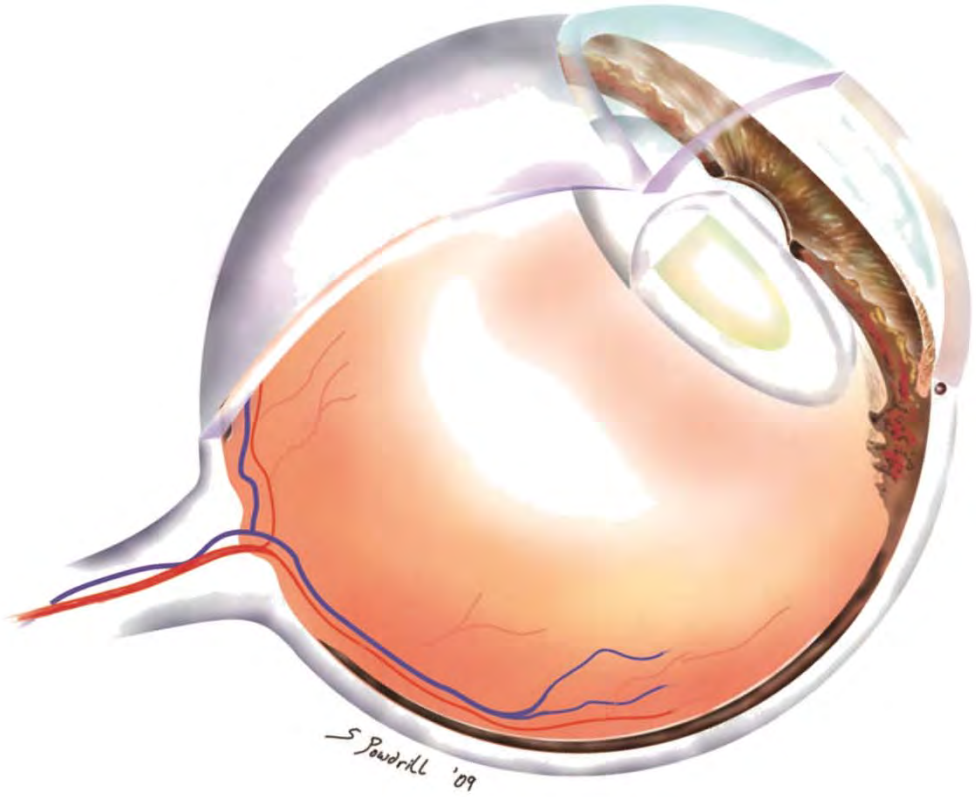
Sight Threatening Conditions



Sam Powdrill PA-C

University of Kentucky
PA program

Learning Objectives

At the end of this session, participants should be able to:

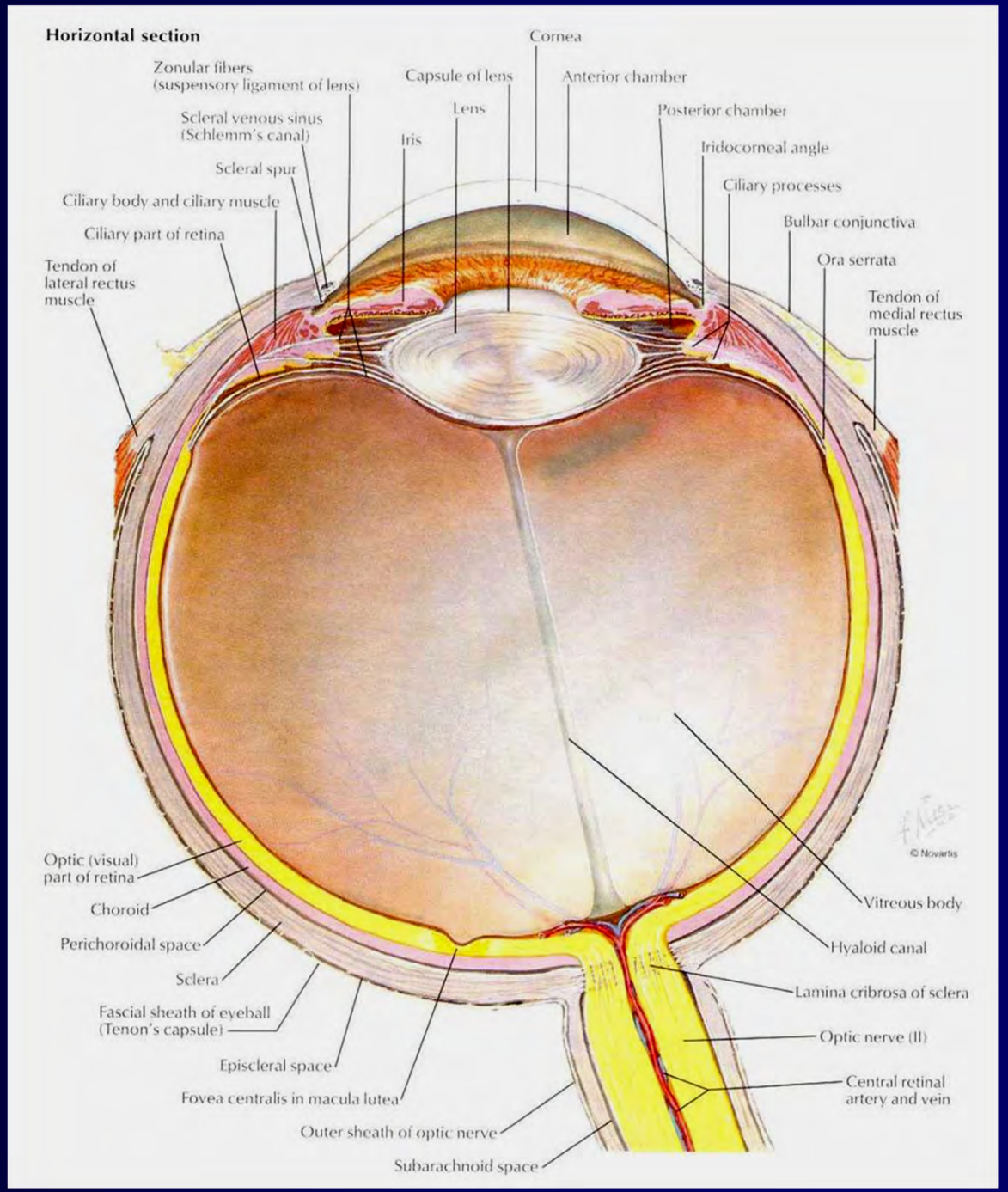
- • Evaluate clinical vignettes for pertinent positive and negative ocular information
- • Recognize sight-threatening historical and clinical findings
- • Differentiate between common, urgent and non-urgent ocular diagnoses
- • Formulate management plans for both urgent and non-urgent ocular diagnoses

Leading Eye diseases in the U.S.

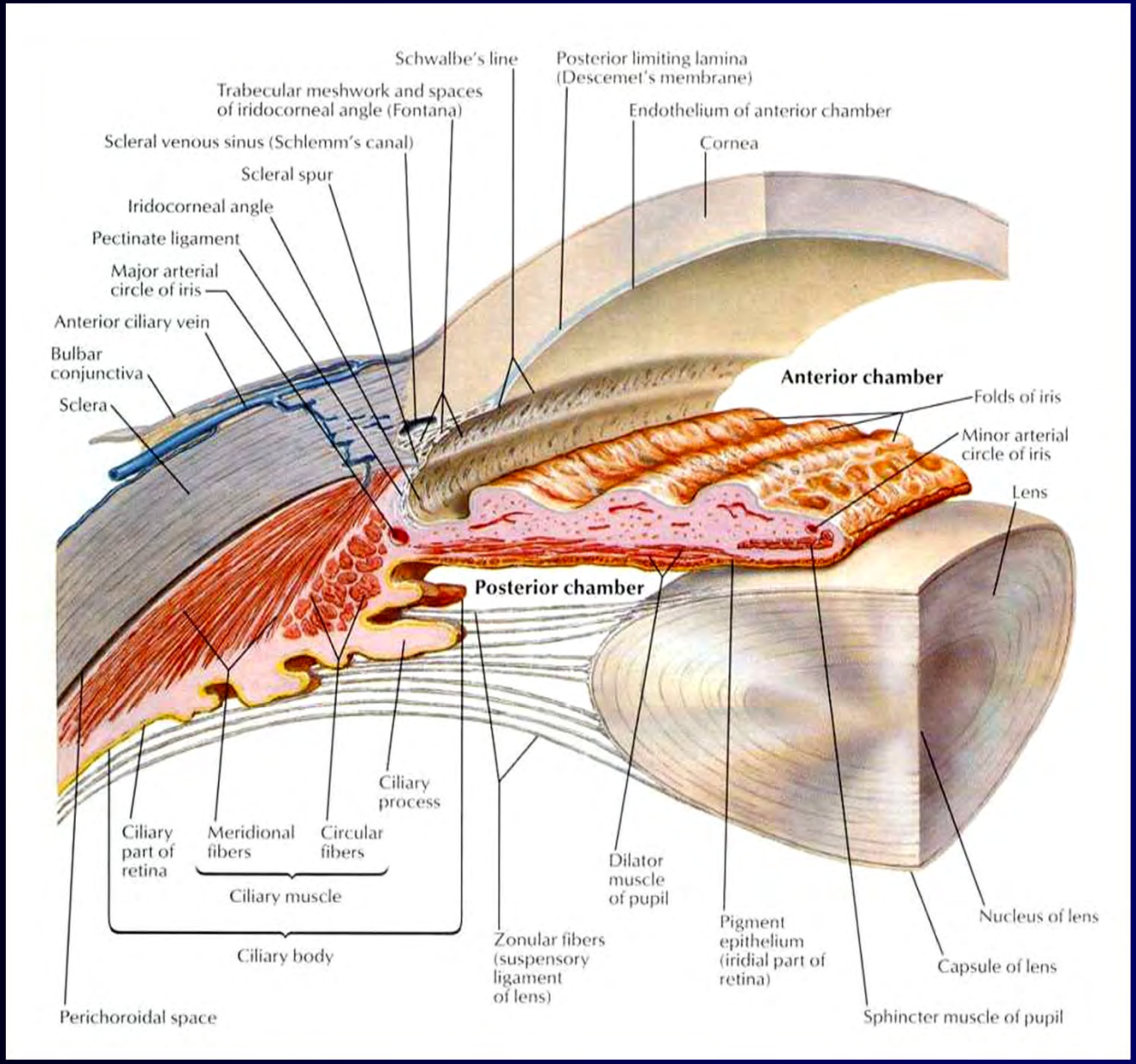
- age-related macular degeneration
- Cataracts
- glaucoma
- diabetic retinopathy,

The Globe

- Anterior chamber *aqueous*
- Iris
- Lens
- Posterior chamber *vitreous*
- Optic nerve



Angle of the Eye



Trauma waiting to happen…

Prevention is better than Treatment


THE LEAP

History

- Visual disturbance – blurred vision, visual change, diplopia, halos, floaters, flashing lights
- Discharge – tears, mucus, blood or pus
- Which eye – OS OD OU
- Pain – sharp, dull, ache, sand sensation, burning, foreign body sensation, photophobia
- Swelling, tumors,
- Trauma , foreign bodies, irritants,
- Glasses or contacts

Eye history

- Was there an injury?
- Time of injury or onset of problem
- What was the mechanism of injury?
- Is there pain – where and how severe?
- Previously was vision good and has the vision changed and how?
- Has the patient used any treatment
- Are they up on tetanus immunization
- Has the patient eaten recently - NPO
- Determine if there are legal implications

History (cont.)

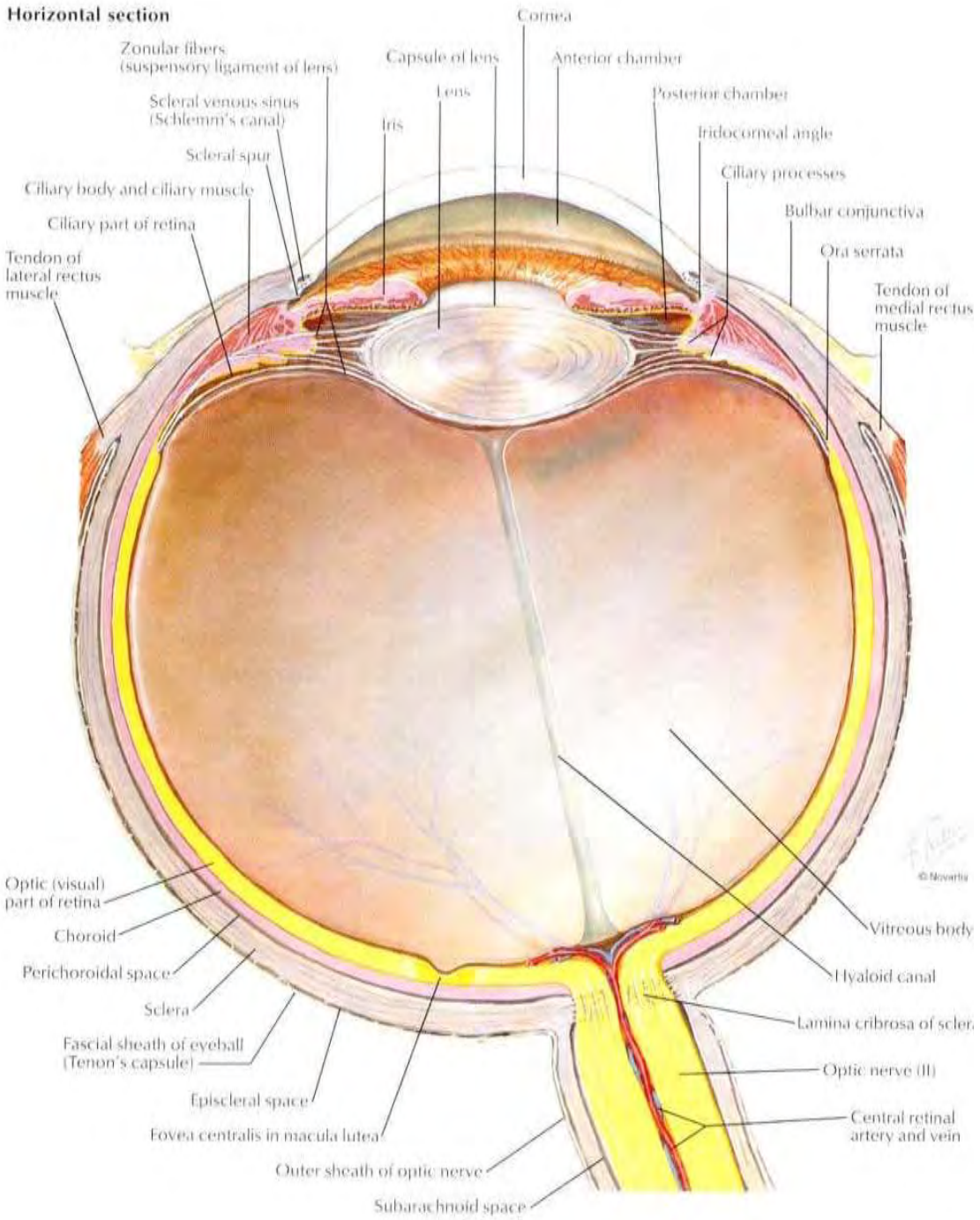
- Systemic illnesses – hypertension, diabetes, cardiovascular, inflammatory, infections.
- Eye disease in family – glaucoma, macular degeneration, cataract or other
- Eye protective wear

Instruments needed to examine the eye

1. Visual acuity chart
2. Flashlight
3. Ophthalmoscope
4. Tonometer
5. Simple loupe

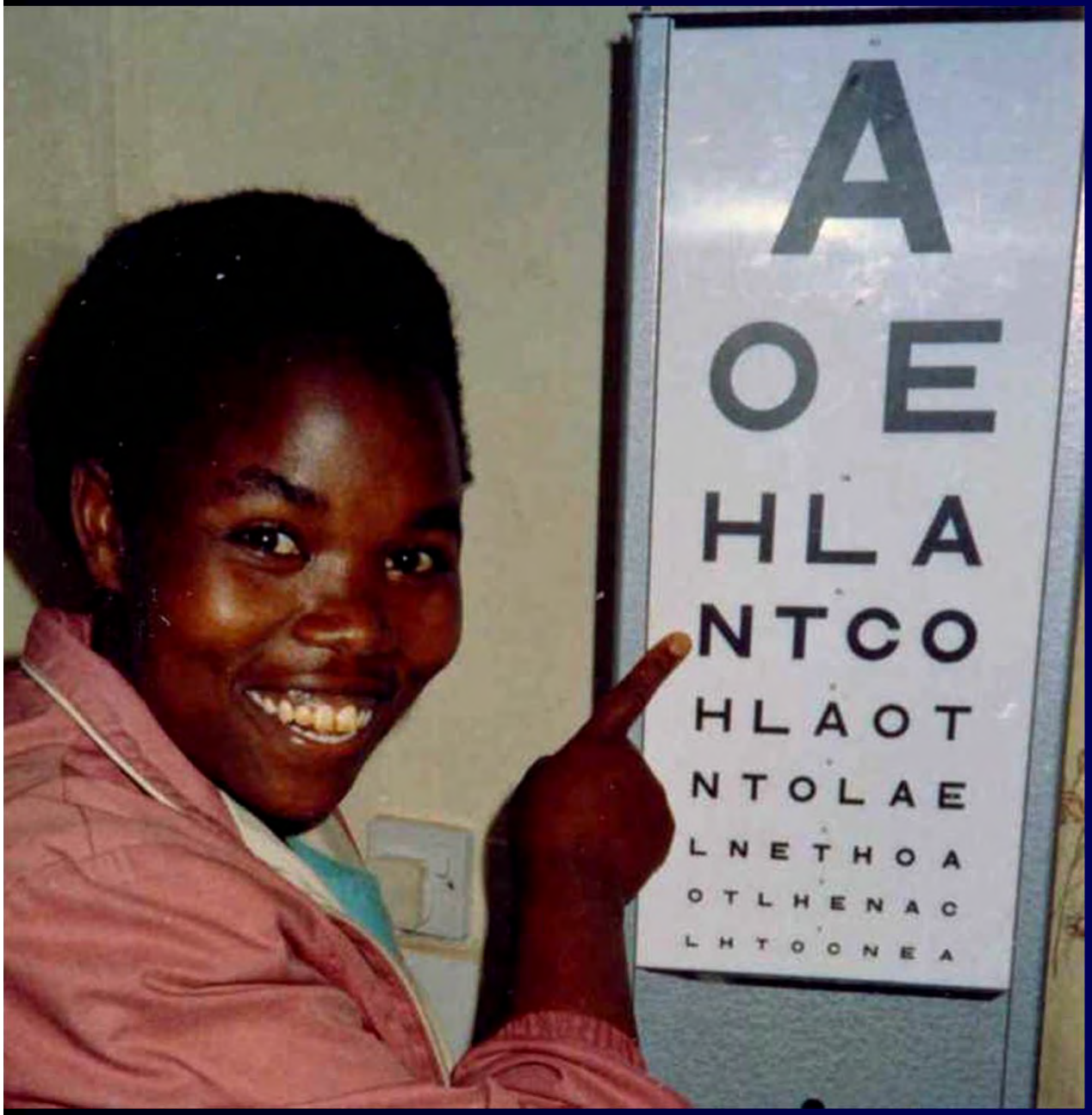
Pathways of Blindness

- Corneal
- Anterior chamber
- Lens
- Vitreous
- Retina
- Optic nerve
- Occipital
- Functional



