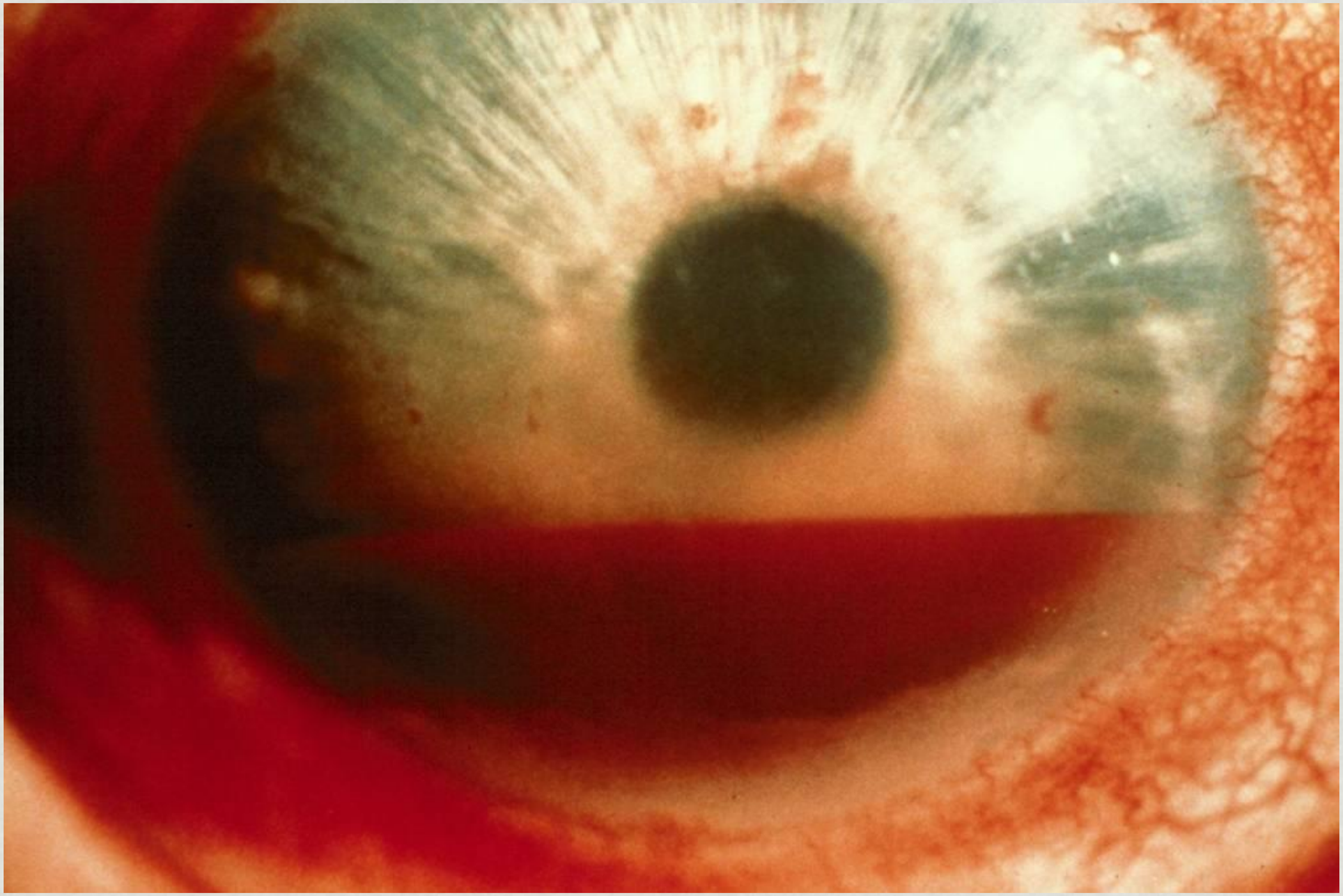
Anterior chamber

- Clarity; measured by cells (counted) & flare
- Depth

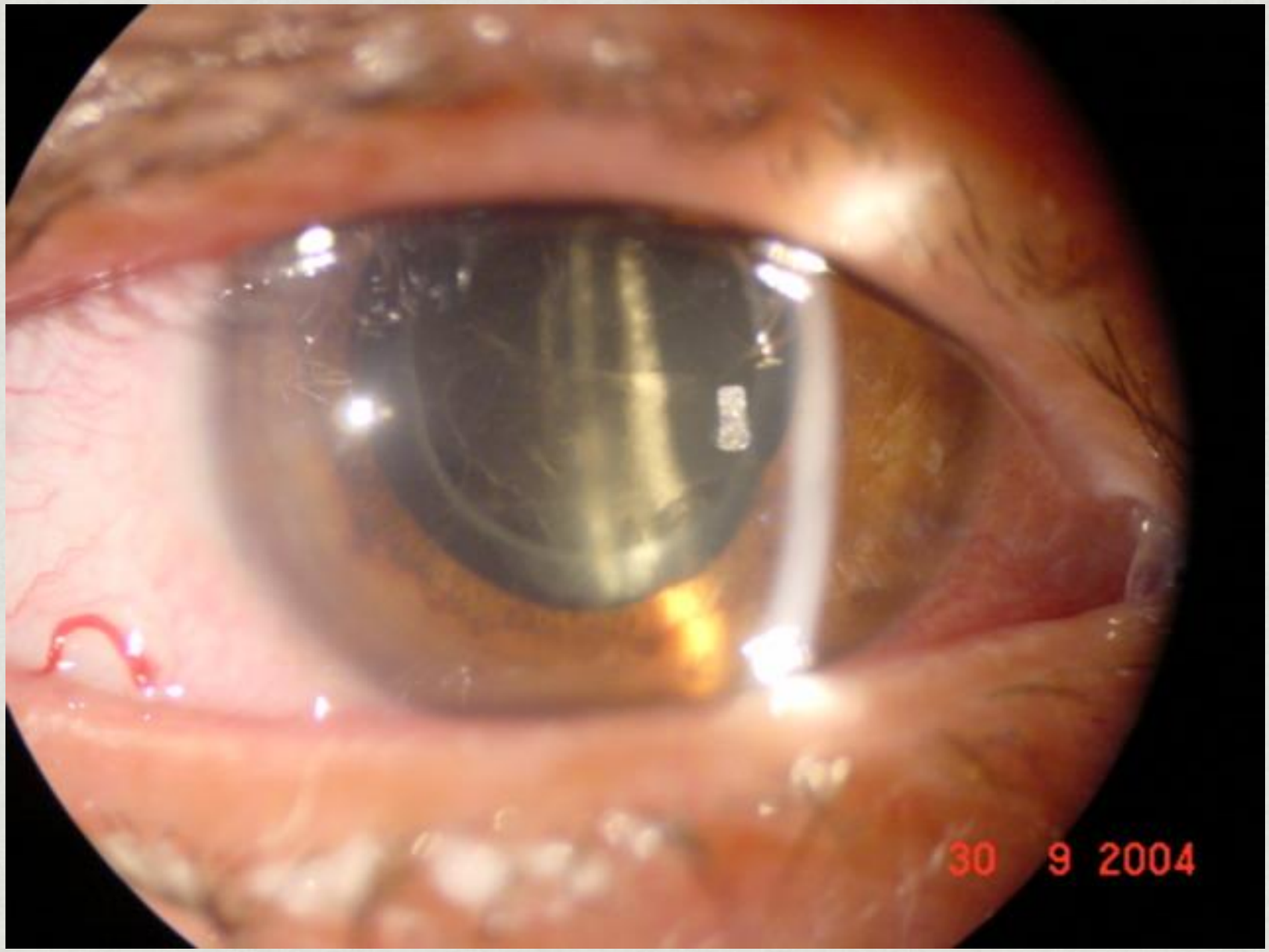
