



# Keeping a Close Eye on Ocular Emergencies

Rosny Daniel, MD

# Guiding Cases



65 year old presents with sudden, painless vision loss in one eye.



55 year old presents with an acutely painful red eye and blurry vision.

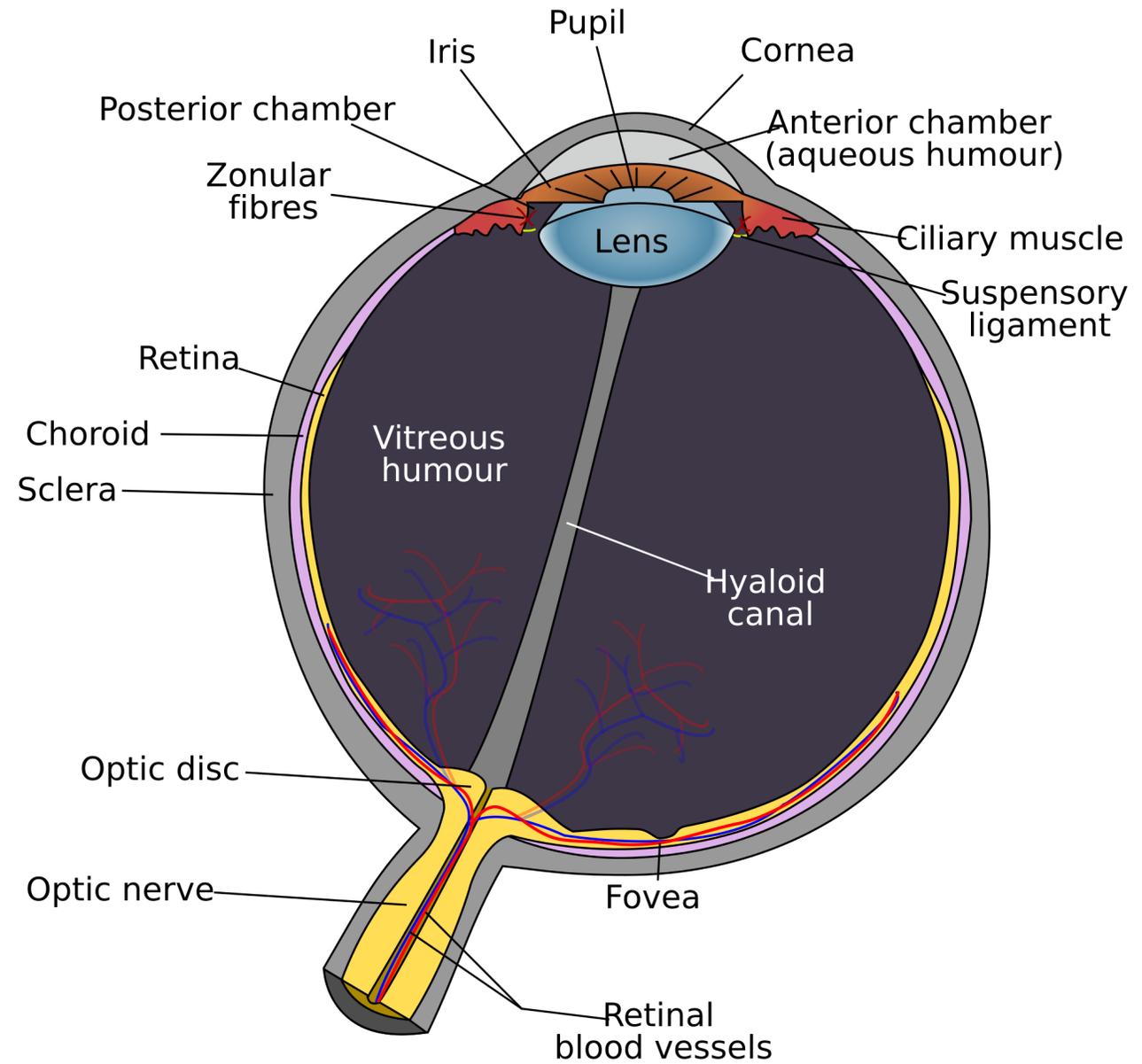


38 year old presents with eye pain after injury at work

# Objectives

1. Review components of an emergency focused ocular examination
2. Recognize time sensitive ophthalmic emergencies
3. Discuss point of care ultrasound in the eye exam
4. Describe indication and technique for lateral canthotomy