Physical exam

- Visual acuity
- Inspection - external structures, redness, pupil, extra ocular movements
- Ophthalmoscope - lids, anterior chamber, iris shadow(indirect light) , red reflex and lens (+4), magnified view of cornea and anterior chamber (+15), retinal and optic nerve (0 or adjusted to pt. refraction)



Visual acuity:

The vital sign of the eye

Rosenbaum near chart

tested at 14 inches

Near vision

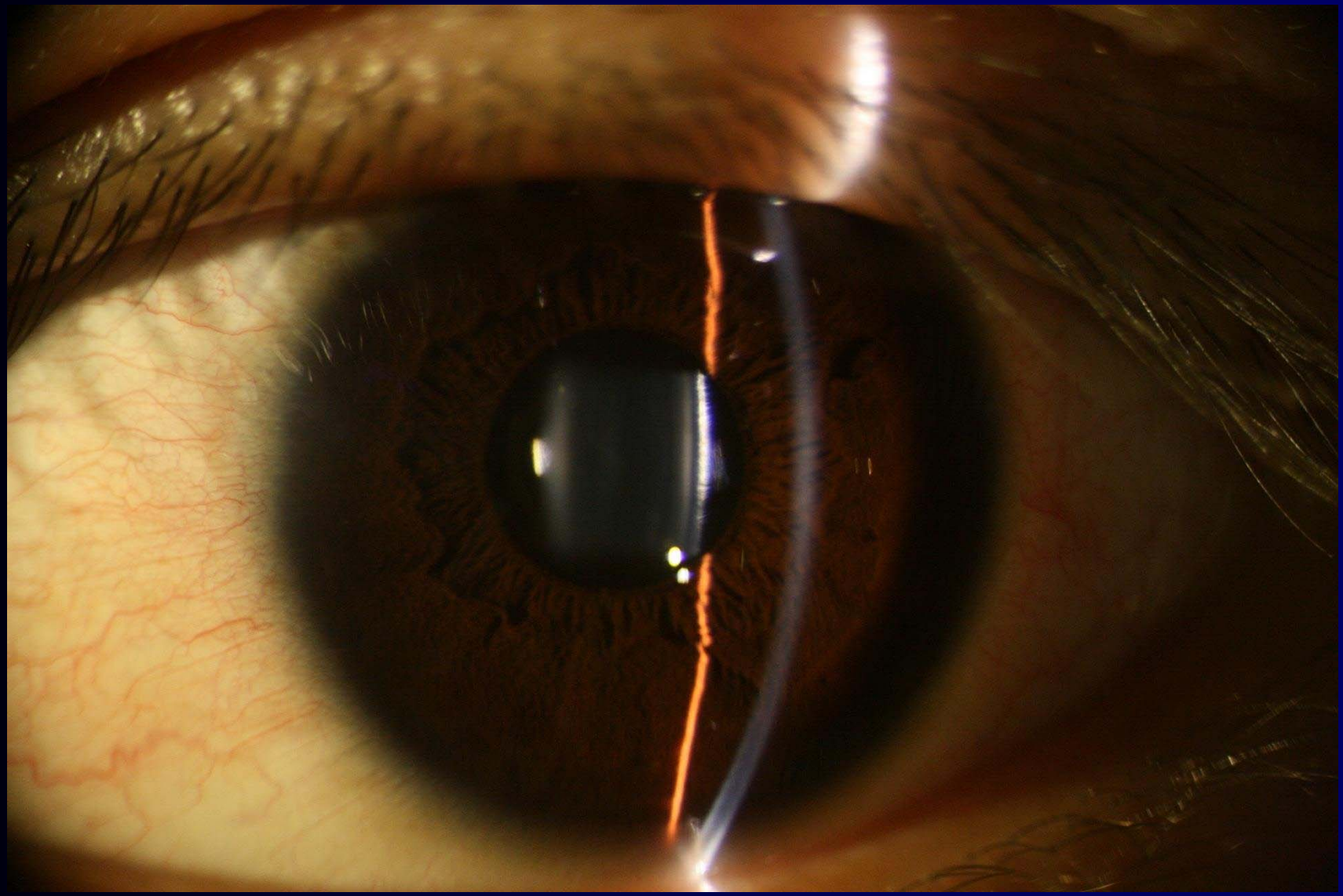
Rosenbaum chart

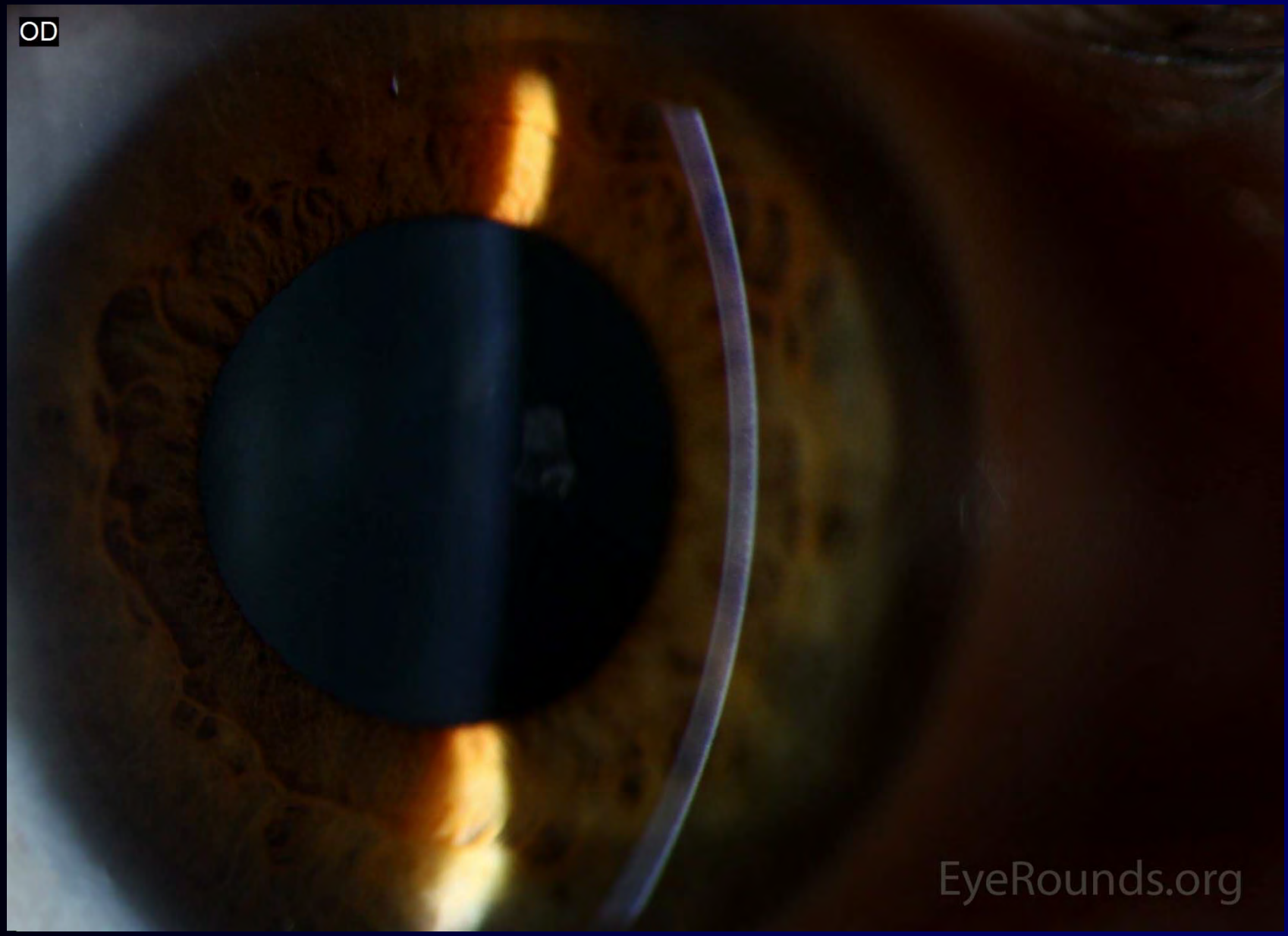
- Test for reading distance vision
- Test for presbyopia – loss of lens accommodation
- Changes with age

Physical exam - special tests

- Slit lamp exam – if available
- Fluorescein stain
- Intraocular pressure – never check if lacerated or ulcerated eye.
- Visual field
- Dilated retinal exam if safe to do so.
- Imaging – X-ray, CT, MRI

Slit lamp view of the eye




OD
EyeRounds.org

Visual fields by confrontation

Peripheral vision

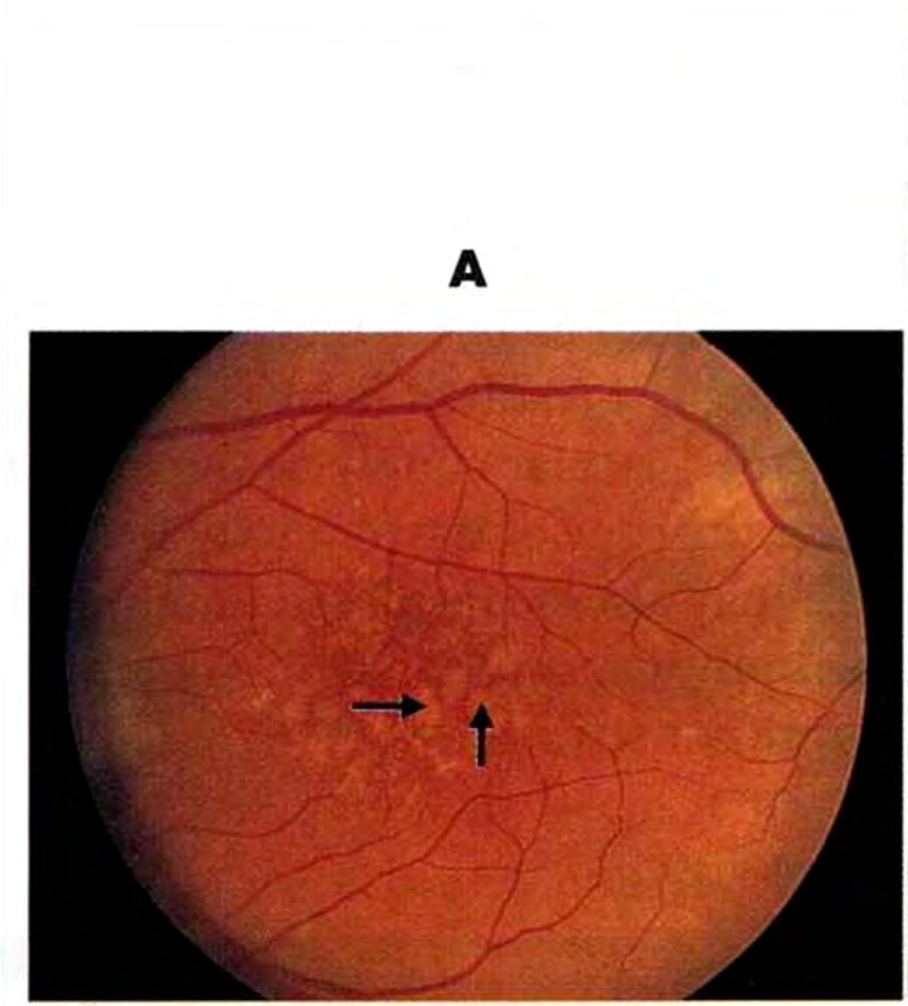
Testing the visual field

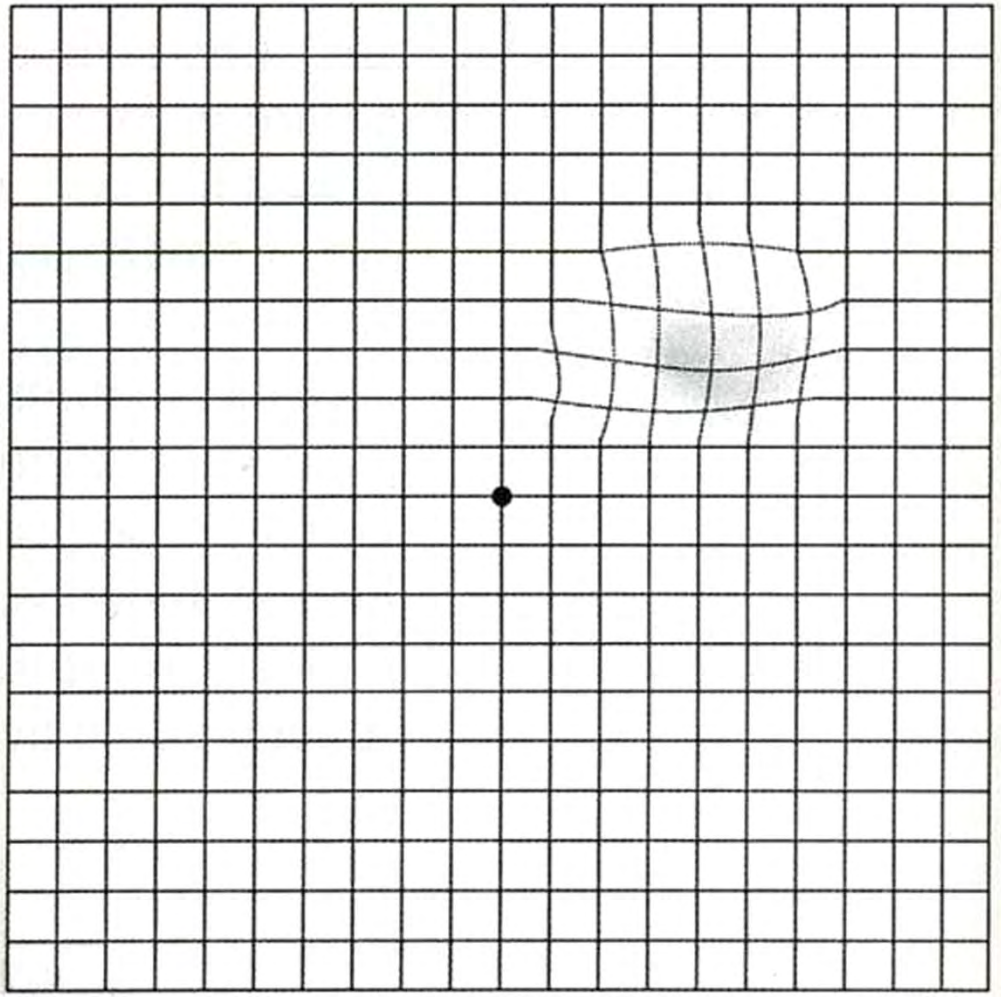
- Confrontation method – compares the examiner's visual field with the patient's
- Automated – done in optometrist's or ophthalmologist's office
- Abnormal in glaucoma

Central vision

- Test for loss of central vision - macula
- Amsler grid
- Abnormal in macular degeneration

Amsler grid





Tonometry

Measurement of the intraocular pressure

- Schiotz
- Applanation
- Air puff
- Tonopen

- Normal is 10 to 20 mmHg

Tonometry

- Can be done in the emergency room or urgent care setting

- Eye must be anesthetized with topical tetracaine drops
- Fluorescene is often used
- Should only be learned under supervision and care taken not to scratch the cornea and cause a corneal abrasion

Extraocular Muscles

- Cardinal eye movements (big H)
- Corneal light reflex position
- Nystagmus
- Cover - uncover test
- Convergence

Eyelids

Inspect

- Trauma
- Opening and closing completely
- Eyelash position
- Ptosis, ectropion or entropion
- Swelling or infection

Injury and dryness from non contact are the greatest eyelid threats to sight

Evert the eyelid

Cornea

Inspect – shine the flashlight from the side at first

- Arcus senilus
- Clarity – scars obscure part of the iris.
- Light reflex – reflex is scattered in edema
- Corneal sensitivity to light with inflammation infection or trauma
- Depth of anterior chamber – iris shadow
- Abrasions or foreign bodies – use fluorescein stain with blue light to examine the cornea for defects or foreign bodies.

Iris and pupil

Inspect Iris

- Color
- Angle
- lesions

Inspect Pupil

- Size
- Shape
- Reaction to light
- Reaction to near
- Consensual response
- **PERRLA**

Conjunctivitis

- Very common – many causes
- Usually viral
- If bacterial there is usually some sort of trauma involved
- Treatment is warm or cool compresses, treat the cause and avoid spread

tearing

Red Eye: overview

- Allergic Conjunctivitis — allergic
- Infectious Conjunctivitis — infectious
- Infectious Keratitis — infectious
- Orbital cellulitis — infectious
- Measles — infectious
- Vitamin A deficiency — nutritional
- Inflammatory causes — inflammatory
- Tumors — neoplastic
- Traumatic causes — mechanical
- Glaucoma — mechanical
- Contact Lens complications — mechanical
- Eyelid Margin disease — mechanical

Infectious Keratitis

- Corneal Ulcer
  - This is differentiated from conjunctivitis because the cornea is *opaque*
- Viral
  - HSV, HZV
- Bacterial
  - Staphylococcus, Streptococcus, Pseudomonas
- Fungal
  - This is usually keratitis that does not improve with treatment