Hypopyon



Hyphema



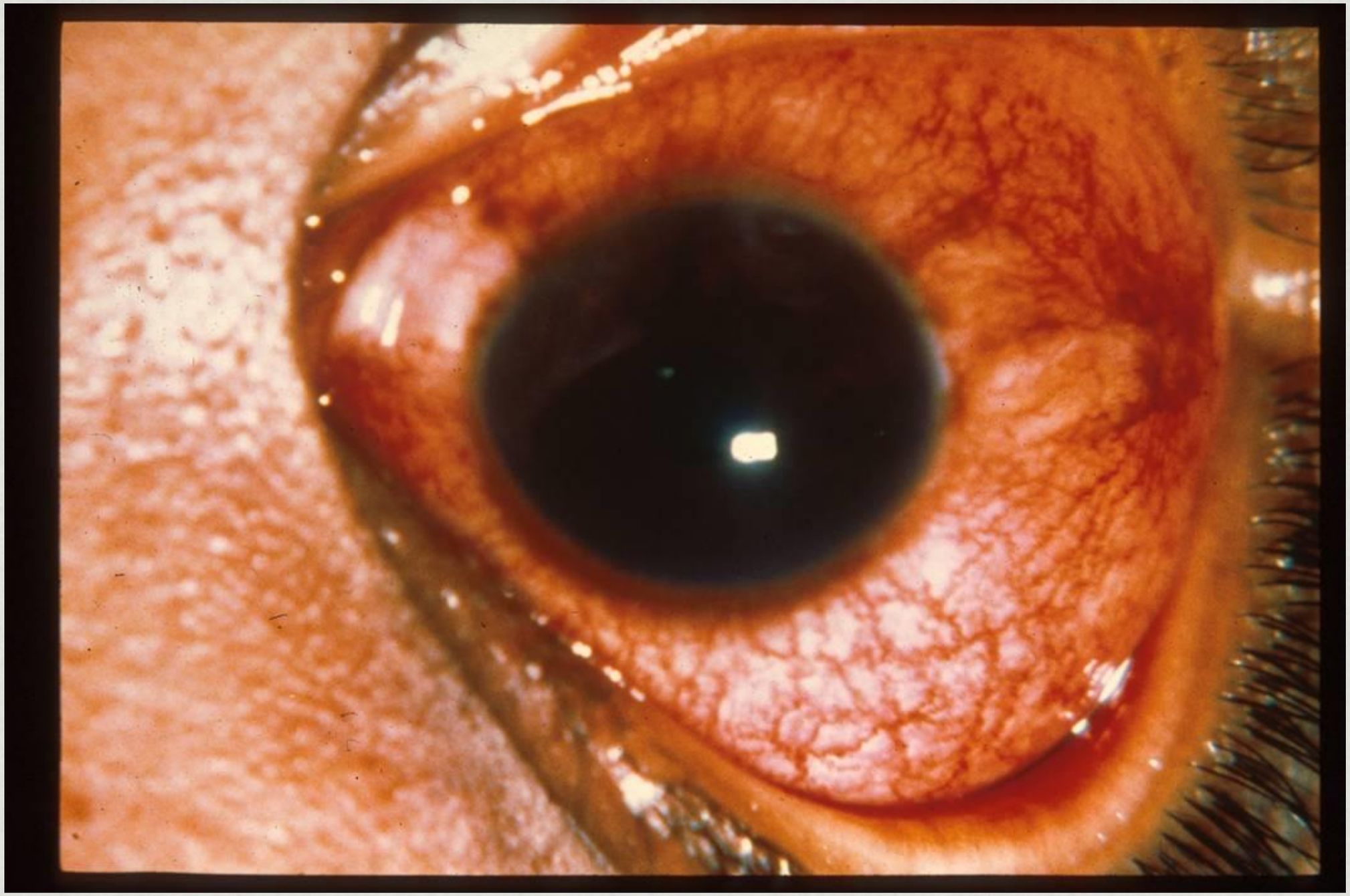
Cell & Flare



Iritis/Uveitus

- “Arthritis of the Eye”
  - Associated with Collagen Vascular disease
  - HLA-B27 associated
    - Crohn’s disease, RA, Lupus
- Sx’s: Photophobia, Floaters, Red Eye, **Pain, Decreased vision**
- Circumlimbal flush