# The emergency focused ocular exam

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Visual acuity

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Extraocular movements

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Pupil exam

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Visual field exam

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Intraocular pressure

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Fluorescein exam

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Slit lamp

# Visual acuity

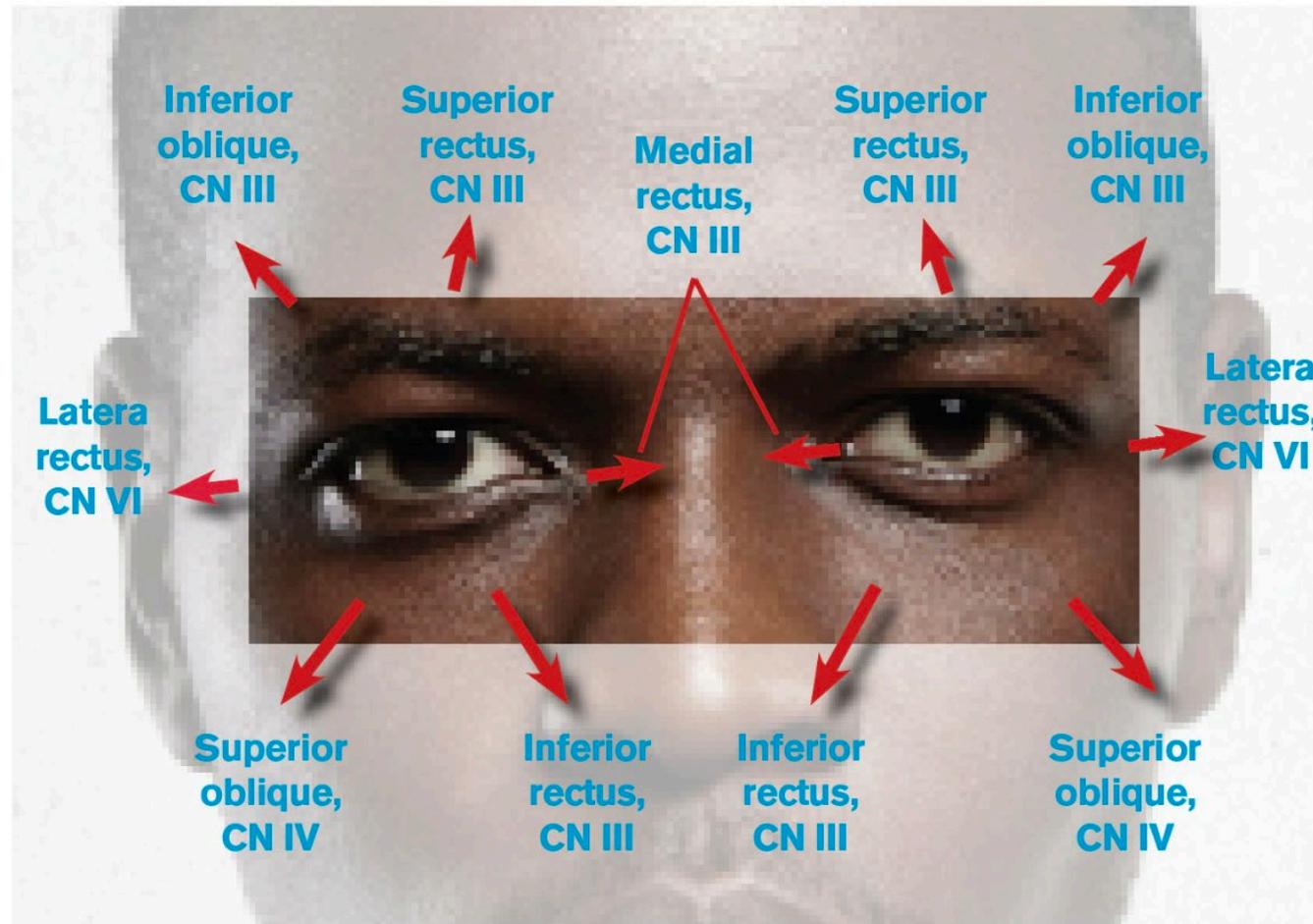
- Snellen Chart
- Pocket Card
- Have patient wear corrective lenses
- Pinhole exam
- Motion
- Light

PRINT FULL SIZE ON  
8.5X11 INCH PAPER

20 200	E	200 FT. 61 M	1
30 100	F P	100 FT. 30.5 M	2
40 70	T O Z	70 FT. 21.3 M	3
50 50	L P E D	50 FT. 15.2 M	4
60 40	P E C F D	40 FT. 12.2 M	5
70 30	E D F C Z P	30 FT. 9.14 M	6
80 25	F E L O P Z D	25 FT. 7.62 M	7
90 20	D E F P O T E C	20 FT. 6.10 M	8



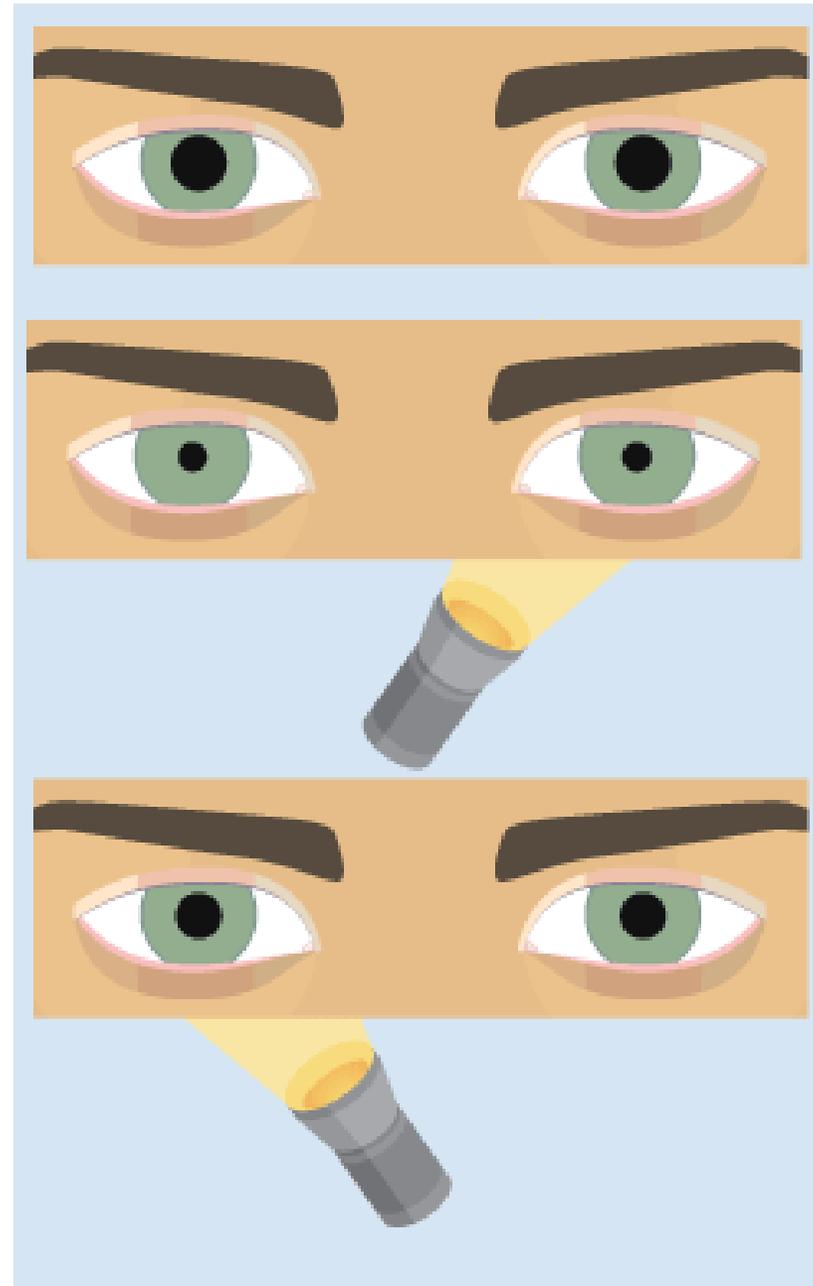
# Extraocular Movements



Eye Movement	Primary Extraocular Muscle
Adduction	Medial rectus
Abduction	Lateral rectus
Supraduction	Superior rectus
Infraduction	Inferior rectus
Intorsion (rotation toward the patient's nose)	Superior oblique
Extorsion (rotation toward the patient's ear)	Inferior oblique