Corneal ulcer

Treat aggressively with topical antibiotics

blinding or non-blinding

- If both eyes are red treat them
- If one eye is red and painful refer

Use extreme caution with steroids

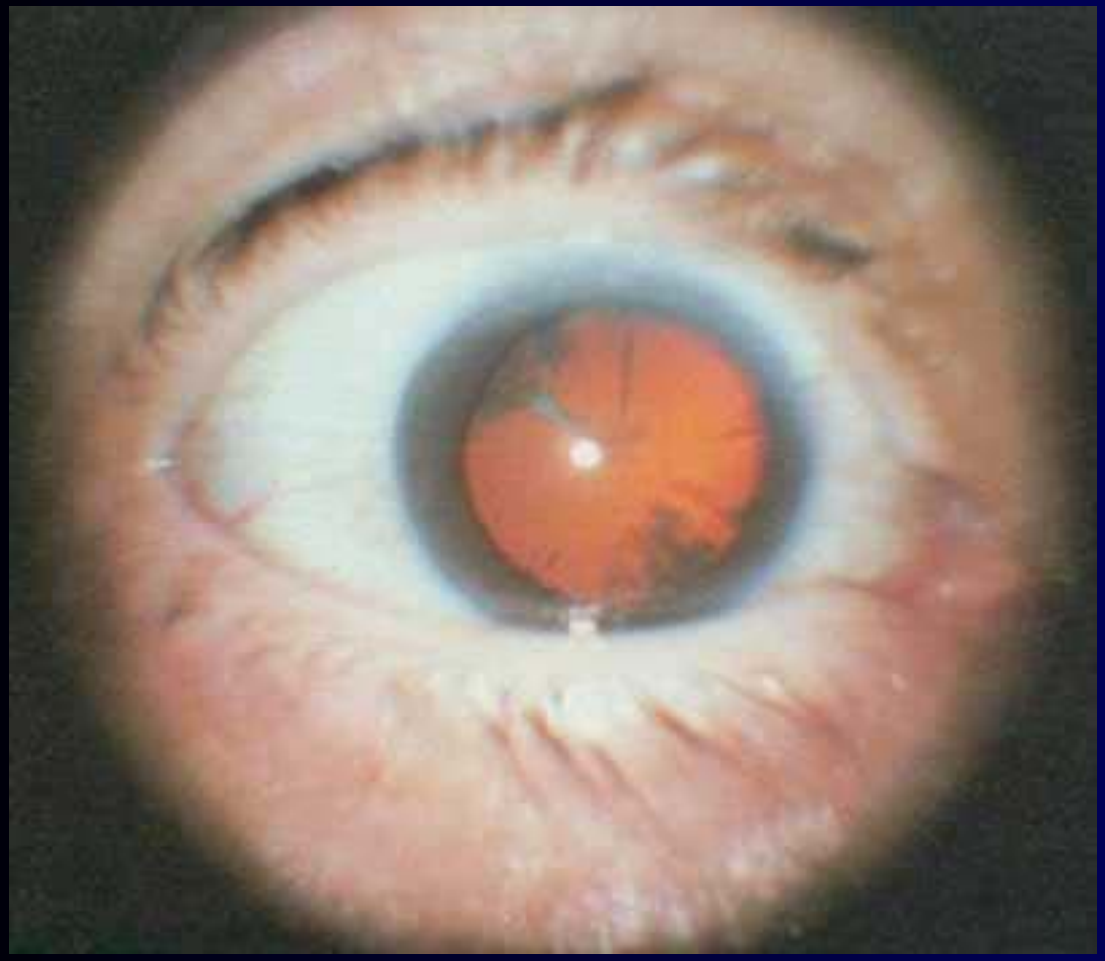
in a red eye

You should probably consult an Ophthalmologist first

Orbital cellulitis

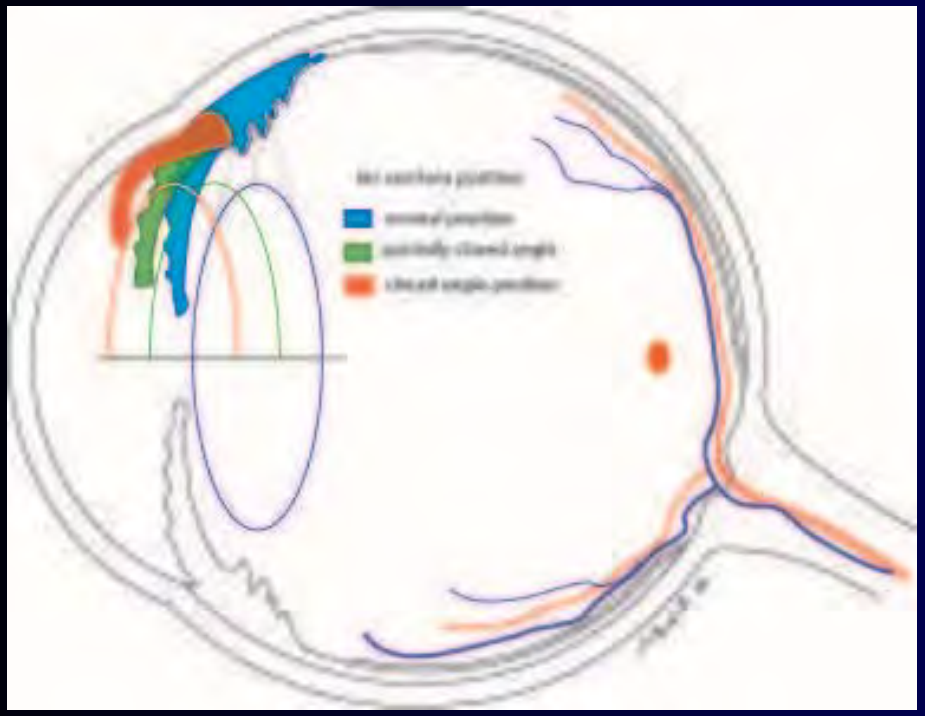
Hospitalize and treat with IV antibiotics

cataract



- Ophthlmoscope set on +4
- Shadows against Red reflex

Traumatic Cataract



Angle Closure Glaucoma

- Sudden rise in intraocular pressure
- Often presents with nausea
- Treated with pupil constriction and surgery
- Can use acetazolamide or manitol

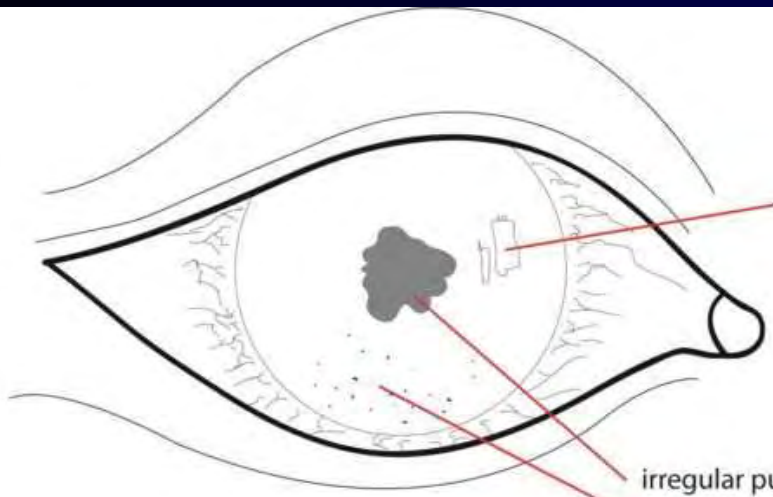
Iris shadow

Anterior chamber depth

Normal – note light illuminating both sides of iris

Shallow – nasal side of iris is in darkness

ACG or Iritis

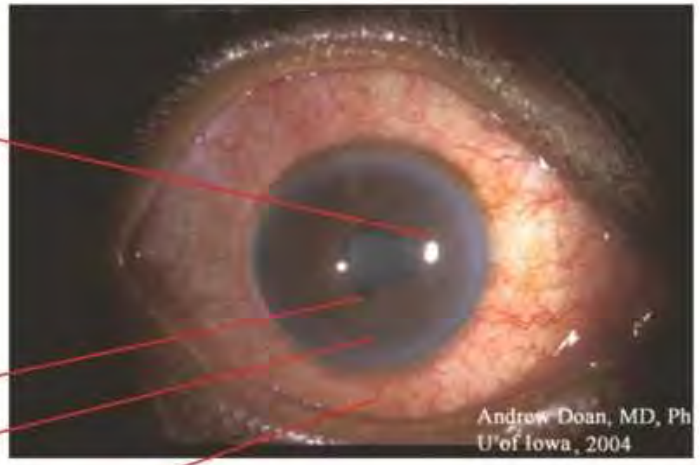


light reflex

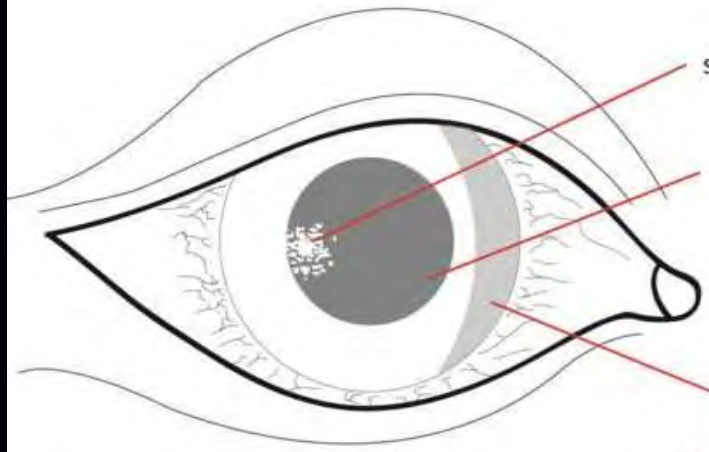
irregular pupil with synechae

Keratic precipitates

Iritis / uvveitis



ciliary injection



scattered light reflex

mid-dilated pupil

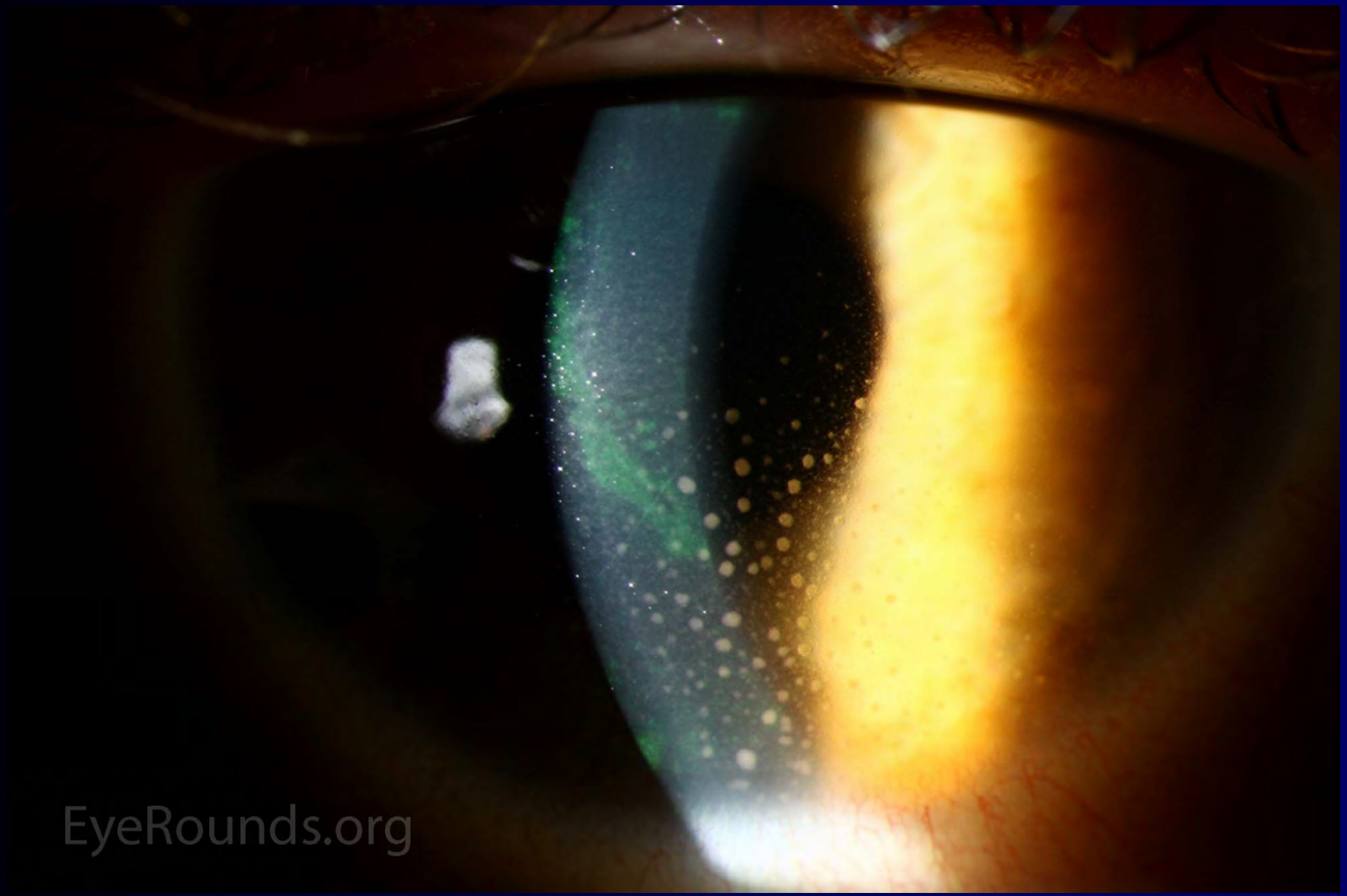
iris shadow
&
shallow anterior chamber

Acute angle closure glaucoma

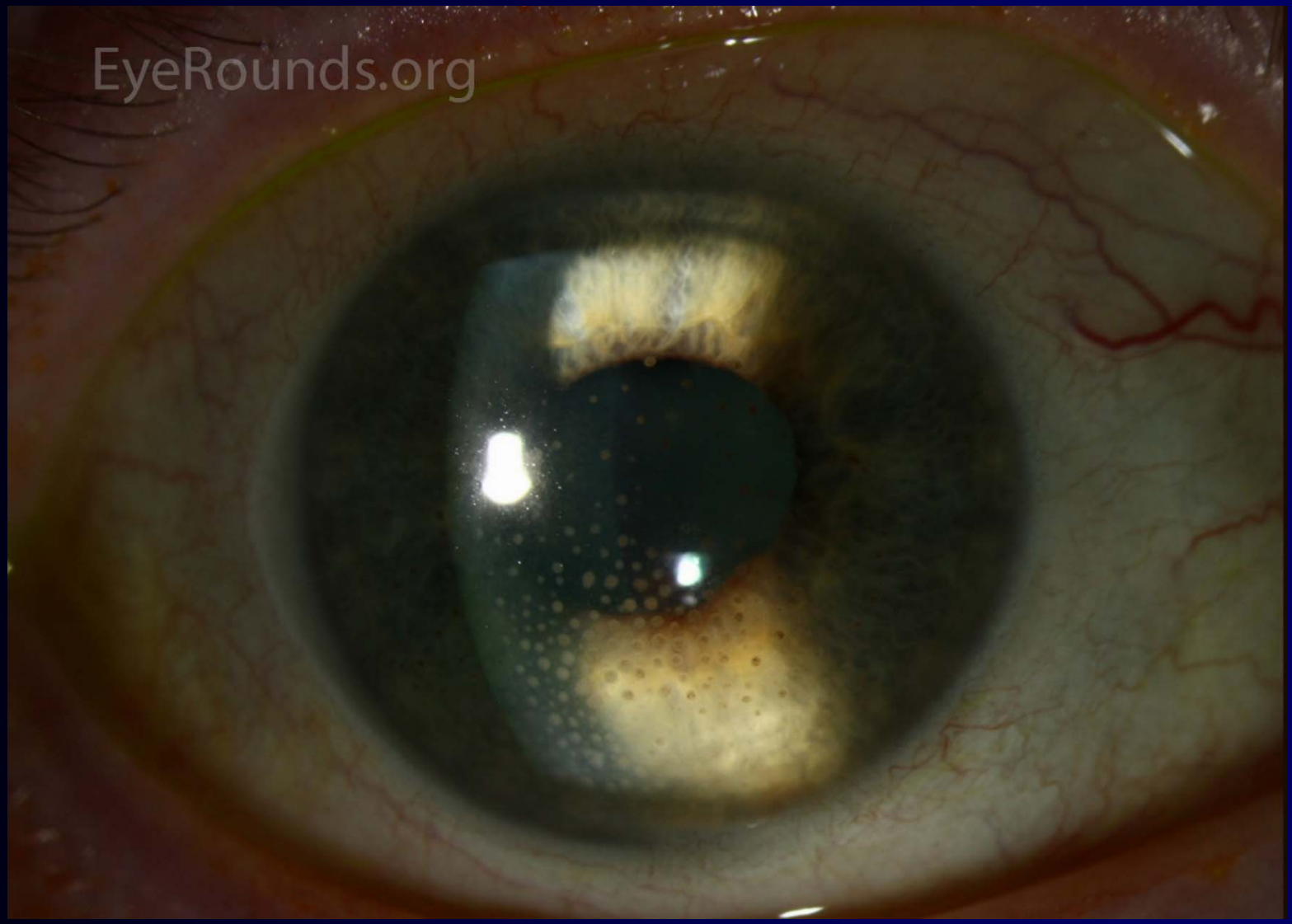
Cell and flare in Iritis

https://timroot.com/cell-and-flare-in-the-eye-video/

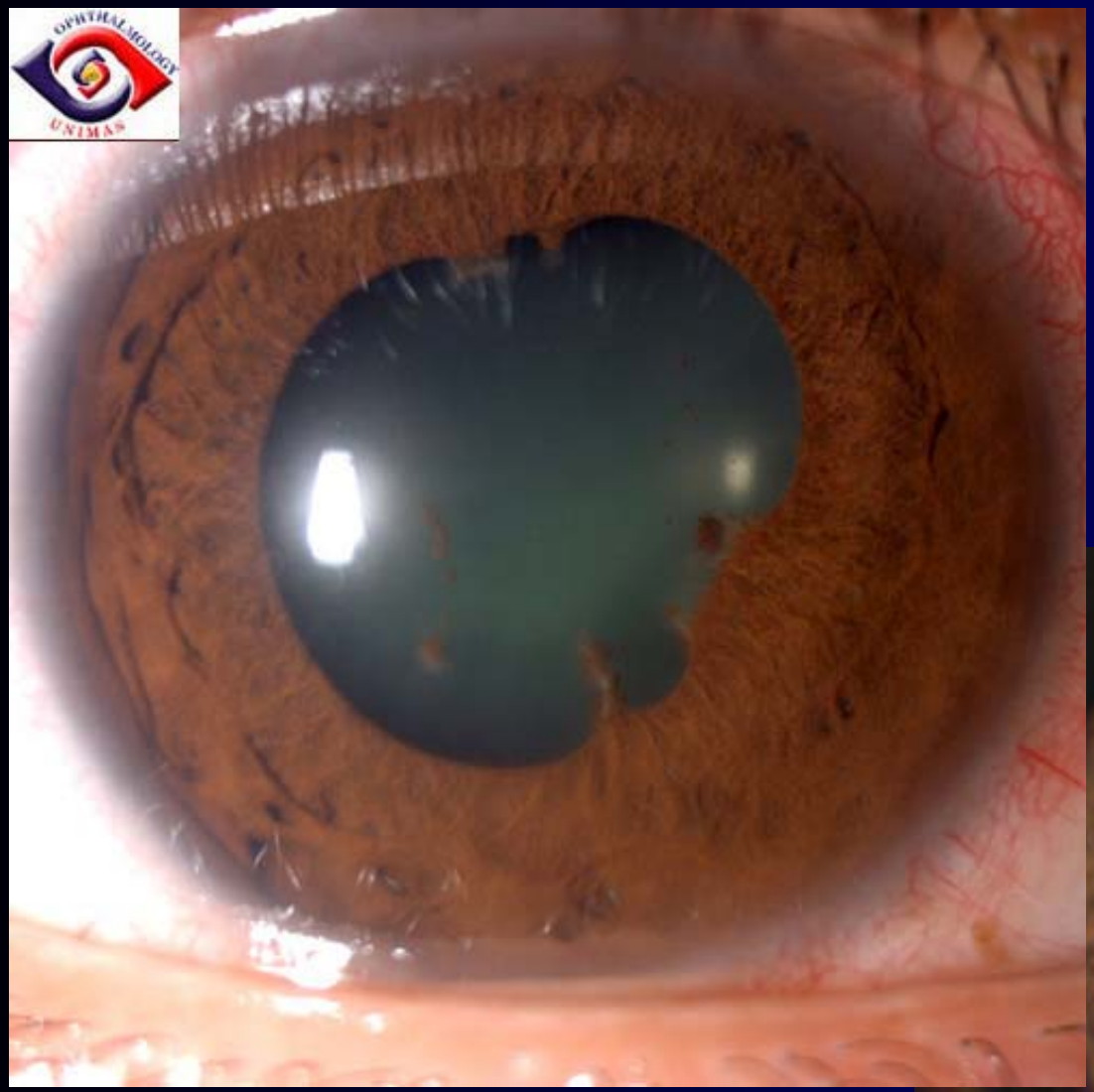
Keratic precipitates in Iritis

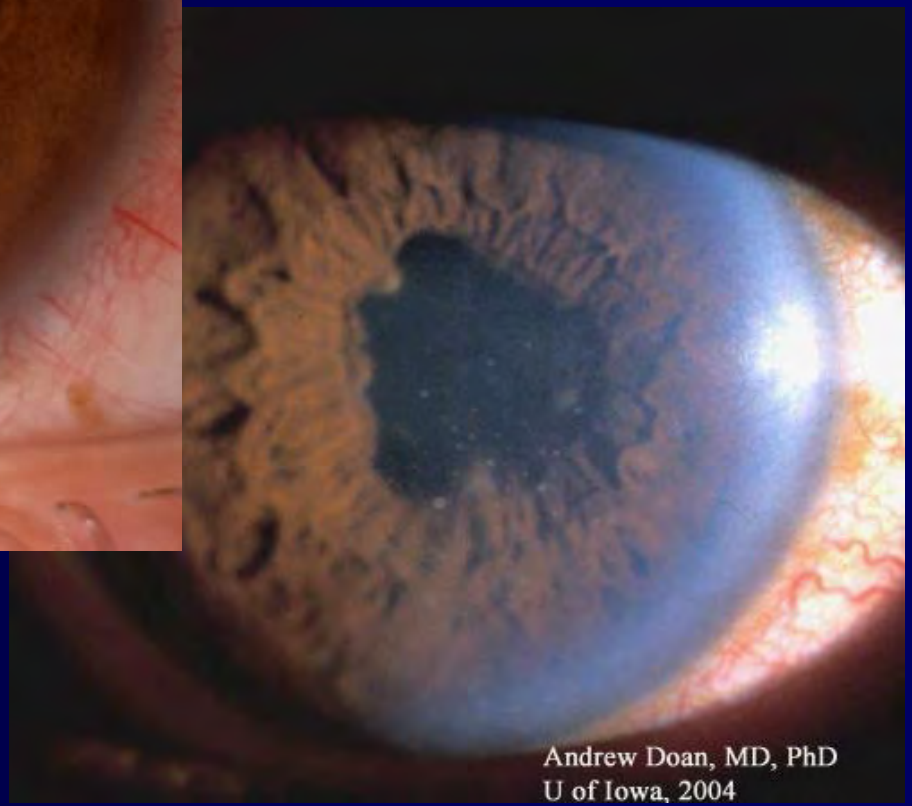


Mutton fat KPs



anterior synechiae





Treatment

- ACG
  - Treated with pupil constriction and surgery
  - Can use ac
- Iritis
  - dilate the pupil
  - Anti-inflammatory drops - prednisone