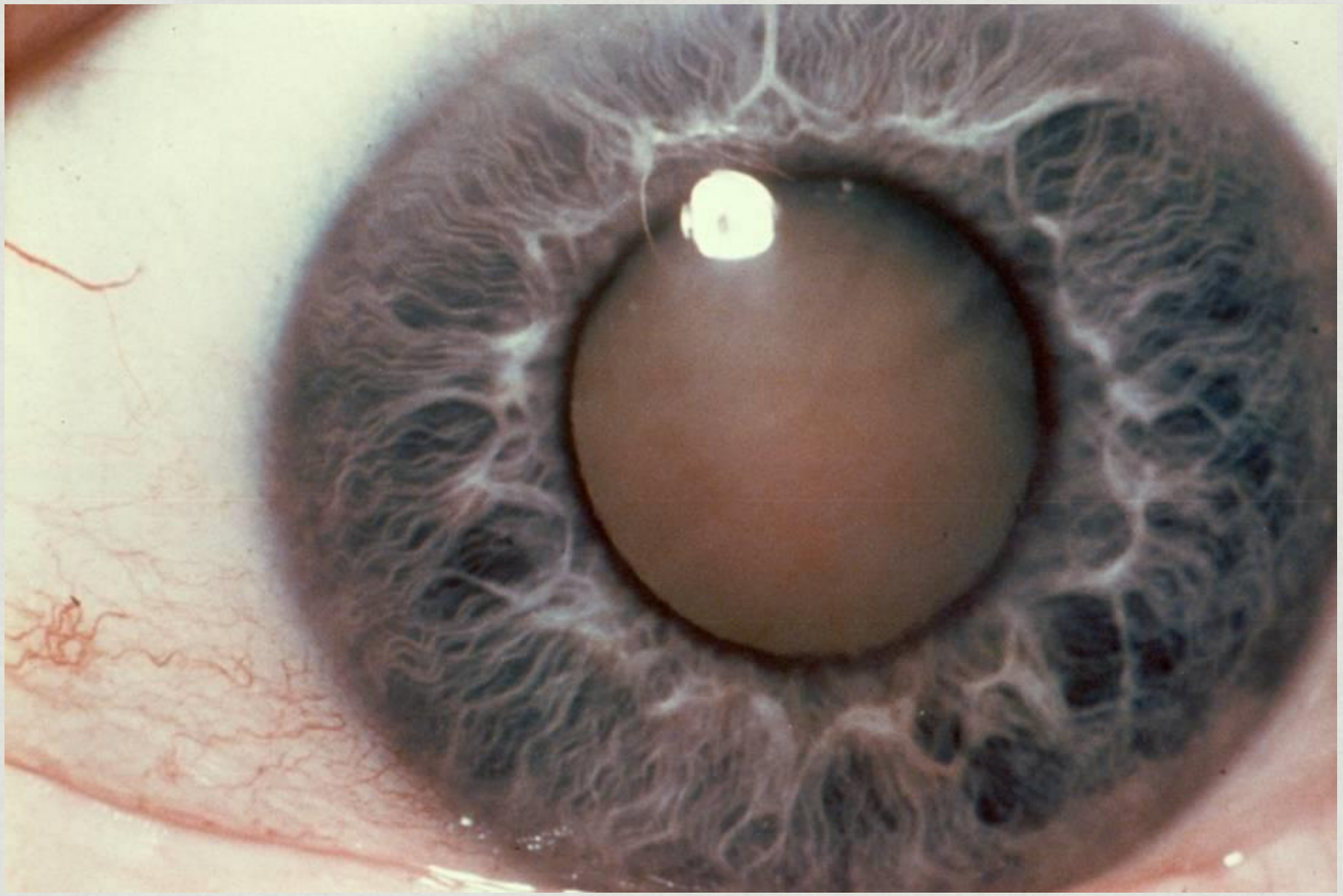
Iritis



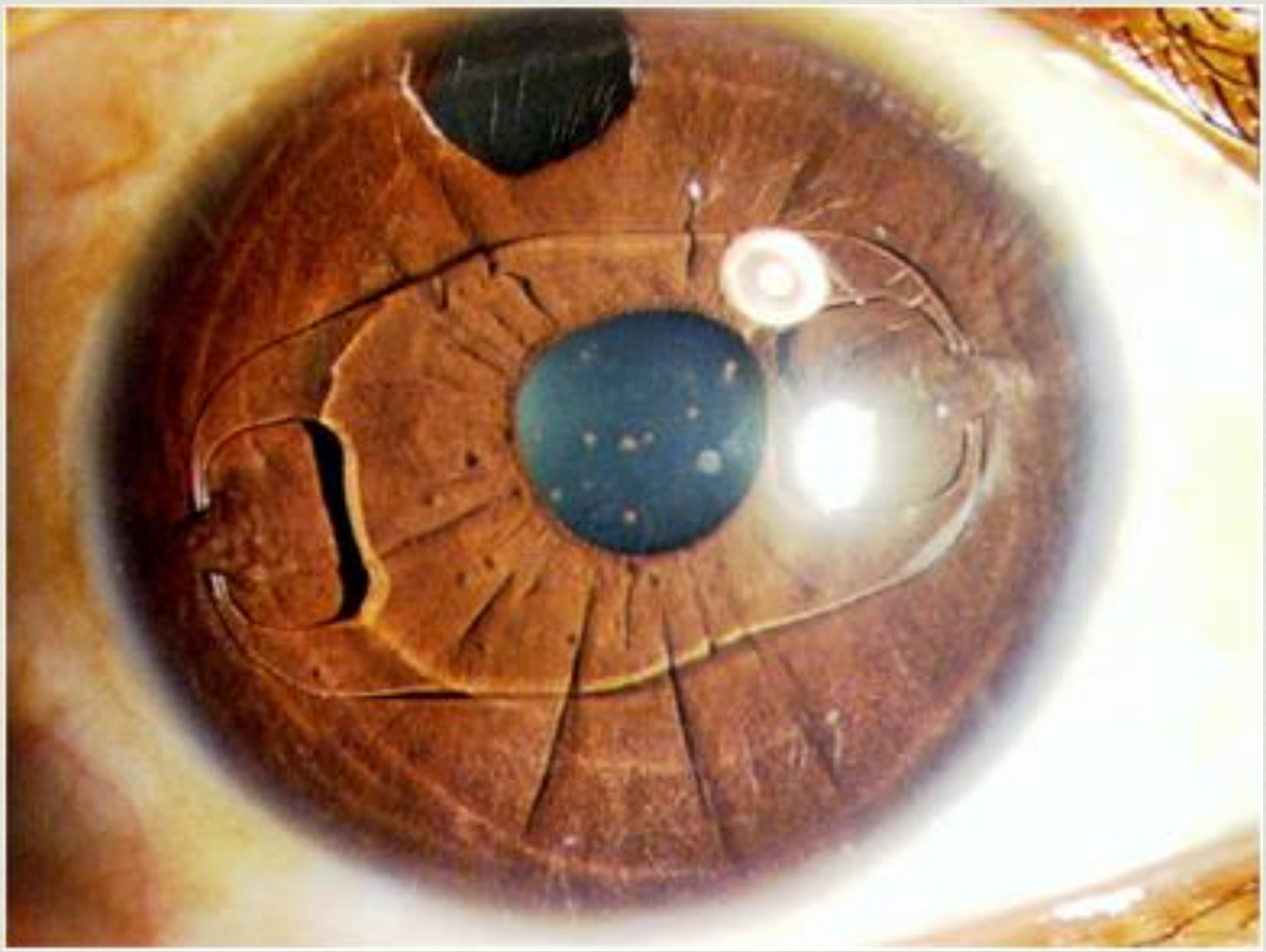
Lens

- Best examined through a dilated pupil
- Senile cataracts can appear white or yellow