# Pupil Exam

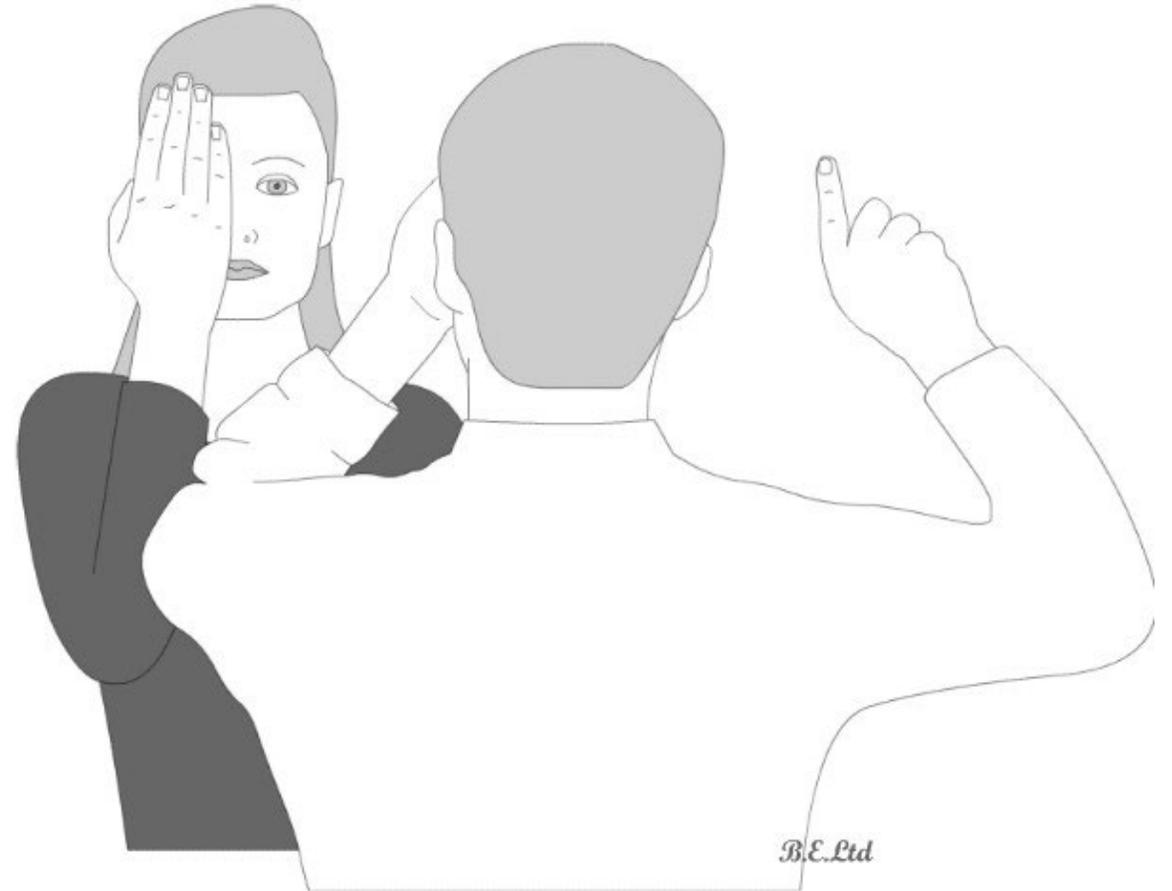
- Evaluate size, shape
- Consensual response
- Afferent pupillary defect
- History of asymmetric pupils