Other non trauma eye emergencies

- Sudden drop in vision
- Central artery occlusion
- Central vein oclusion
- Retinal detachment

Epidemiology

- 85% of eye trauma is accidental
- 15% caused by assault
- Men are 4 times more likely to have eye trauma than women
- Average age of trama is 30 years
- Blunt trauma is most common
- Most occur at home
- Highest industrial cause is construction
- Airbags and seat belts have reduced eye trauma

Mechanisms of Eye Trauma

- Foreign body
- Blunt
- Sharp
- Burns
- Miscellaneous

Foreign body trauma

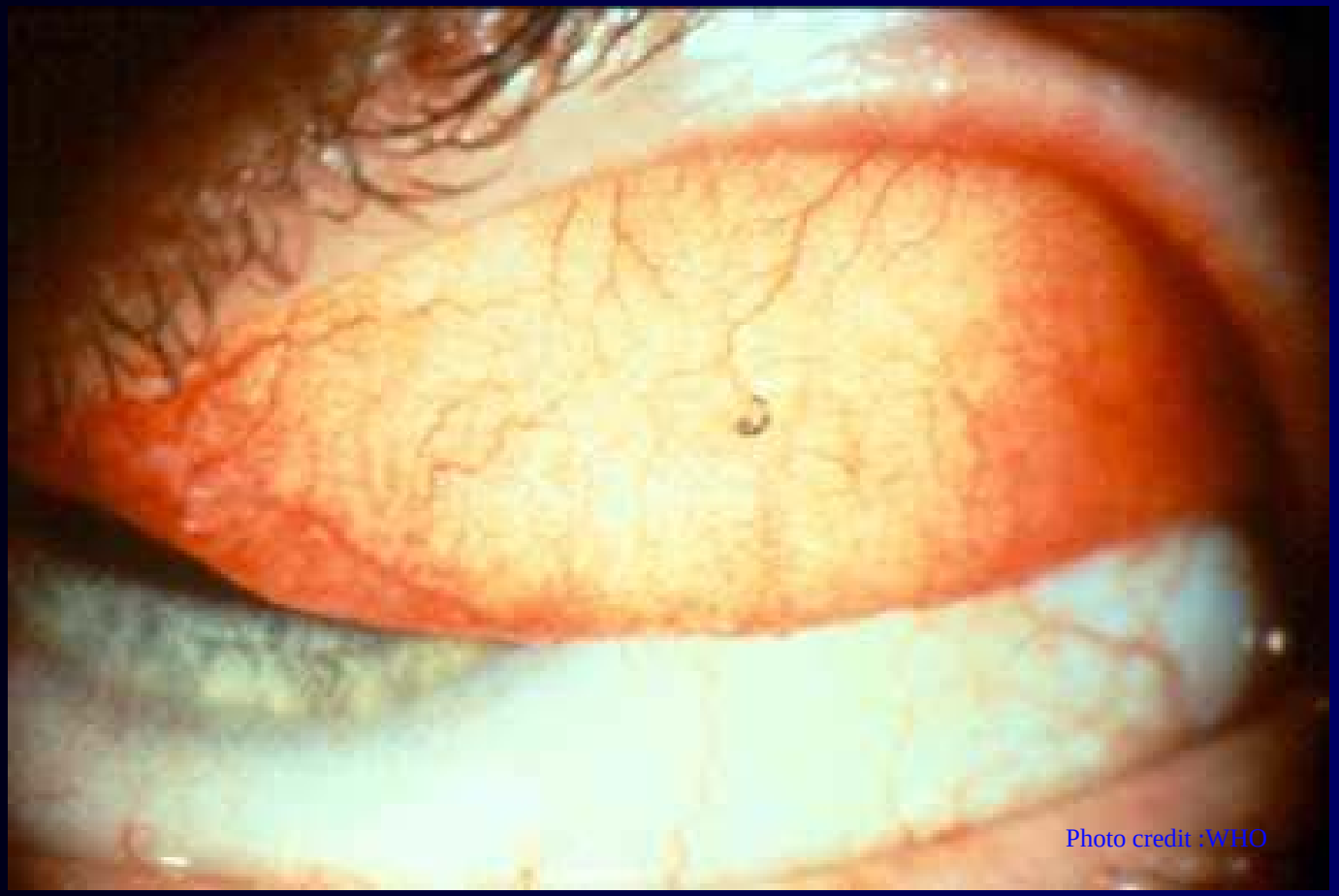
- Low velocity
  - Dust, grass seeds
- High velocity
  - Metal-on-metal contact (eg hammering nails)
- Signs:
  - Red eye, foreign body sensation, linear fluorescein pattern with blue (cobalt) light

"Something's in my eye!"

Fluorescein test shows vertical linear streaks, but no corneal FB is seen. Where could it be?

Invert the upper eyelid

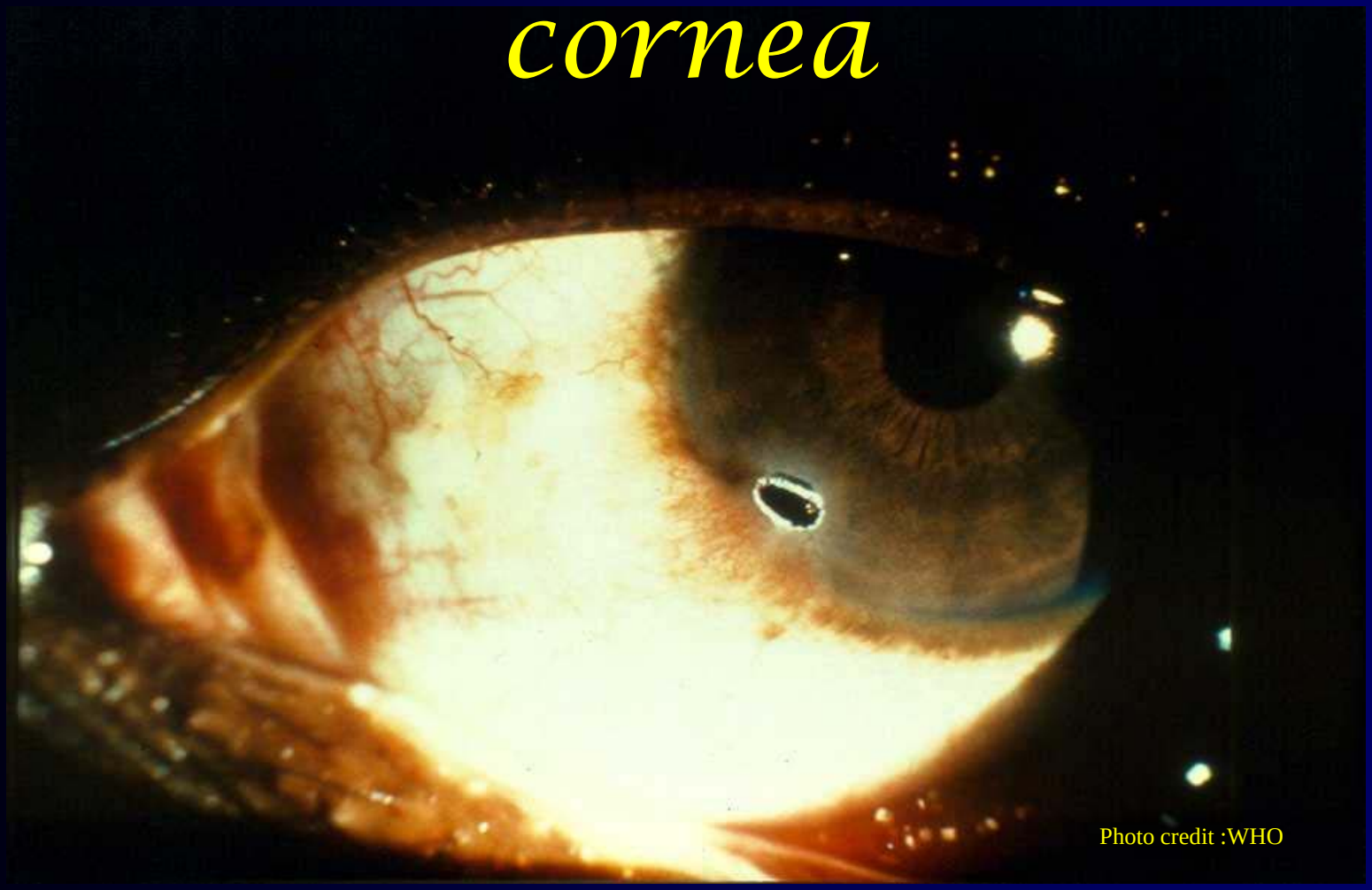
Upper eyelid foreign body



Common presentation: “something in the eye”

- look under the lower lid & evert the upper lid.
- Avoid using a topical anesthetic – it masks the symptoms

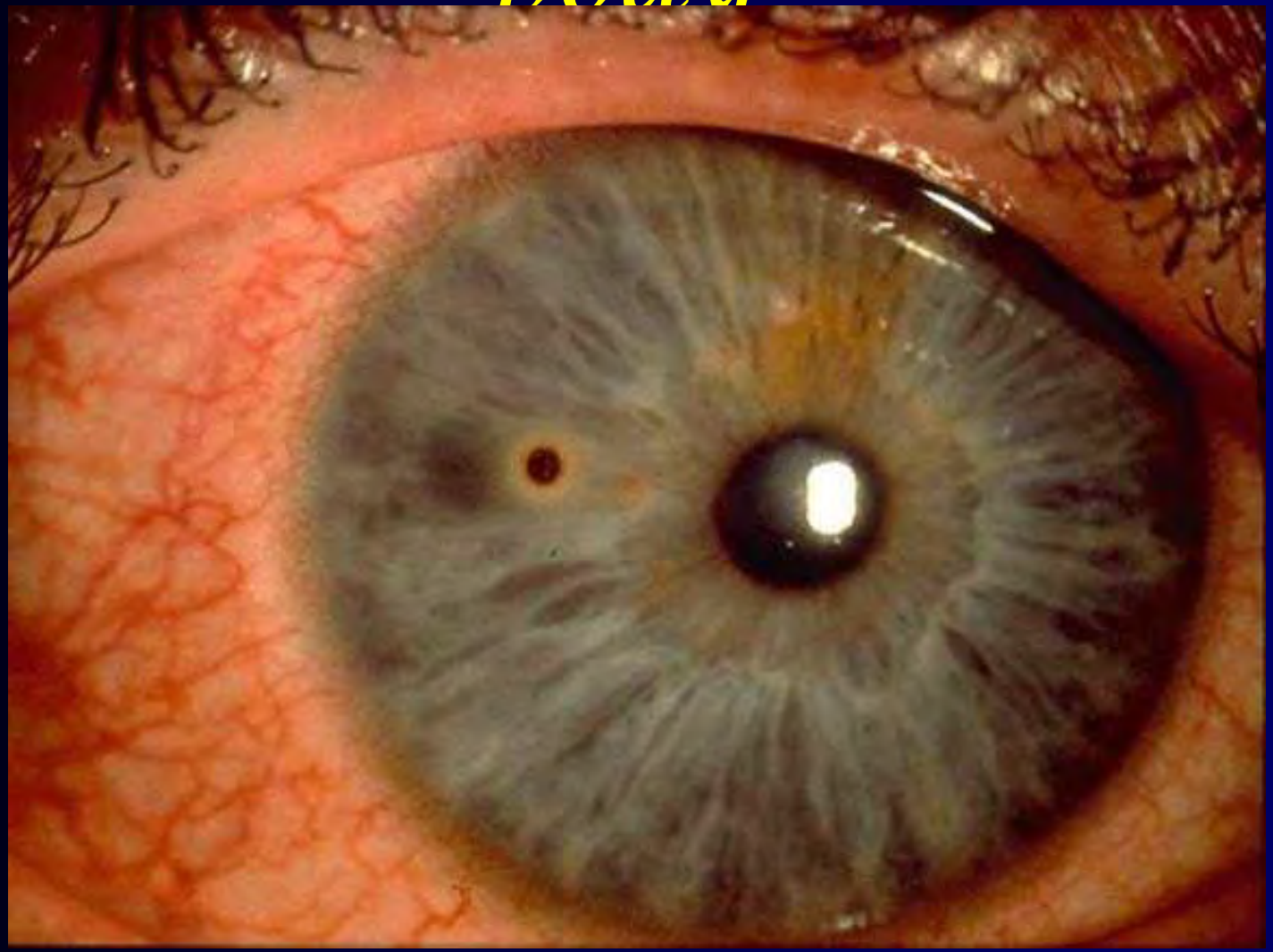
Grass seed stuck to cornea



Removal: *topical anesthetic & cotton tip applicator; or 25ga needle, bevel up and parallel with corneal surface.*

Treatment: *Antibiotic drops & cycloplegics.*

Corneal metal foreign body



These are removed the same way as before. A rust ring (brown stain) may form & should be removed, if possible.

Blunt Trauma (front to back)

- Orbital damage/ fractures
- Eyelid damage
  - Ecchymosis – a black eye
  - *Lacerations don't require sharp mechanisms in the lids!*
- Anterior damage
  - Subconjunctival hemorrhage, corneal abrasion, hyphema, globe rupture (between cornea and sclera), cataract
- Posterior damage
  - Vitreous hemorrhage, retinal detachment, optic nerve damage

Ecchymosis

Usually not sight threatening and typically no treatment

Subconjunctival hemorrhage

This is not a serious condition, but appears threatening.

Check for deeper injury - usually no Treatment needed.