Cataract



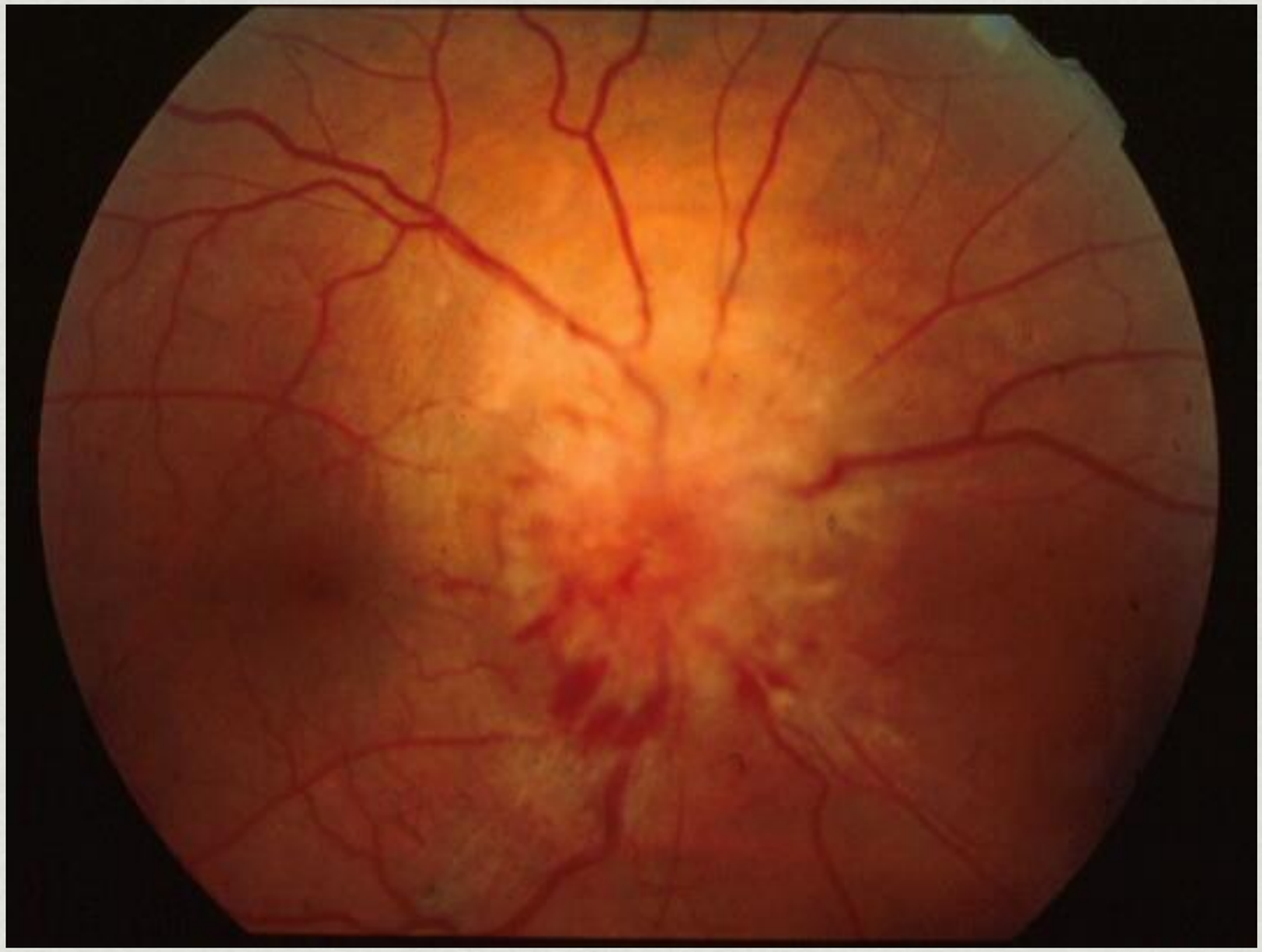
Intraocular lens



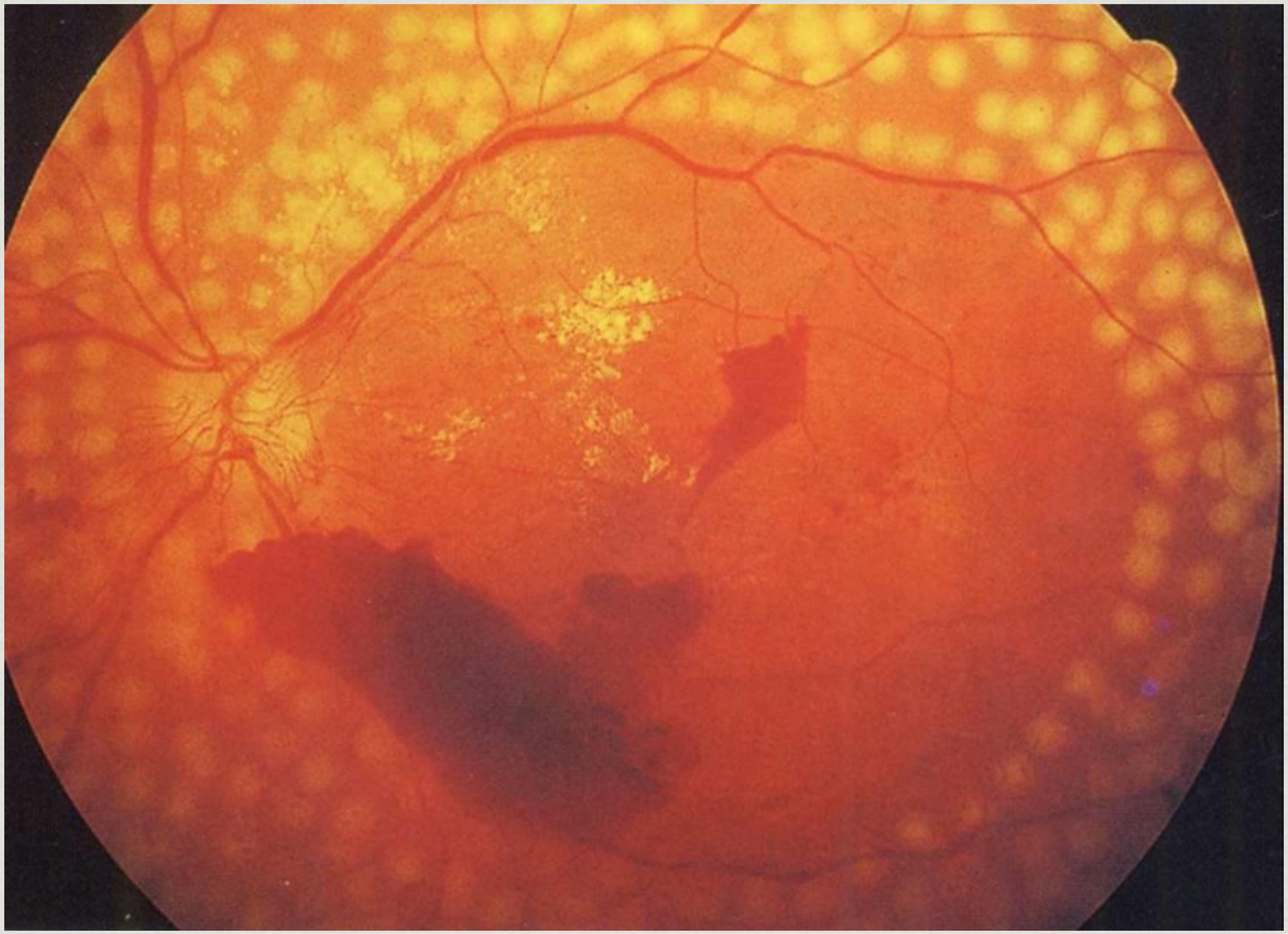
Dilated fundoscopic exam

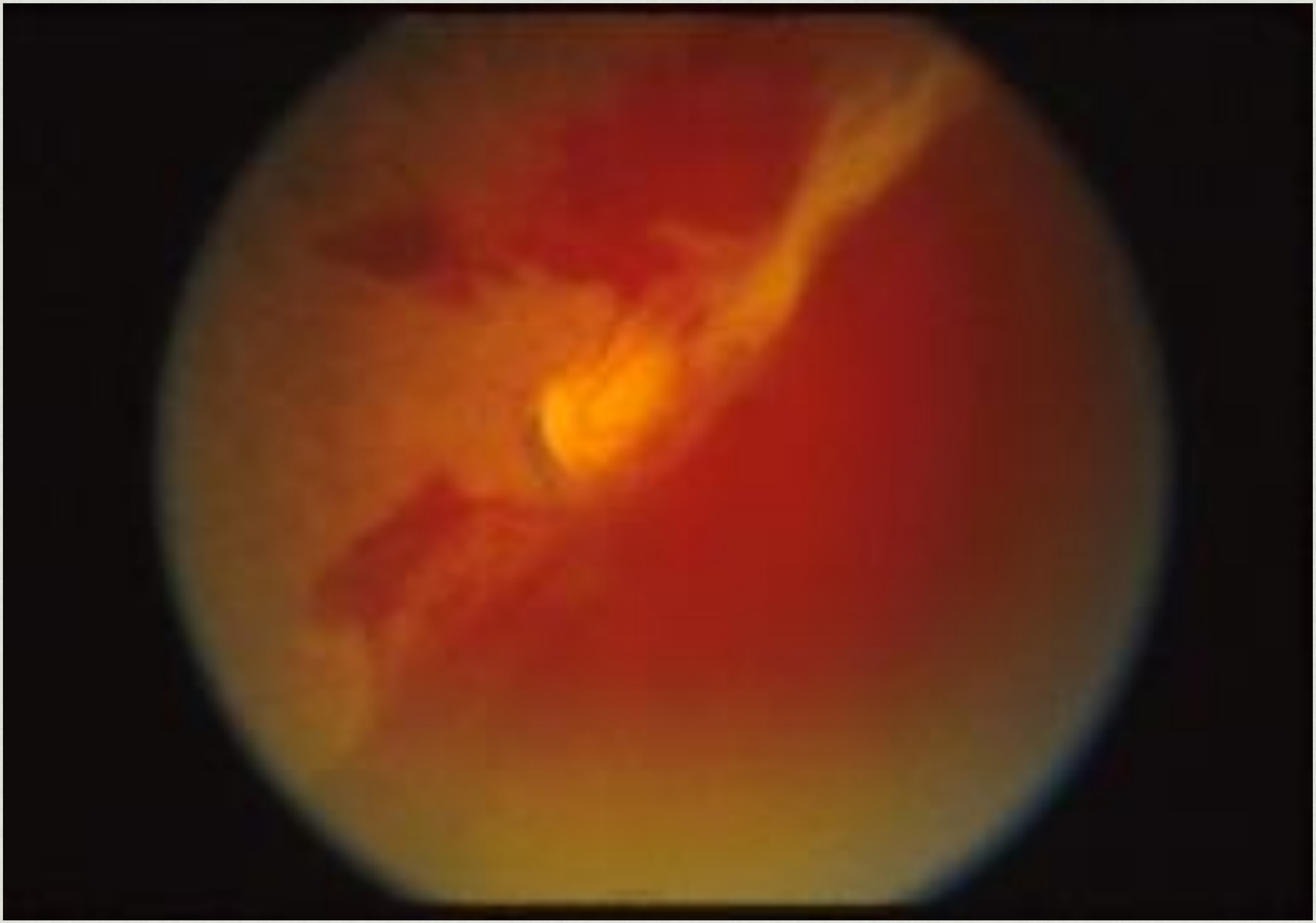
- Red reflex with direct ophthalmoscope
- Dilate with phenylephrine 2.5% & tropicamide 1% (not used in infants)
- Get close with the direct ophthalmoscope
- Vitreous clarity (hemorrhage)
- Nerve, vessels, macula & periphery with direct ophthalmoscope

Papilledema



Diabetic retinopathy





Vitreous Hemorrhage

- Sudden onset of painless decrease in vision
- Floaters
- Often Diabetic
- Dx: No red reflex

Macular degeneration