# Visual Field Exam

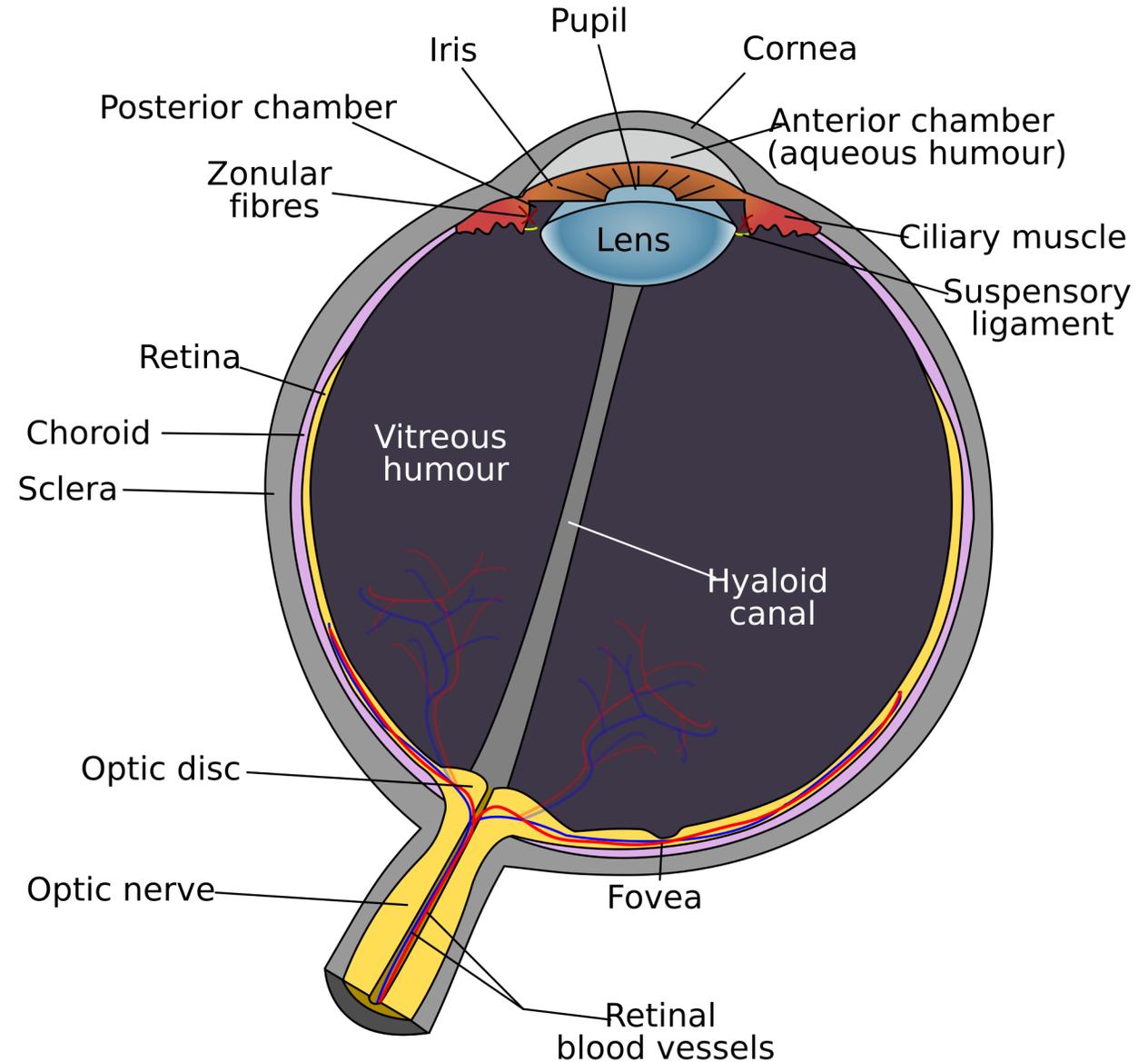
- Test one Eye at a time
- Check four quadrants
- Hand should be equidistant