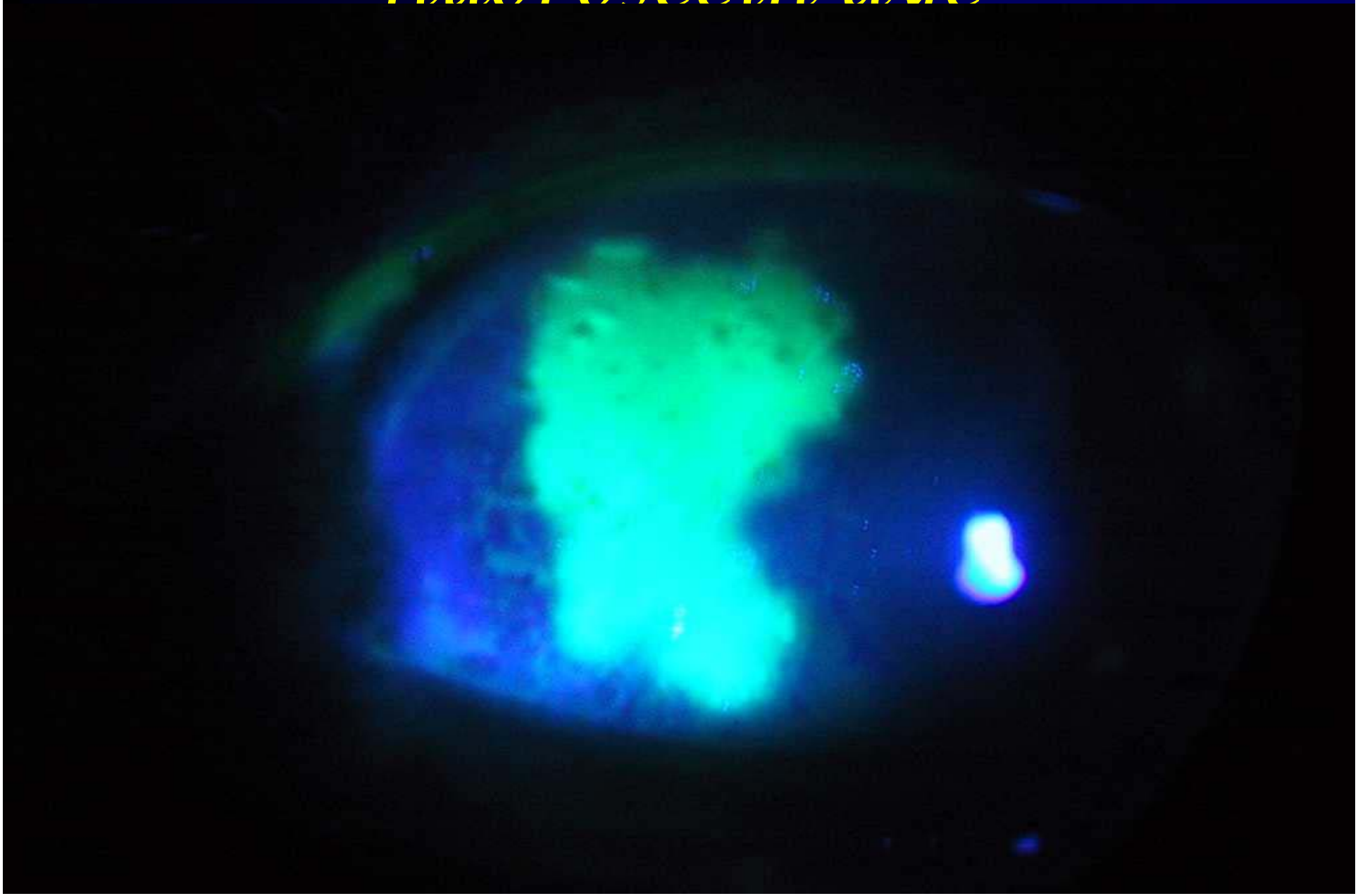
Subconjunctival Hemorrhage

Note: this is usually not from trauma

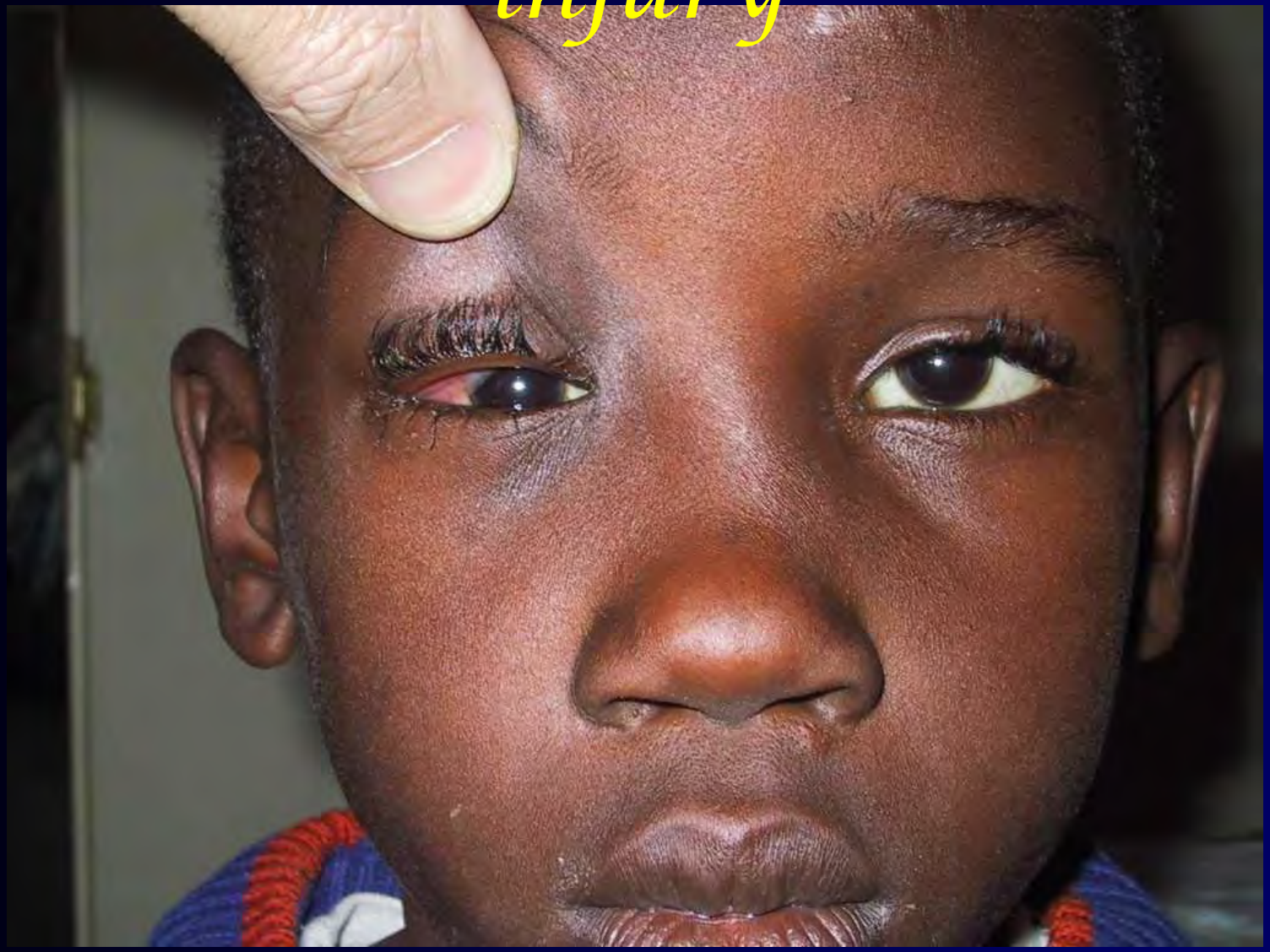
Corneal abrasion

Treatment: antibiotic drops or ointments, cycloplegics (eg cyclopentolate or homatropine) for comfort; NO STEROIDS, NO TOPICAL ANESTHETICS. Patching is optional.

Cornea staining with fluoroscein dye



Status post football (soccer) injury



What sort of damage has occurred to the eye?

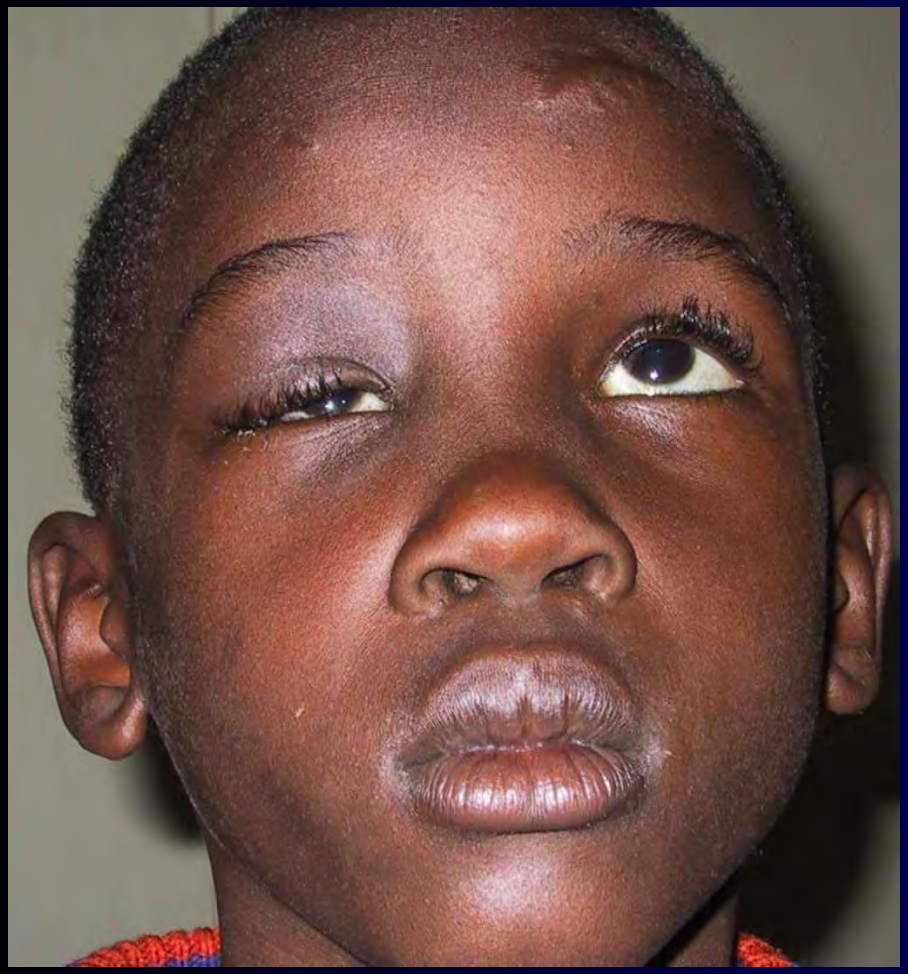
Which would be the most useful physical exam sign to assist in a diagnosis of this case?

A. Have the patient look laterally on the injured side
B. Observe for ptosis
C. Palpate for edema
D. Have the patient look upward
E. Palpate for a fracture

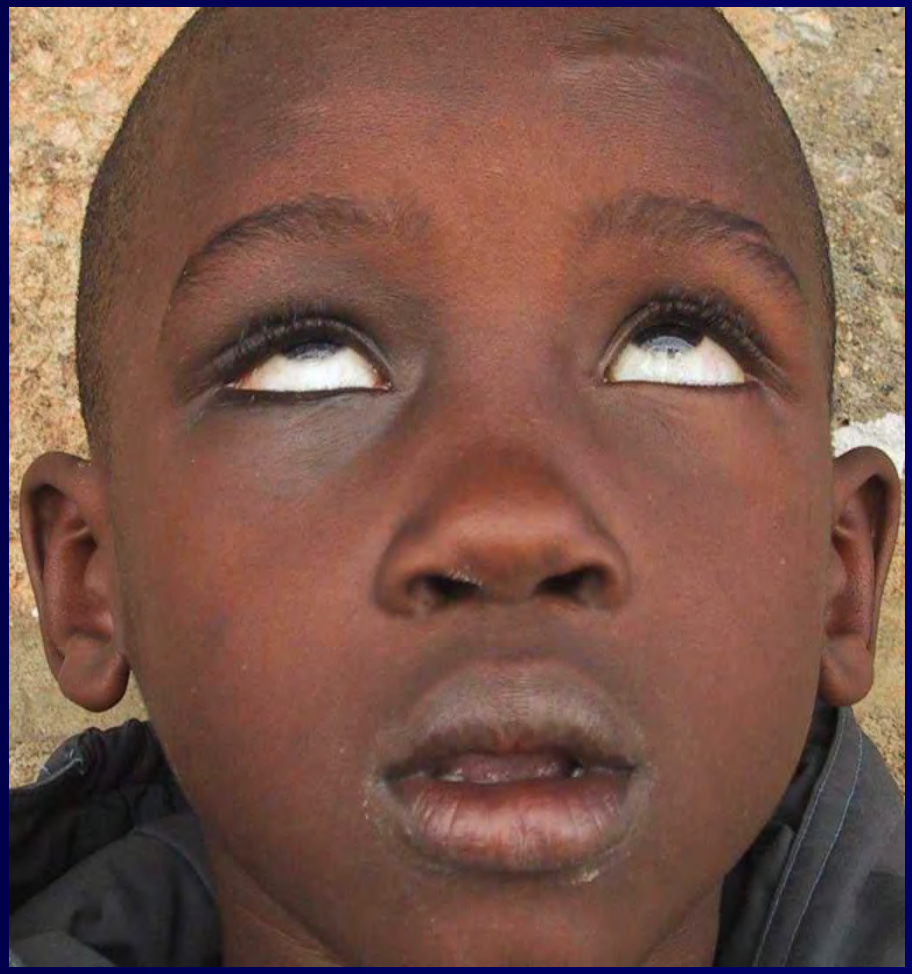
Ptosis and restriction in superior gaze

This requires extensive surgery. Give po Antibiotics for nasal flora, and no nose blowing (makes swelling worse). Refer to eye surgeon.

Orbital floor ("blowout") fracture with tissue entrapment (and periorbital swelling causing ptosis)



Before surgery

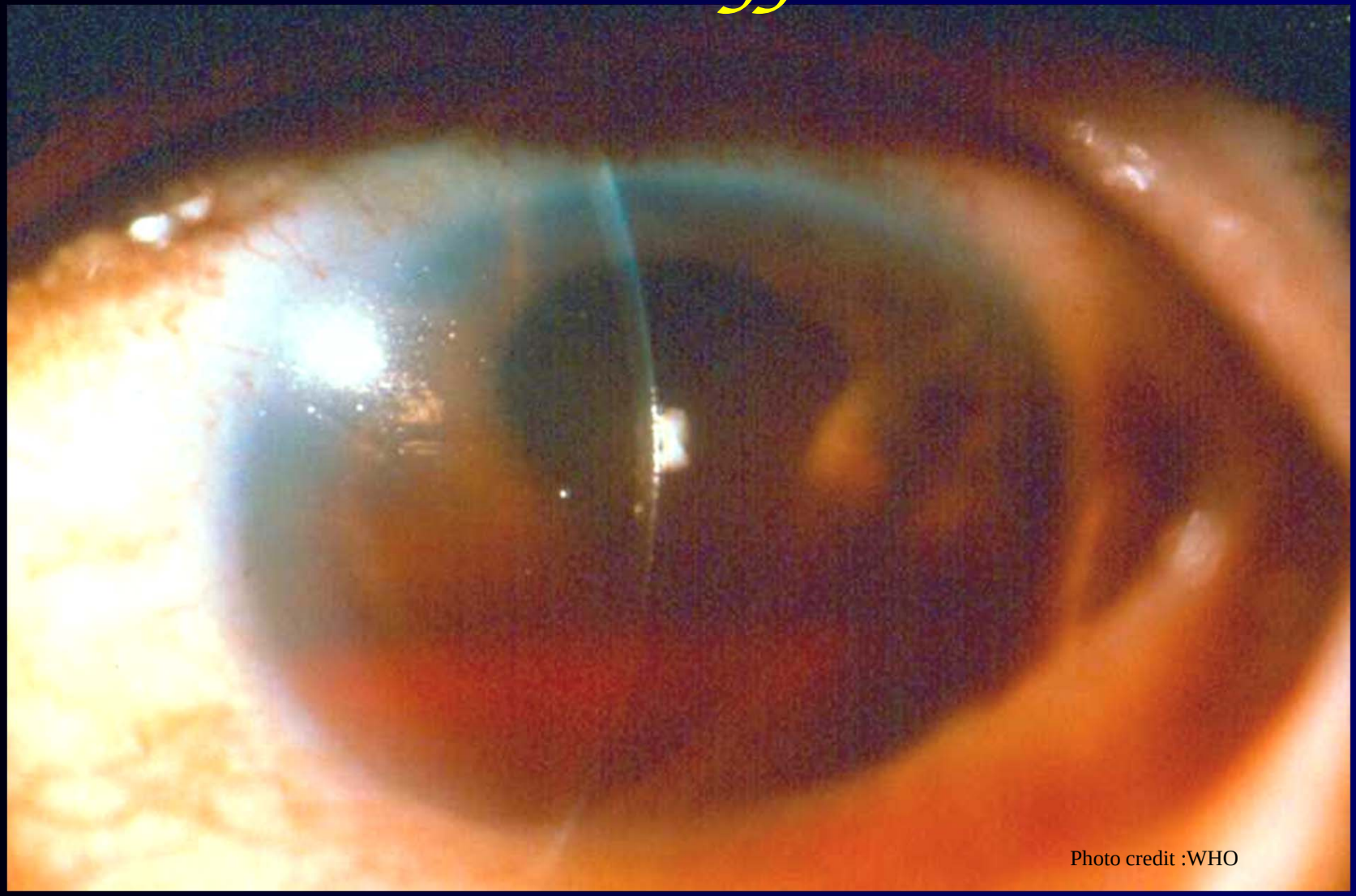


Two weeks post-op

Blunt trauma iridodialysis

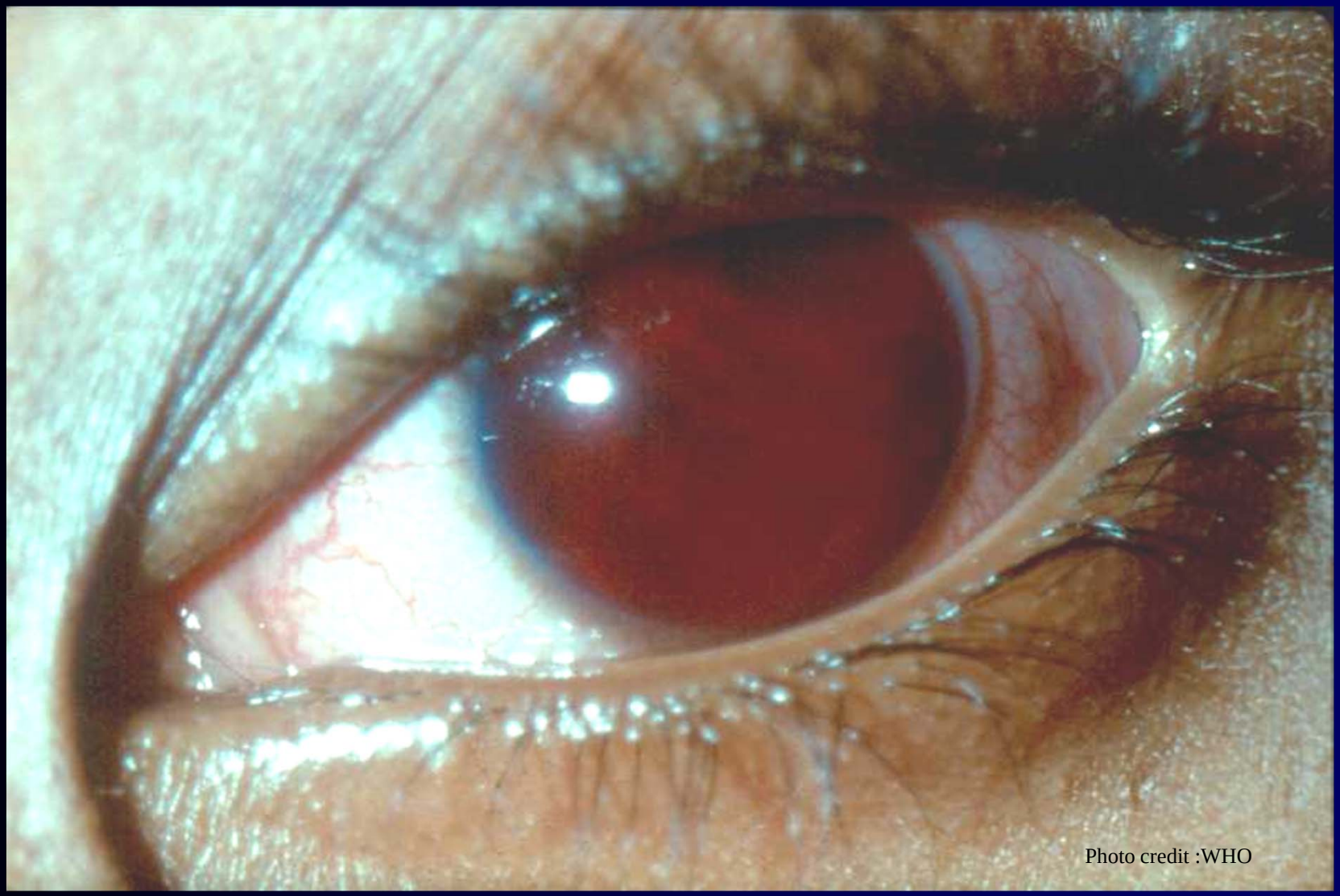
Usually no treatment needed

Partial hyphema



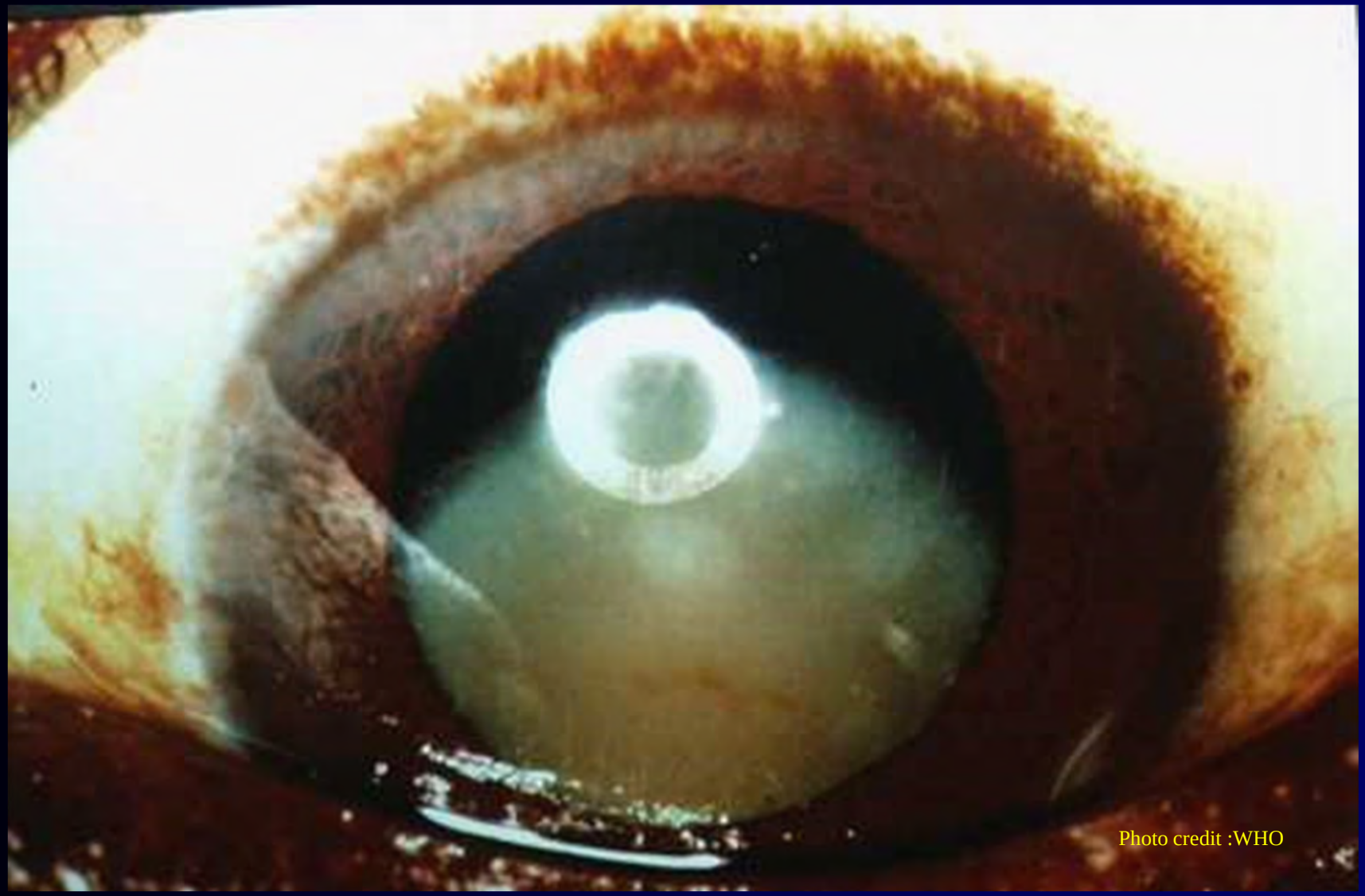
Treatment: atropine (careful!), bedrest, eye pressure drops (if needed).

Total hyphema



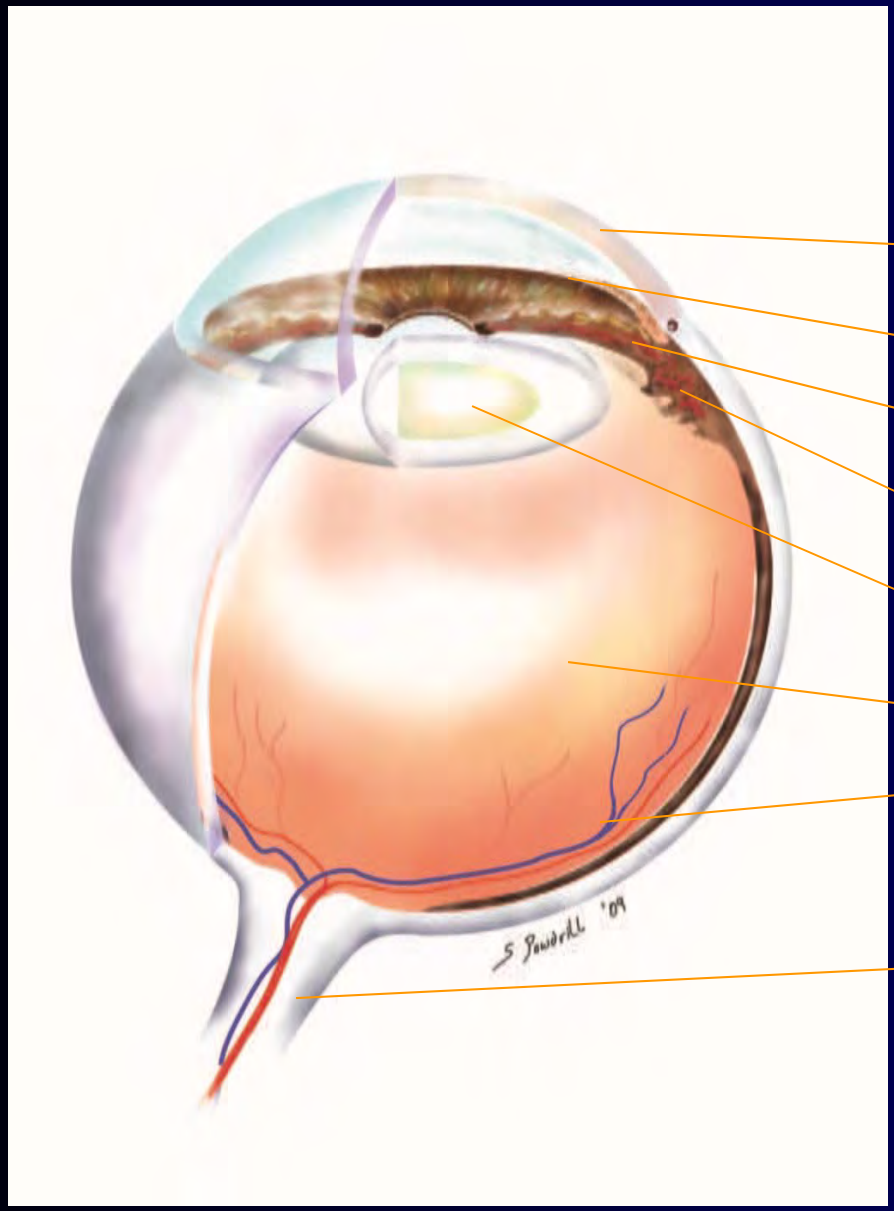
Same treatment as partial hyphema (atropine, bedrest, IOP drops *prn*).

Cataract and subluxed lens



dilation is needed for Diagnosis. Refer to an eye surgeon.

Common results of trauma



- Corneal abrasion or laceration
- Hyphema
- Iris tear
- Ciliary bodyshut down
- Cataract
- Vitreous loss or hemorrhage
- Retinal hemorrhage or detachment
- Optic nerve damage

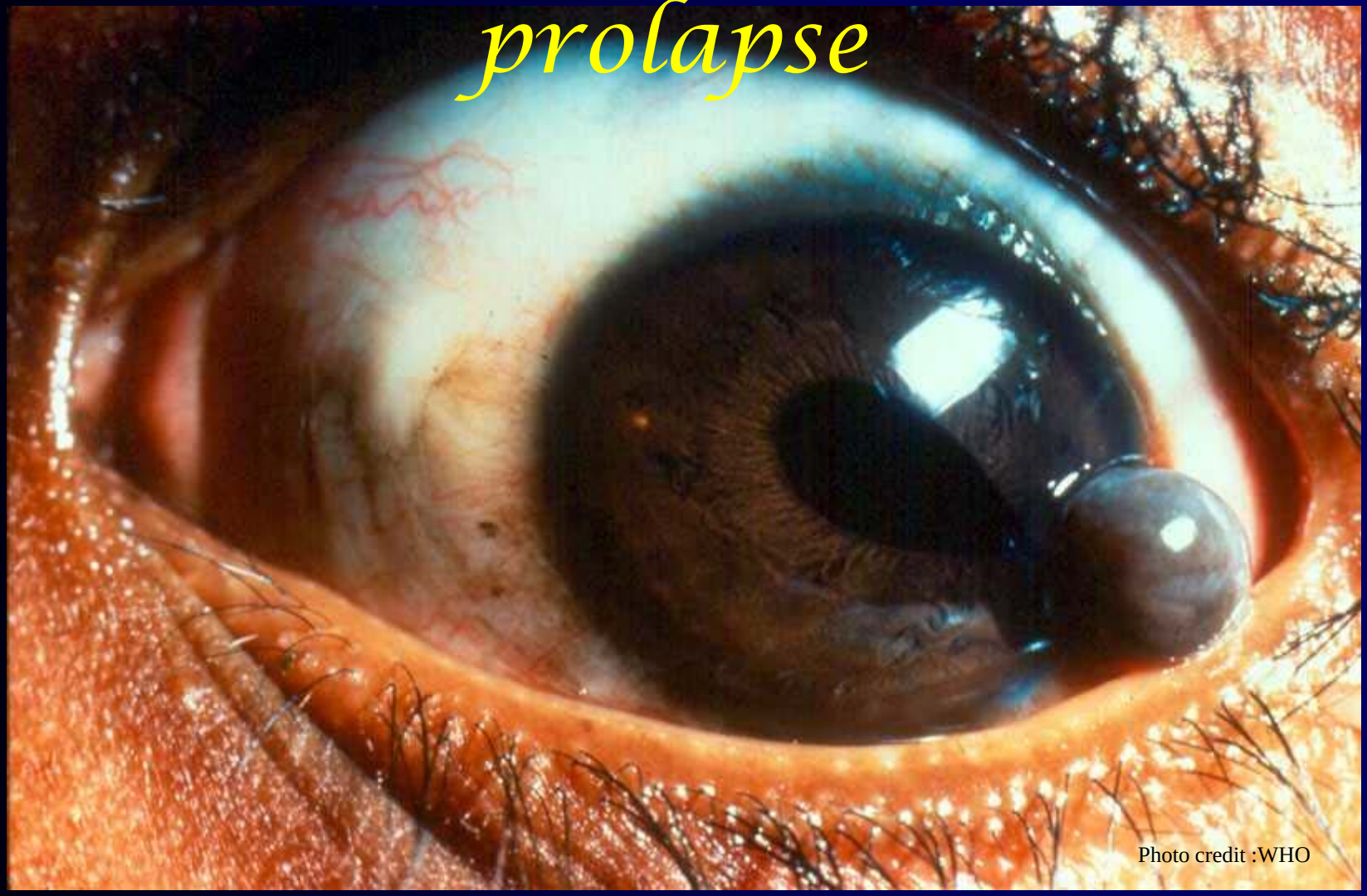
Sharp Trauma

- Lacerations
  - Knives, scissors, chopping firewood
- Perforating injuries
  - Metal-on-metal contact (eg hammering nails or pipes), sticks, thorns, pellets/bullets
  - This means something has entered the eye and remains there
  - Signs: red eye, corneal laceration, cataract, iris transillumination. Requires high degree of suspicion

Left eyelid laceration

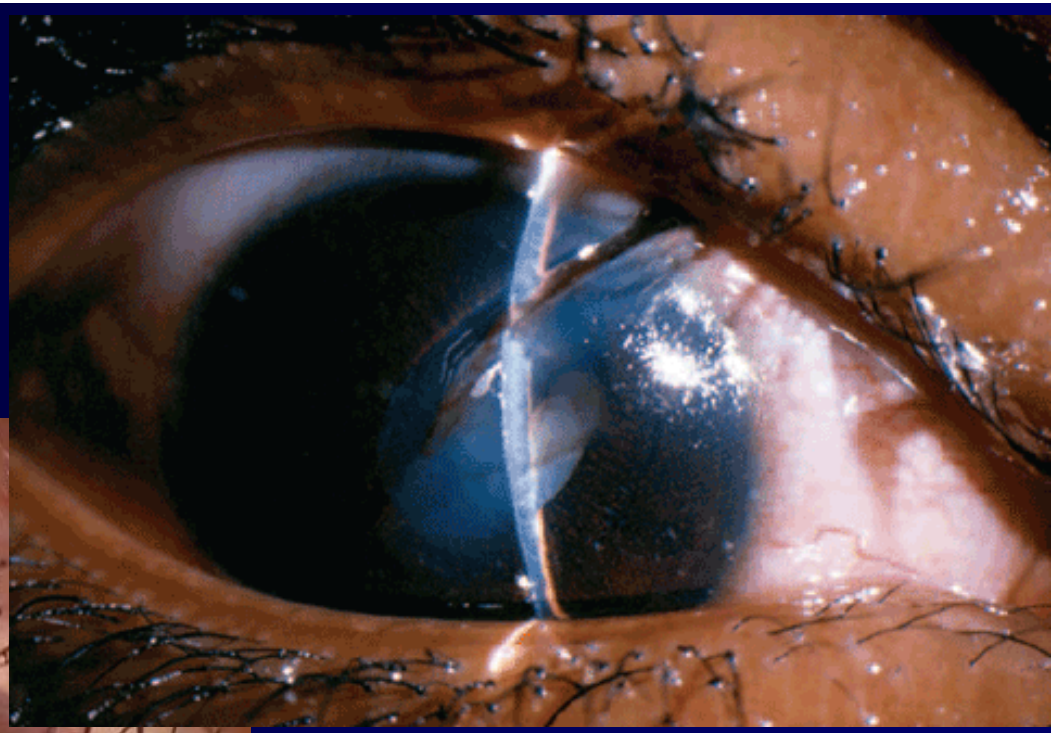
This can be repaired in the field with basic instruments.

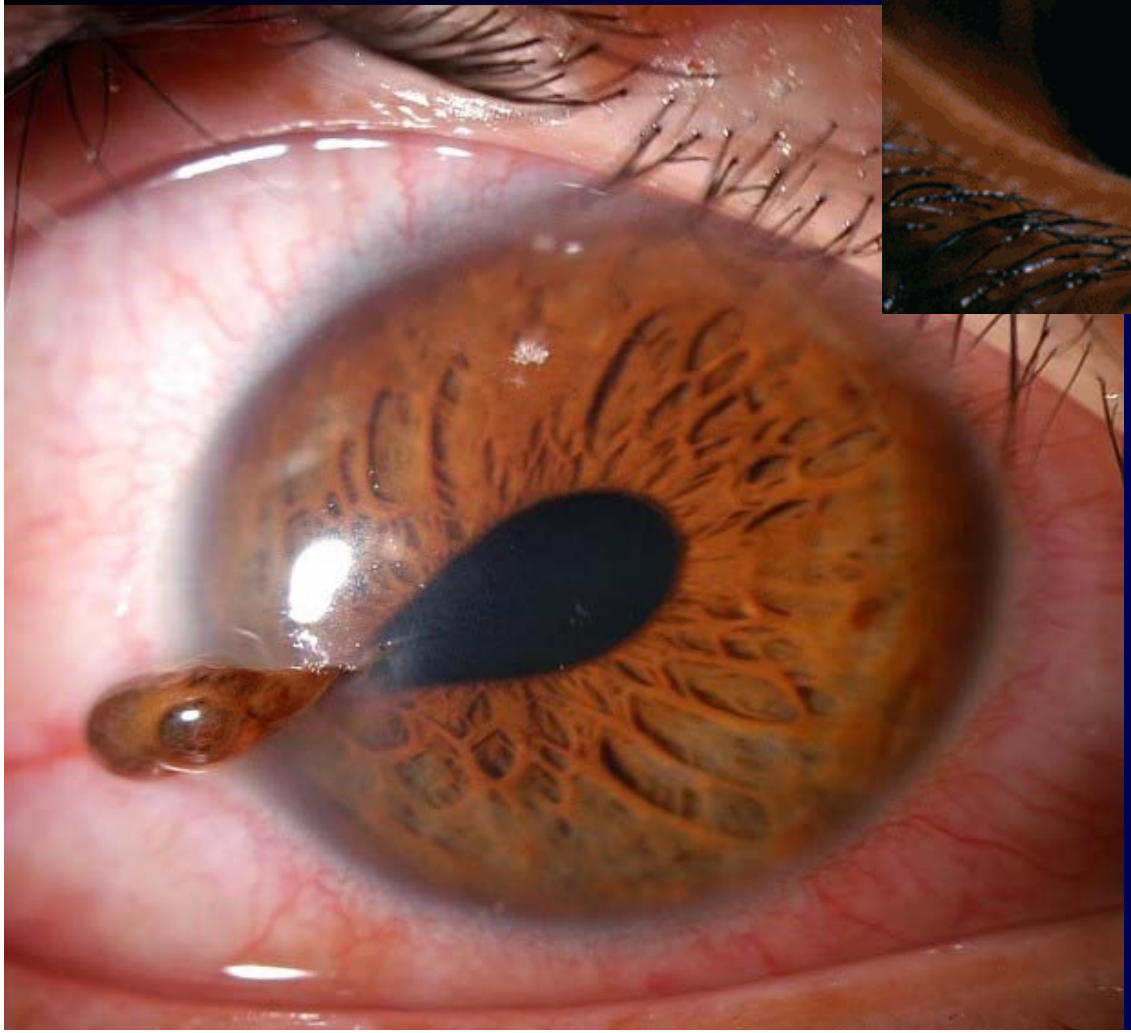
Corneal puncture and Iris prolapse



Remember: this can happen from blunt or sharp trauma. This is an open globe. Cover with a shield & refer to an eye surgeon.