## Visual fields test

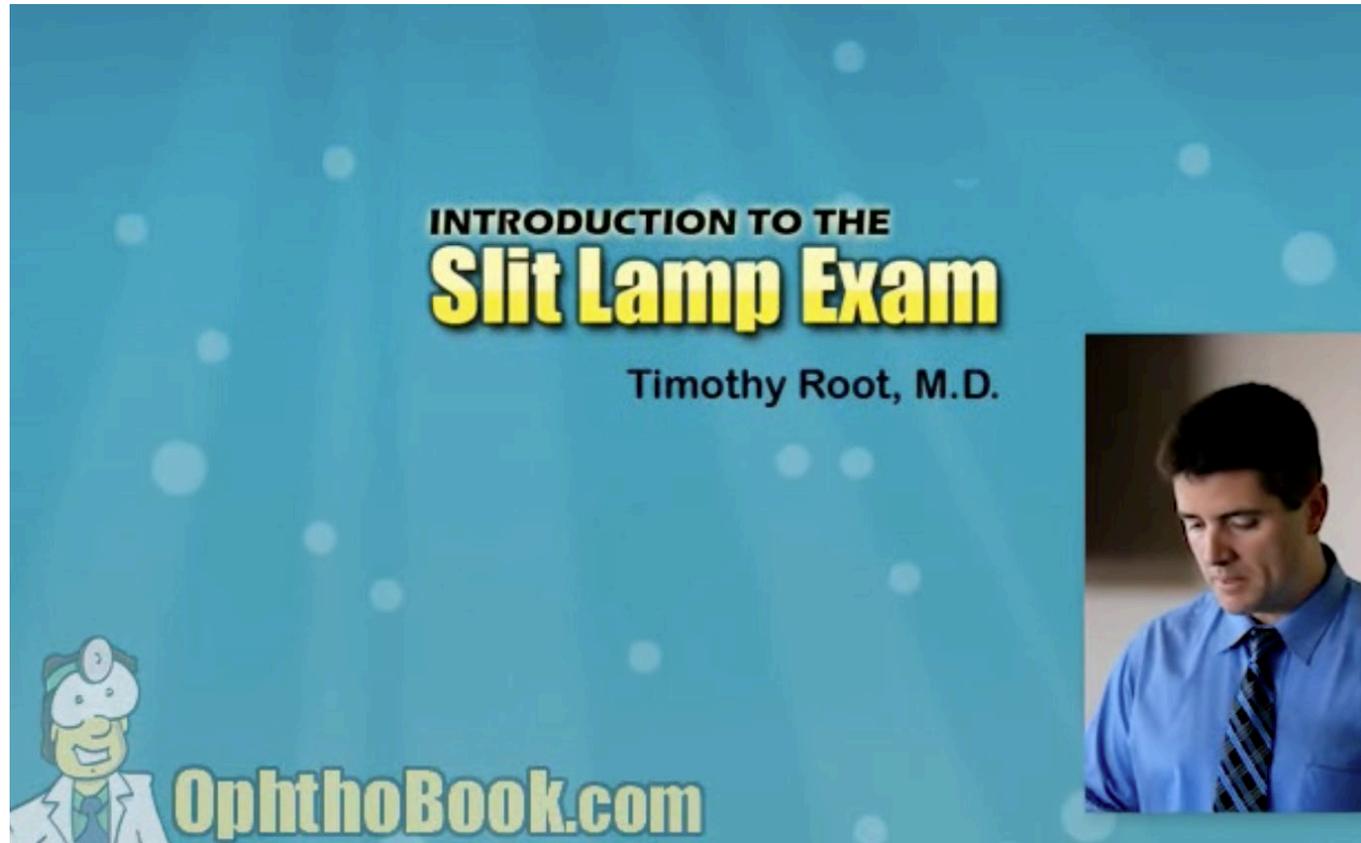


# Intraocular pressure

- Test over center of the cornea
- Document bilateral pressures



# Slit Lamp and Fluorescein Exams



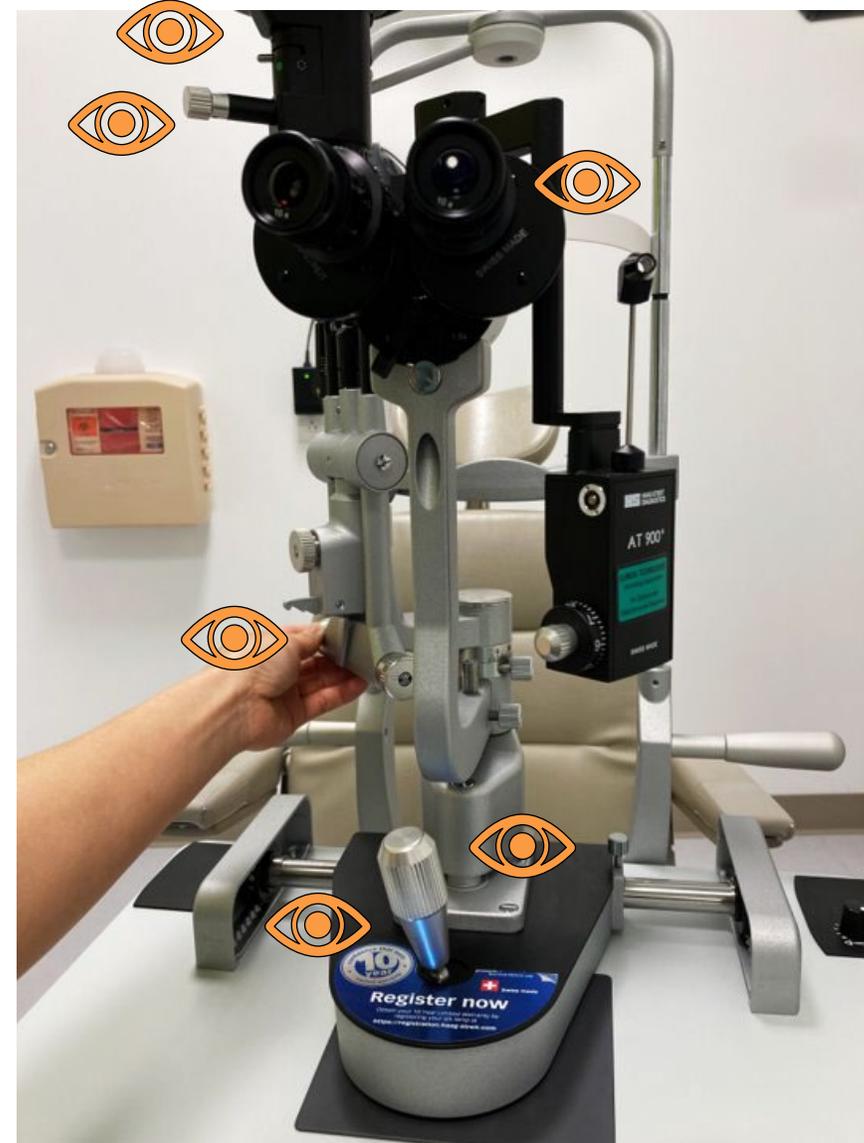
# Slit Lamp and Fluorescein Exams

- Comfort is key
- Patient must be positioned correctly
- Many bobs and knobs
- Main benefit is anterior chamber exam
- Wood's Lamp and standard Ophthalmoscopes have a blue light!