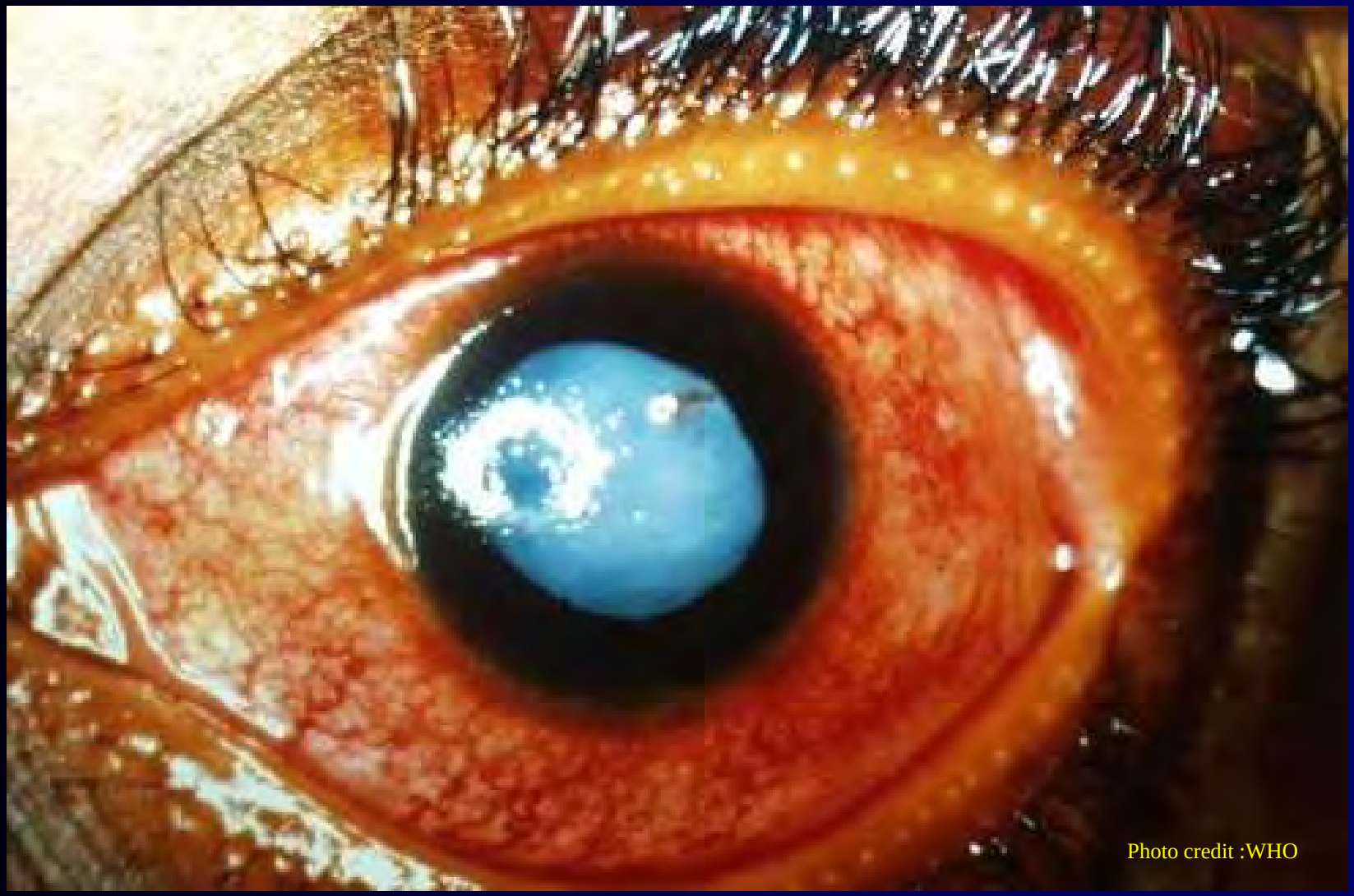
Corneal laceration





This needs to be repaired as soon as possible to avoid infection and recover optimum vision

Penetrating injury



Note: scattered light reflex, irregular pupil, cataract

Referral of a corneal laceration

- Do not remove an intraocular foreign body
- Use a cup rather than an eye pad to avoid further injury to the eye.
- Cover for tetanus
- Keep the patient NPO

Late complications of trauma

- Secondary infections
  - Corneal ulcers or scars from abrasions
  - Orbital cellulitis from skin abrasions or lacerations
- Poor vision (refer to eye surgeons)
  - Traumatic cataracts
  - Endophthalmitis (infection of the whole globe)
  - Glaucoma or low eye pressure
  - Sympathetic ophthalmia

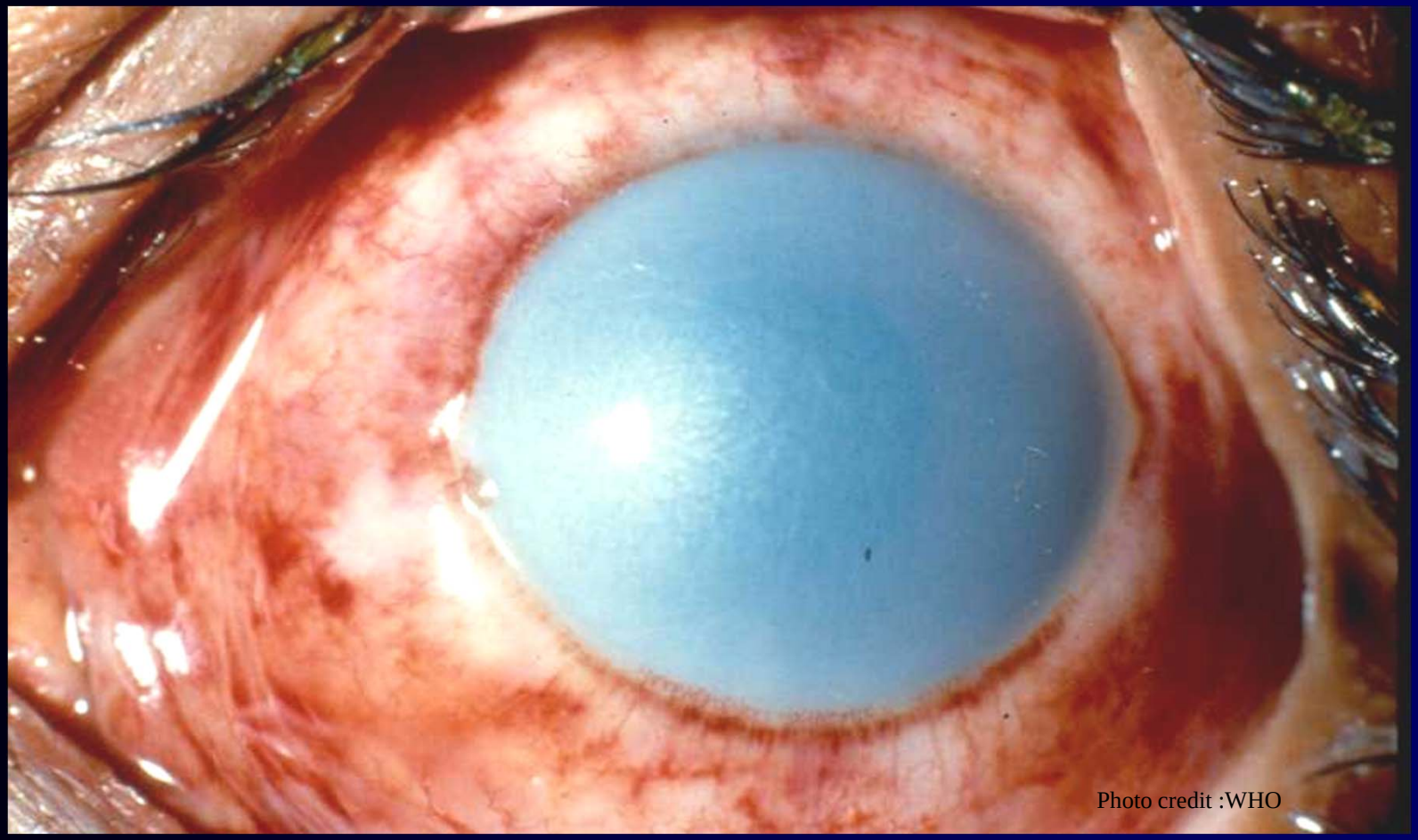
Referral

- Take a visual acuity as a baseline
- Shield not pressure dressing
- Antibiotic drops – avoid neomycin
- PO fluoroquinalones (cipro)
- Cyclopentolate not amethocaine for pain
- If you dilate the eye – record it.
- PO pain control

Burns of EENT areas

- Thermal
  - Fire, hot liquid, unprotected welding
- Chemical
  - alkalines are *worse* than acids; both are bad
- Electrical
- Radiation

Alkaline chemical burn



Copious irrigation immediately is required stat, especially for alkaline injuries. Then, Cycloplegics for pain and Antibiotic ointment, Patch as needed.

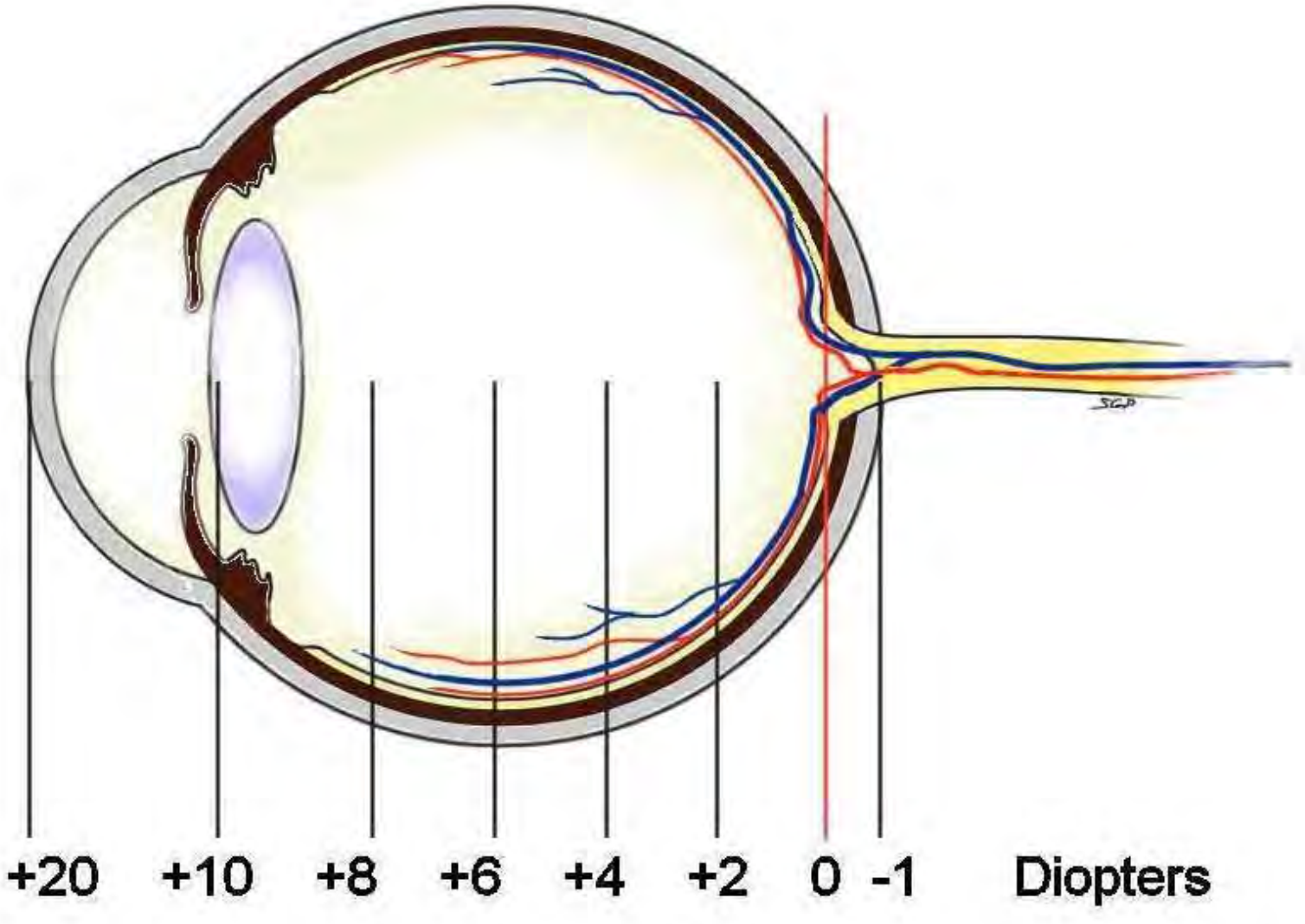
Parts of the ophthalmoscope exam

- 1. Assess the red reflex +4 at 10 inches distance
- 2. examine the cornea lids and AC with magnified view +20 at 5 cm distance
- 3. examine the inside the eye starting on 0 then adjusting the focus to get a clear view of the retina.
- 4. Optic disc
- All 4 quadrants and vessels
- 5. macula

Ophthalmoscope exam

- The exam is done starting at a distance and at 15 degrees away from the patient's central gaze.
- Position the patient to improve your view. Adjust for patient's height
- Patient should look straight ahead at a distant point over your shoulder (don't block their view)

Focusing the ophthalmoscope

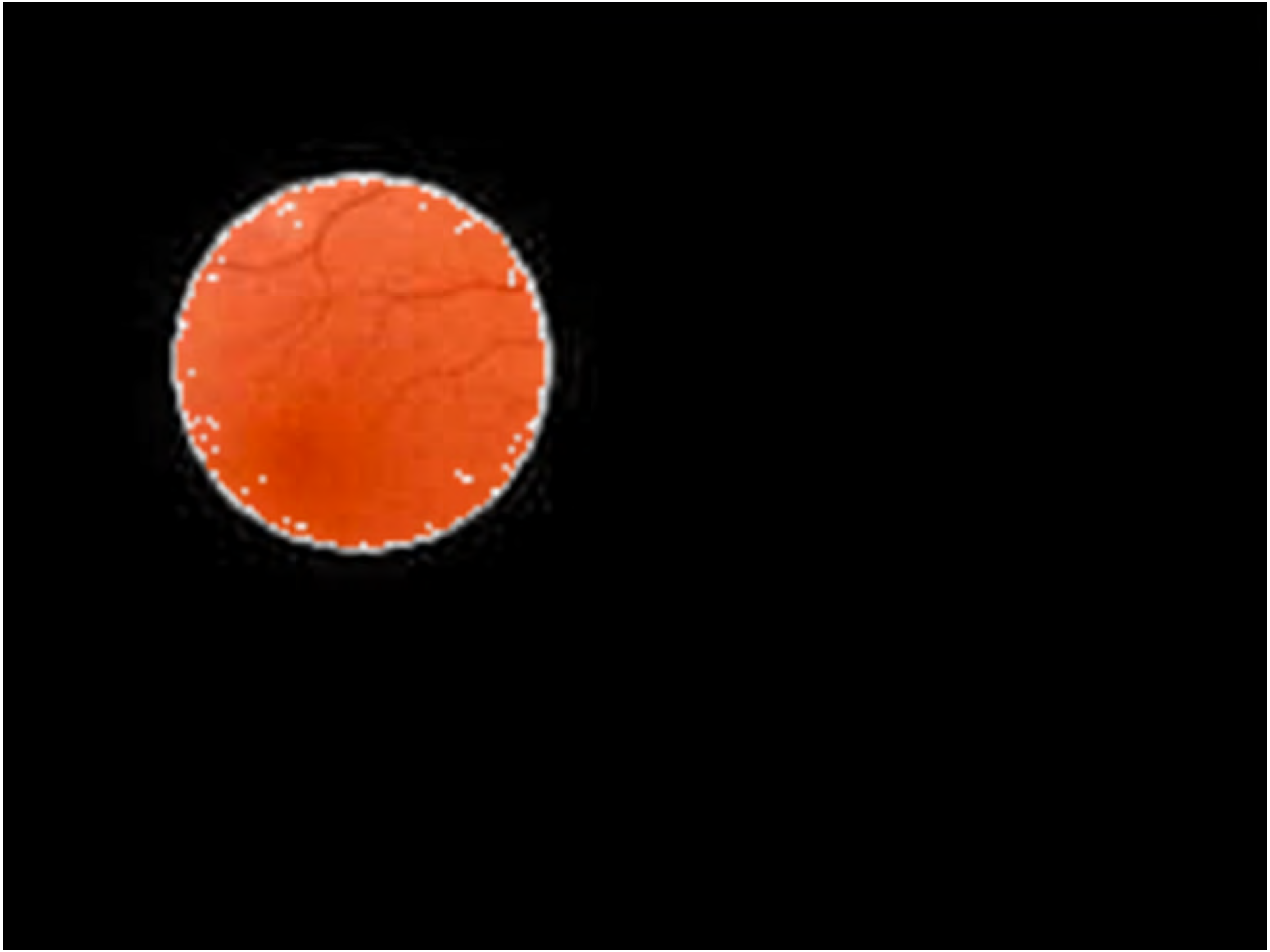


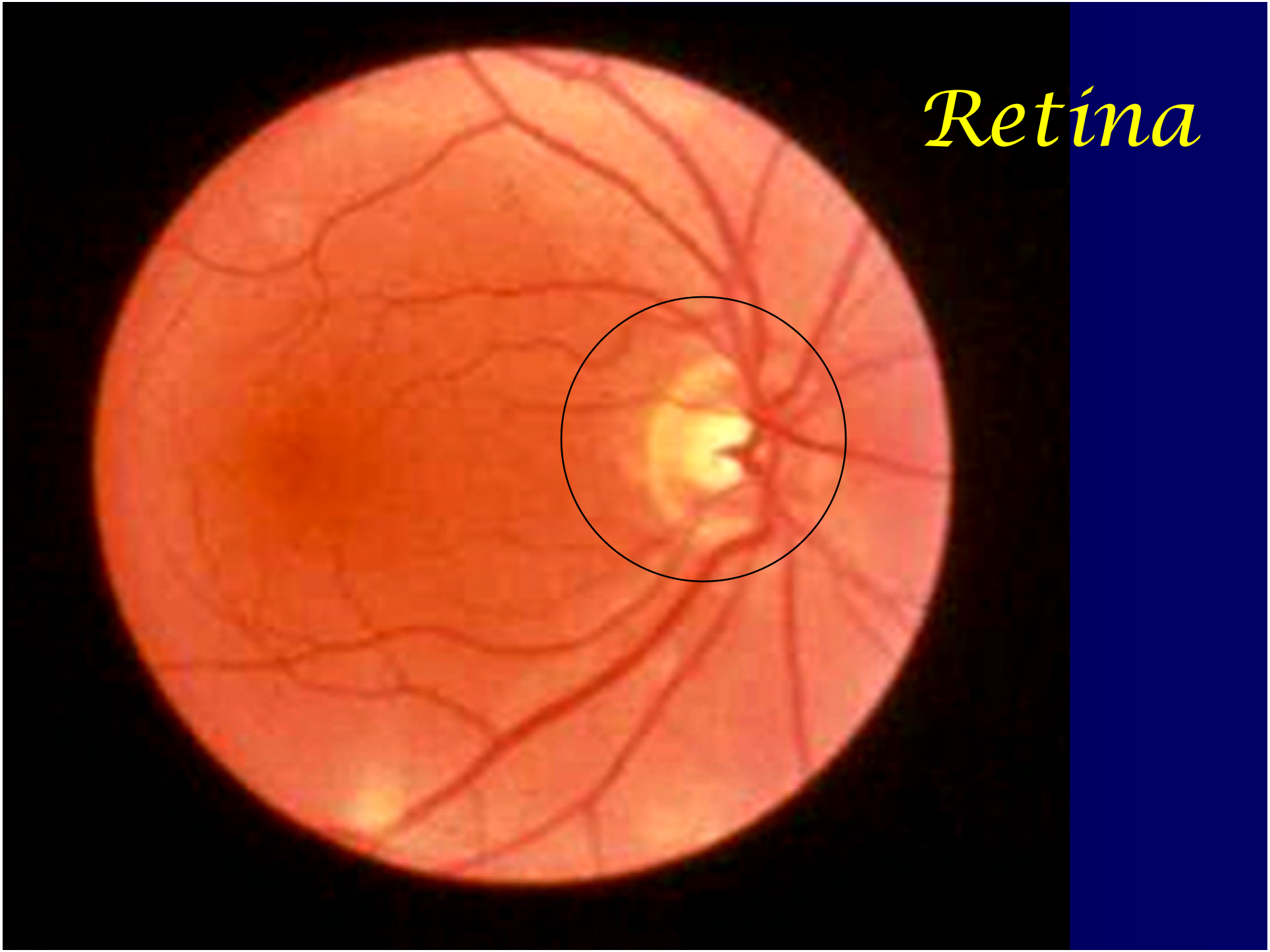
view structures in the eye with these settings

Here is how to find the optic disk on retinal exam

Watch the next slide animation

Find the optic disk by finding a vessel on retinal exam and follow it to where it converges at the optic disk




Retina

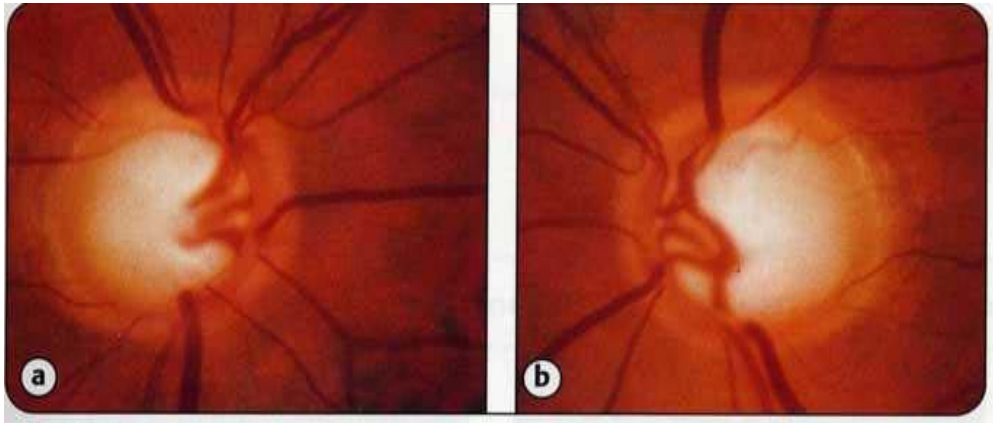


Fig. 11.29

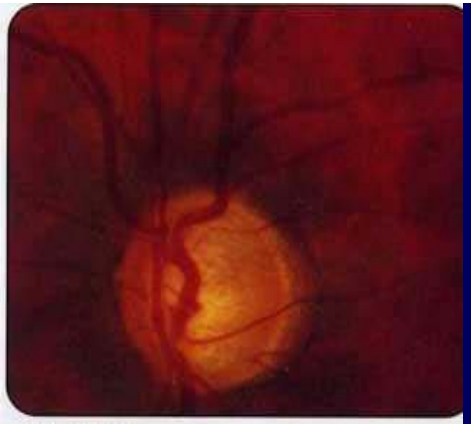


Fig. 11.30

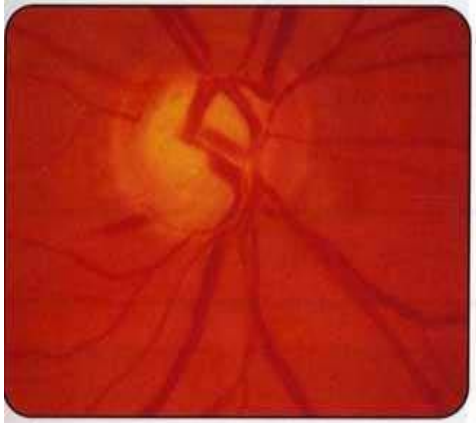


Fig. 11.31

Fig. 11.32

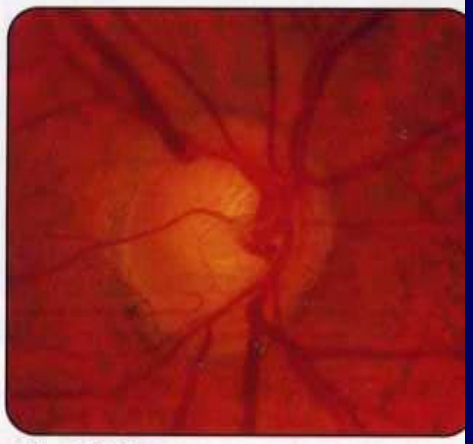
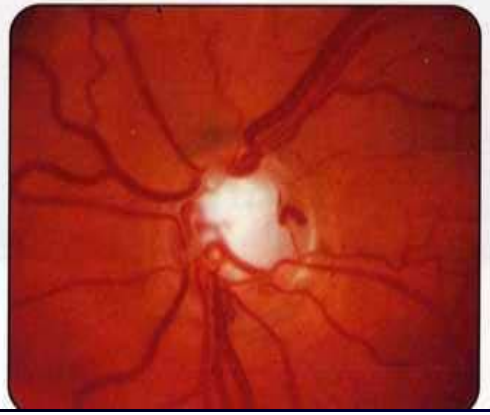
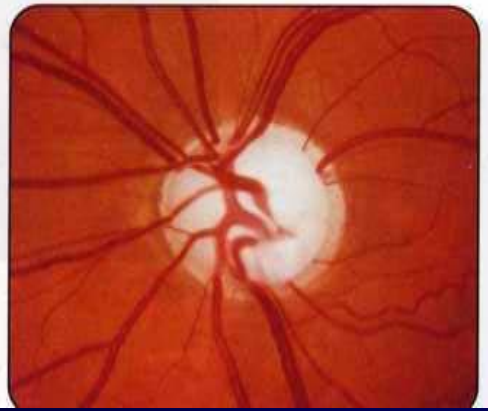


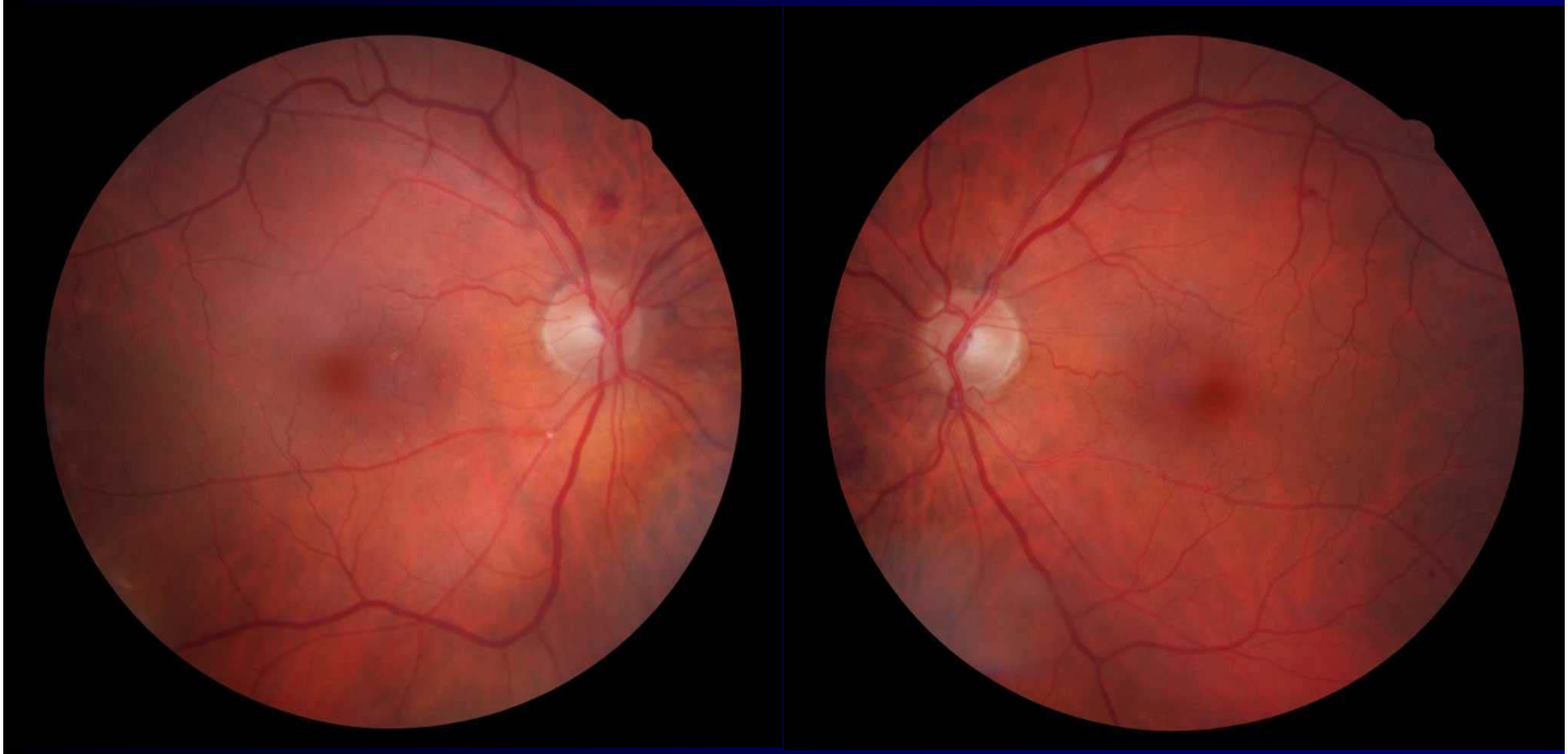
Fig. 11.33





Glaucoma cupping

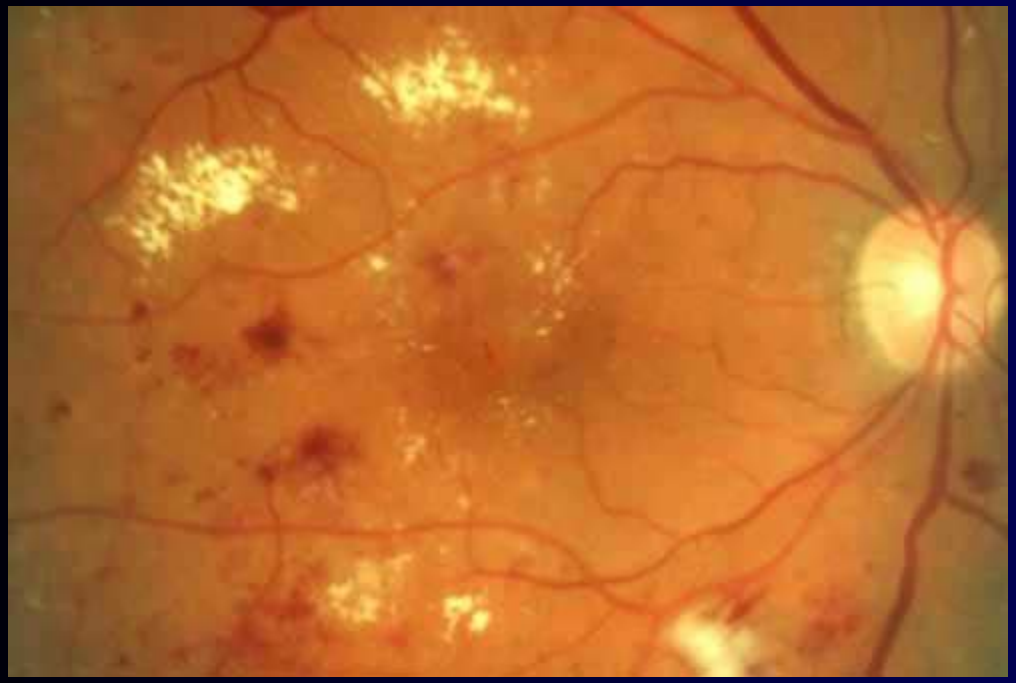
What do you see ?

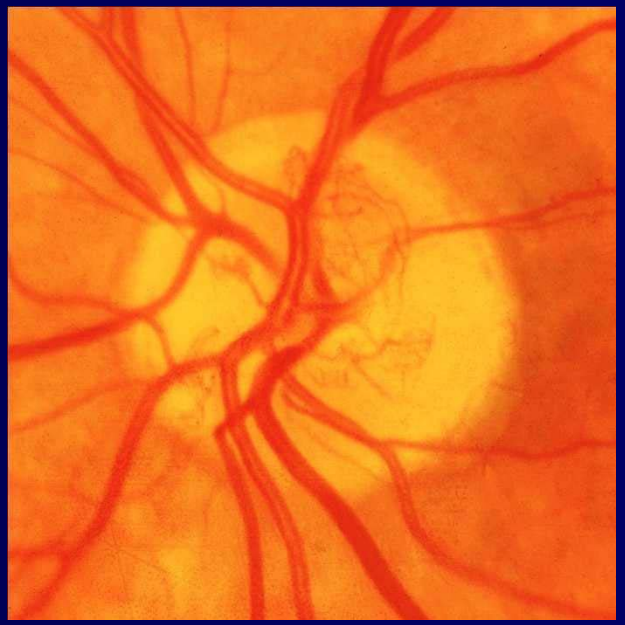


- Nicking
- Hollenhorst plaque
- Drusen
- Small hemorrhage
- Early cotton wool spot

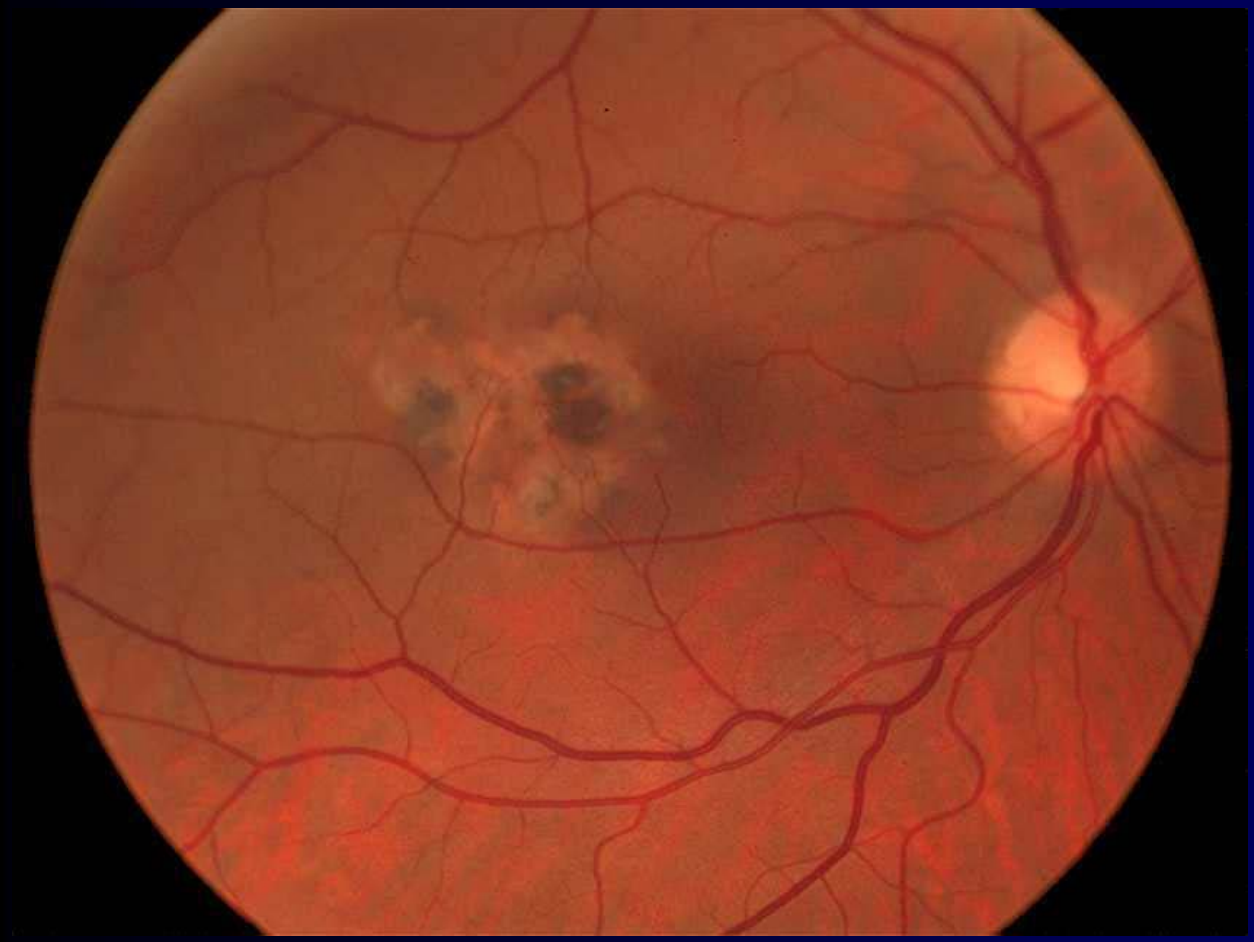
Retinopathy

- Non prolipherative
  - Exudates
  - Hemorrhages
  - Micro aneurisms
- Proliferative
  - New vessel growth



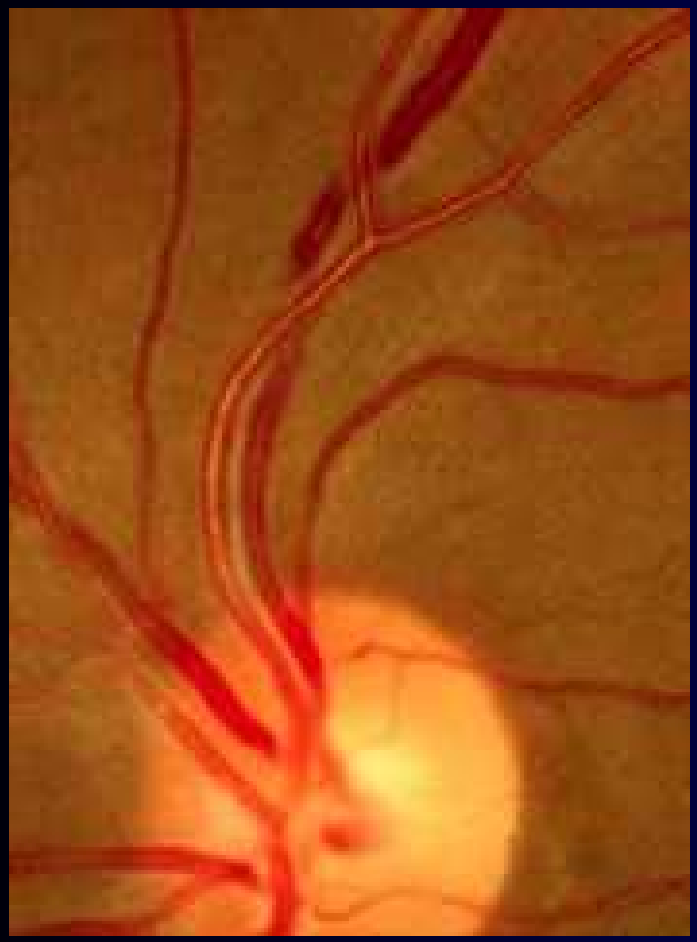


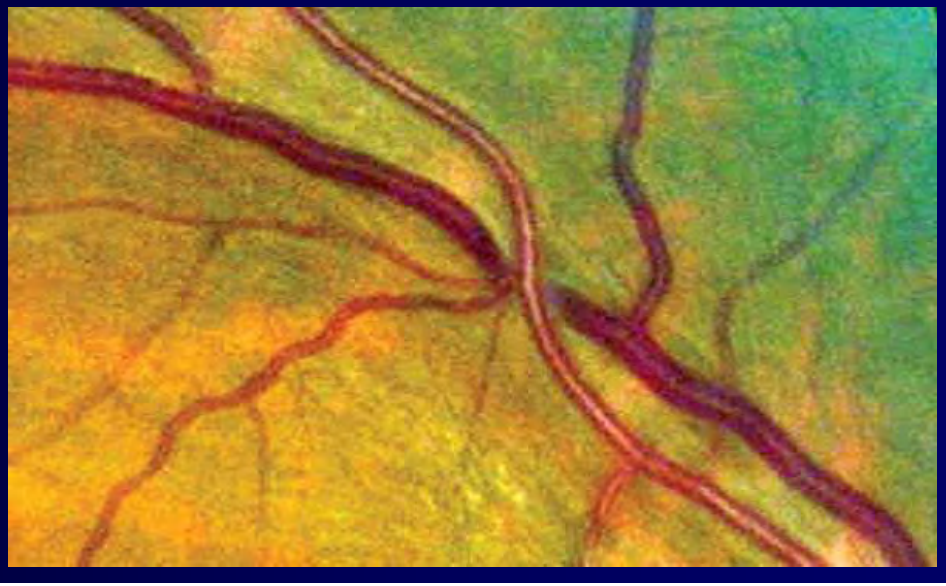
Maculopathy



- Have patient look directly into the light
- Changes in the macular area

Copper and Silver wiring





Retinal detachment

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- Prevention and Treatment of Common Eye Injuries in Sports

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- **Women at Higher-Risk than Men for Sight-Threatening Eye Diseases And Conditions**

https://www.preventblindness.org/women-higher-risk-men-sight-threatening-eye-diseases-and-conditions-1


The End
Kwaheri