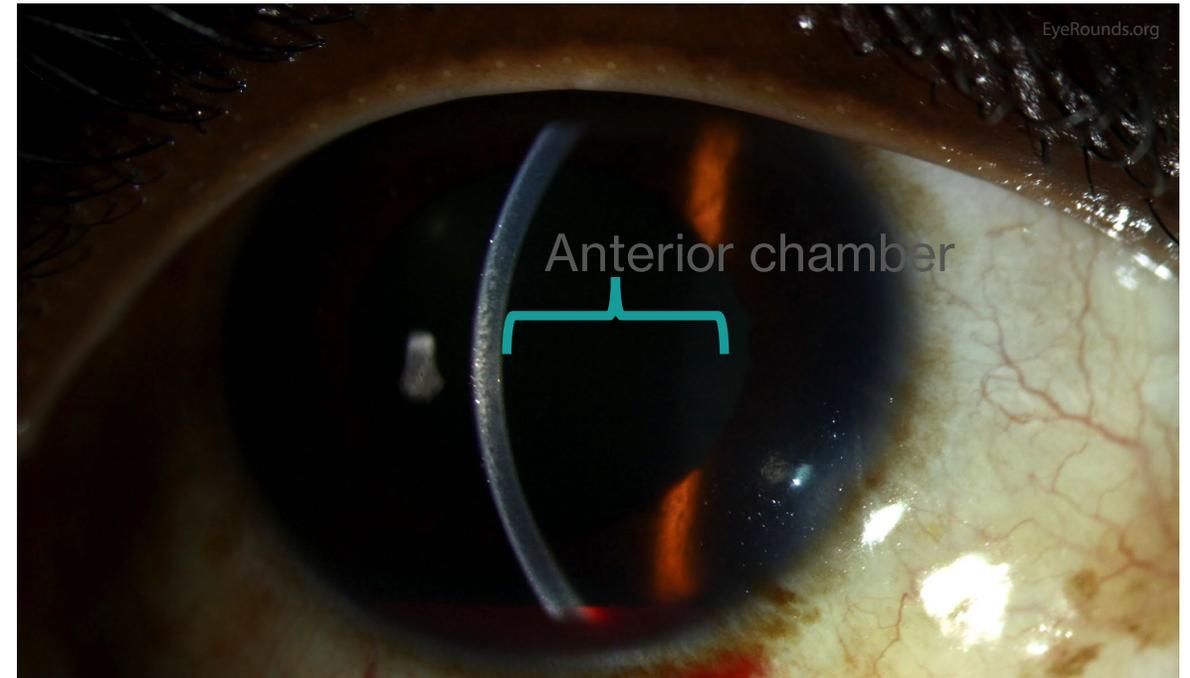
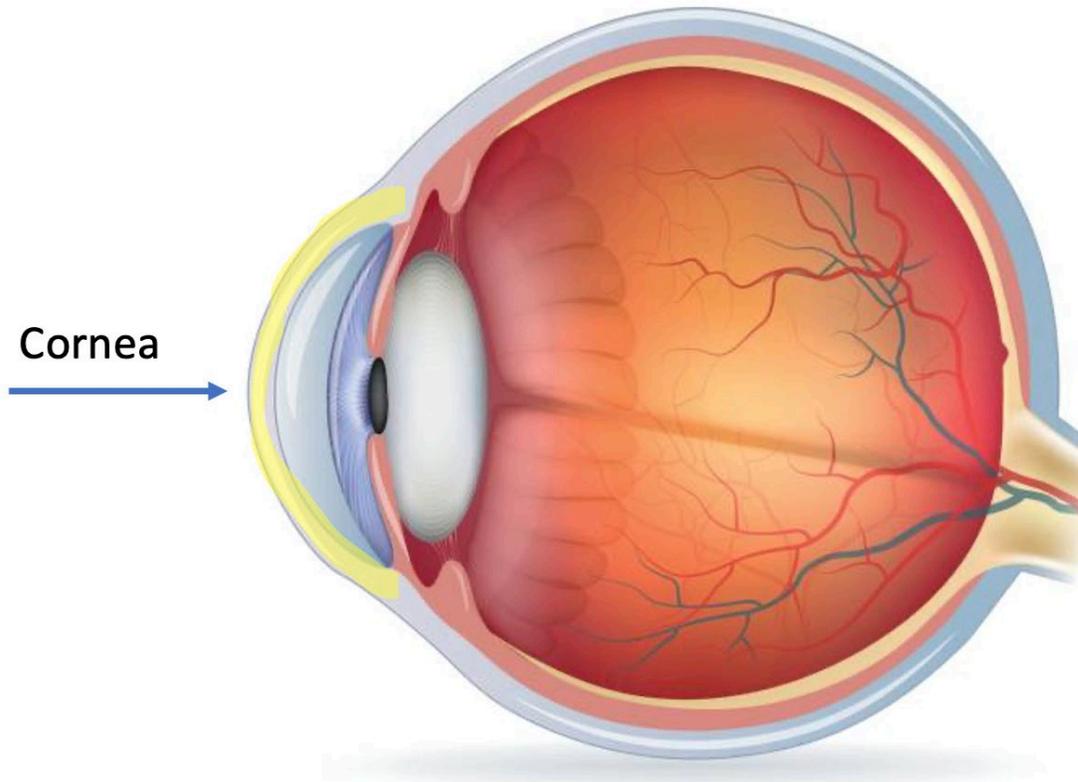


# Slit Lamp and Fluorescein Exams

- Pupil distance
- Patient position
- Brightness and color
- Shape of light beam
- Macro vs micro movements
- Magnification



# Slit Lamp and Fluorescein Exams



# Slit Lamp and Fluorescein Exams



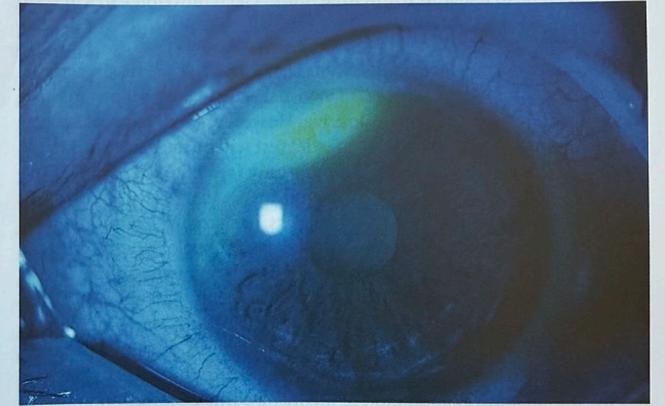
**FIGURE 236-16.** Hypopyon: a layering of white blood cells in the inferior portion of the anterior chamber. (Courtesy of Allen R. Katz, Department of Ophthalmology, University of Nebraska Medical Center.)



**FIGURE 236-17.** Hyphema secondary to blunt trauma. Note the blood filling the lower half of the anterior chamber and hazy appearance of cornea suggesting increased intraocular pressure. (Courtesy of Allen R. Katz, Department of Ophthalmology, University of Nebraska Medical Center.)

# Slit Lamp and Fluorescein Exams

- Drop proparacaine in first
- Drop proparacaine onto fluorescein strips
- Gently touch to the eye



**FIGURE 236-39.** Corneal abrasion. (Reproduced with permission from Knoop K, Stack L, Storrow A: *Atlas of Emergency Medicine*, 2nd ed. © 2002, McGraw-Hill, New York.)



# Guiding Cases



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55 year old presents with an acutely painful red eye and blurry vision.

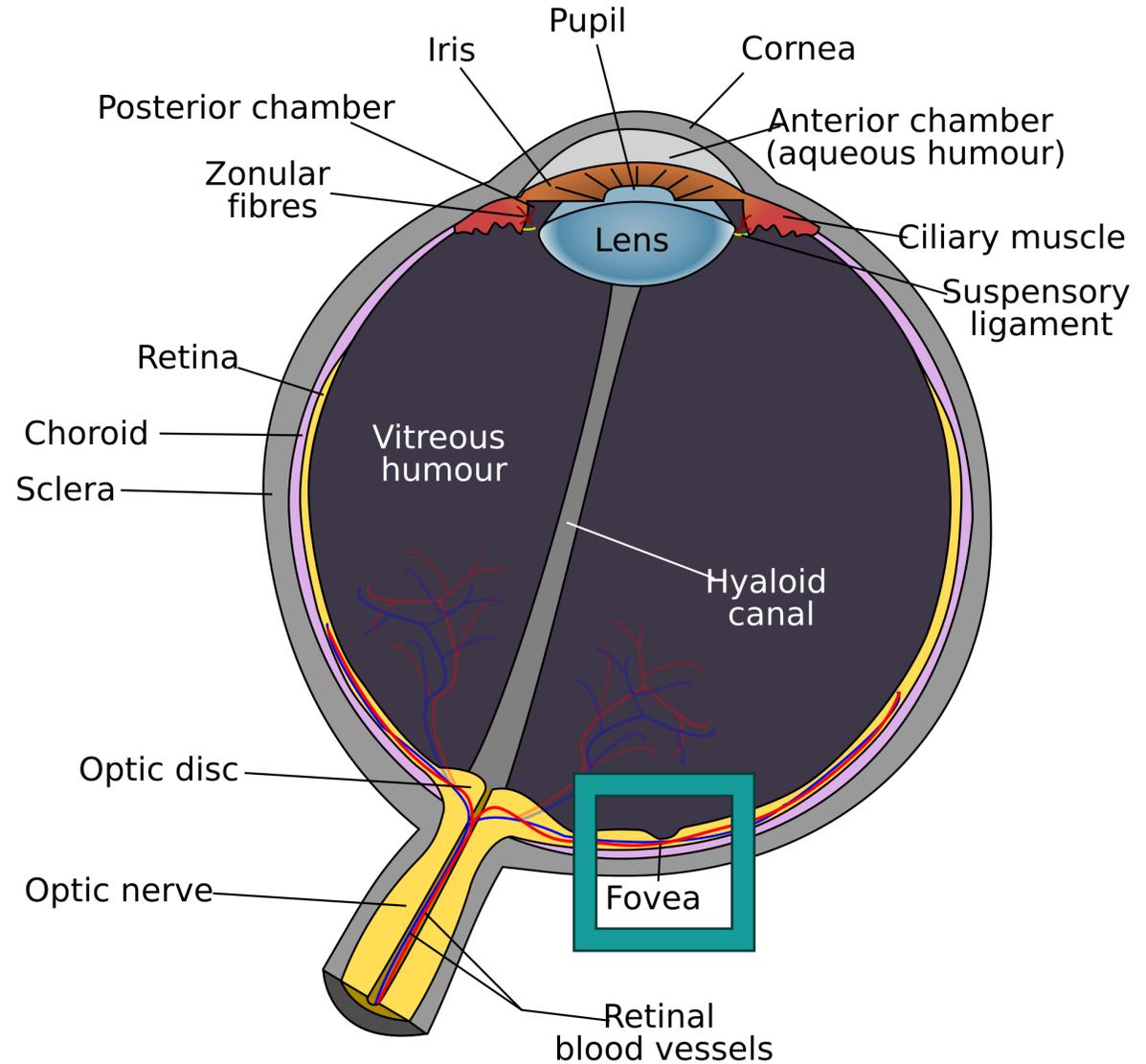
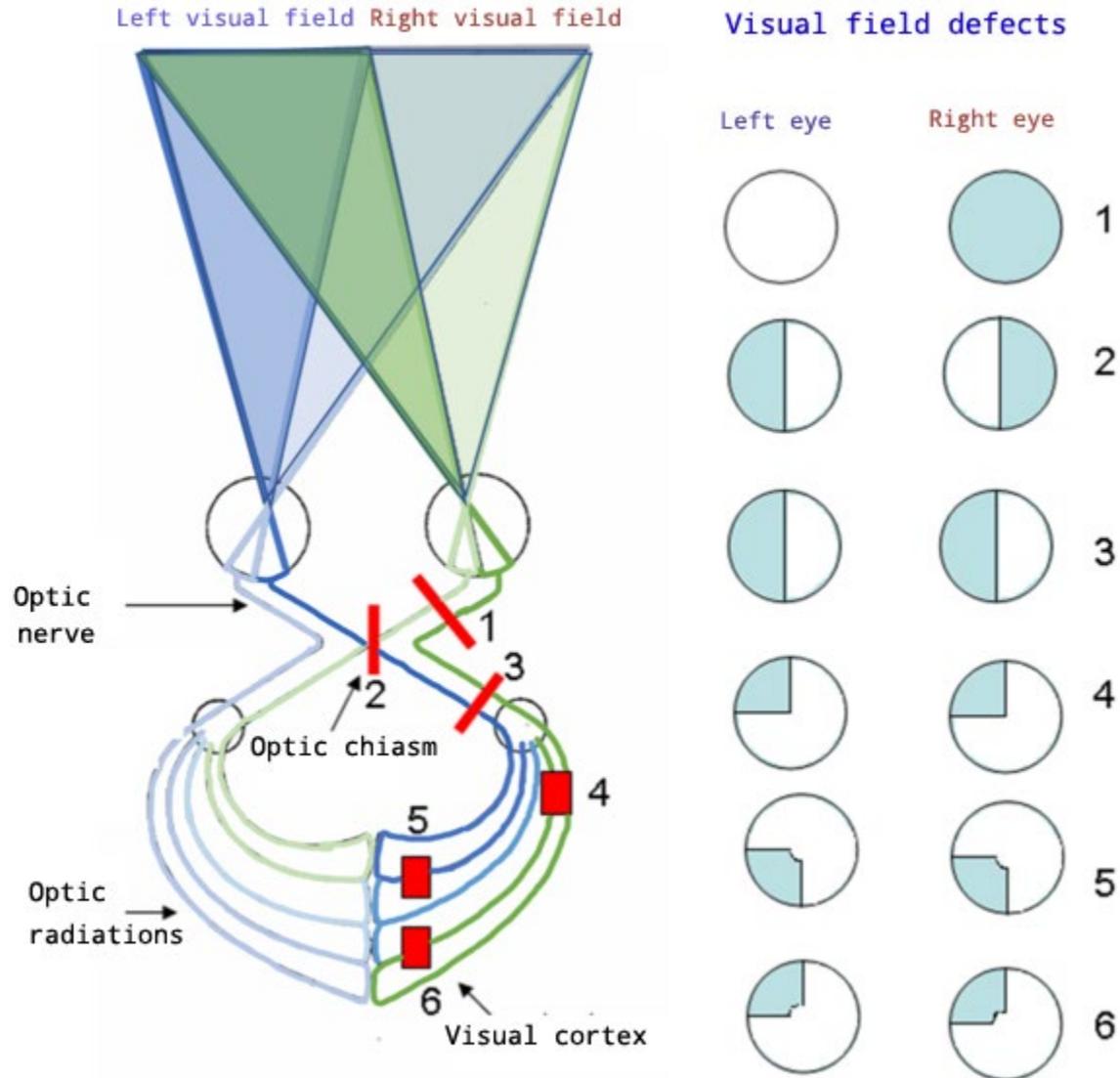


38 year old presents with eye pain after traumatic injury at work

# Case 1

- 65 year old presents with sudden, painless vision loss in one eye
- HPI: Patient was at home watching TV, noticed that they couldn't see very well from R eye, their depth perception started to feel off
- PMH: HTN, HLD, DM, gout
- Vitals: T: 36 HR: 87 BP: 176/97 RR:12 O2: 98%

# Painless vision loss



# Painless vision loss

- **Retinal Problem**

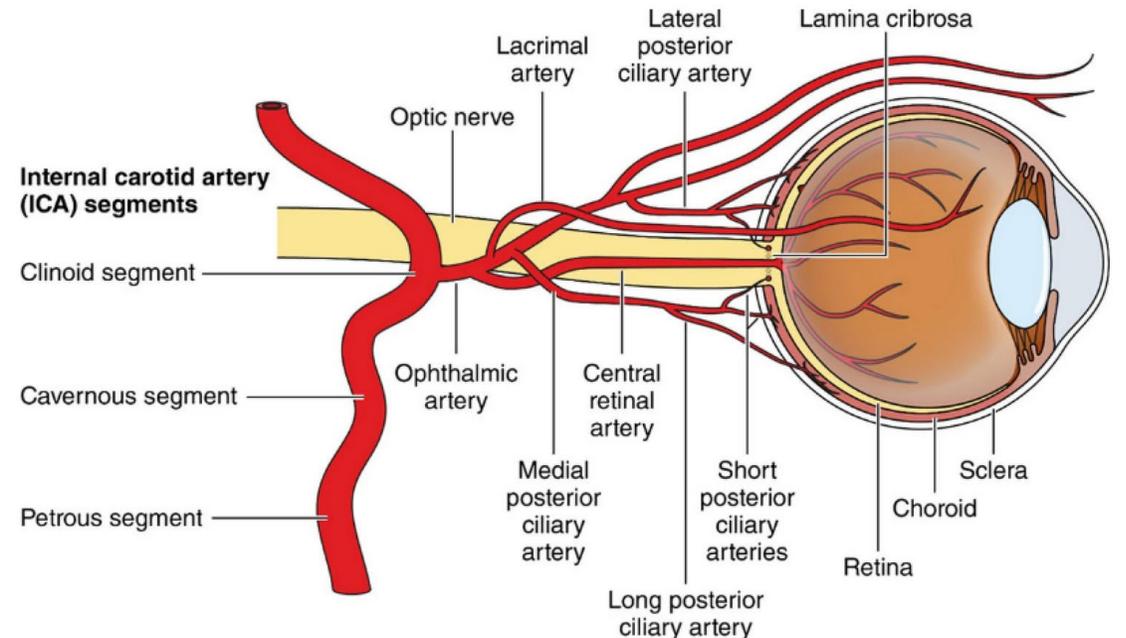
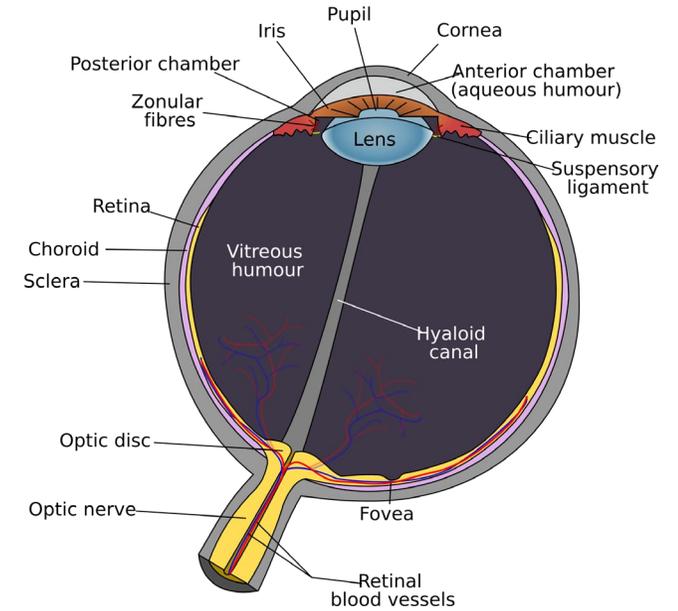
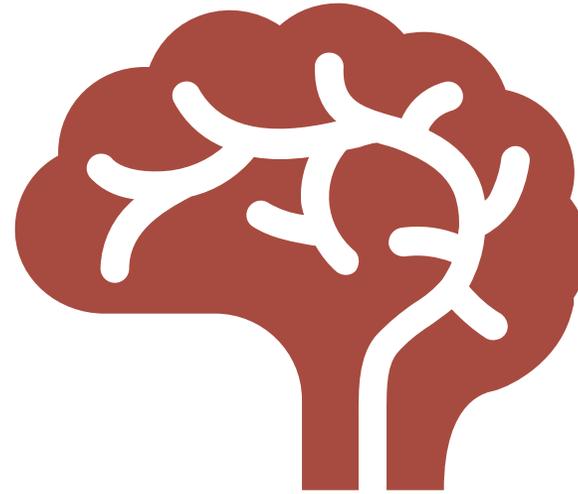
- Retinal detachment
- Posterior vitreous detachment

- **Brain Problem**

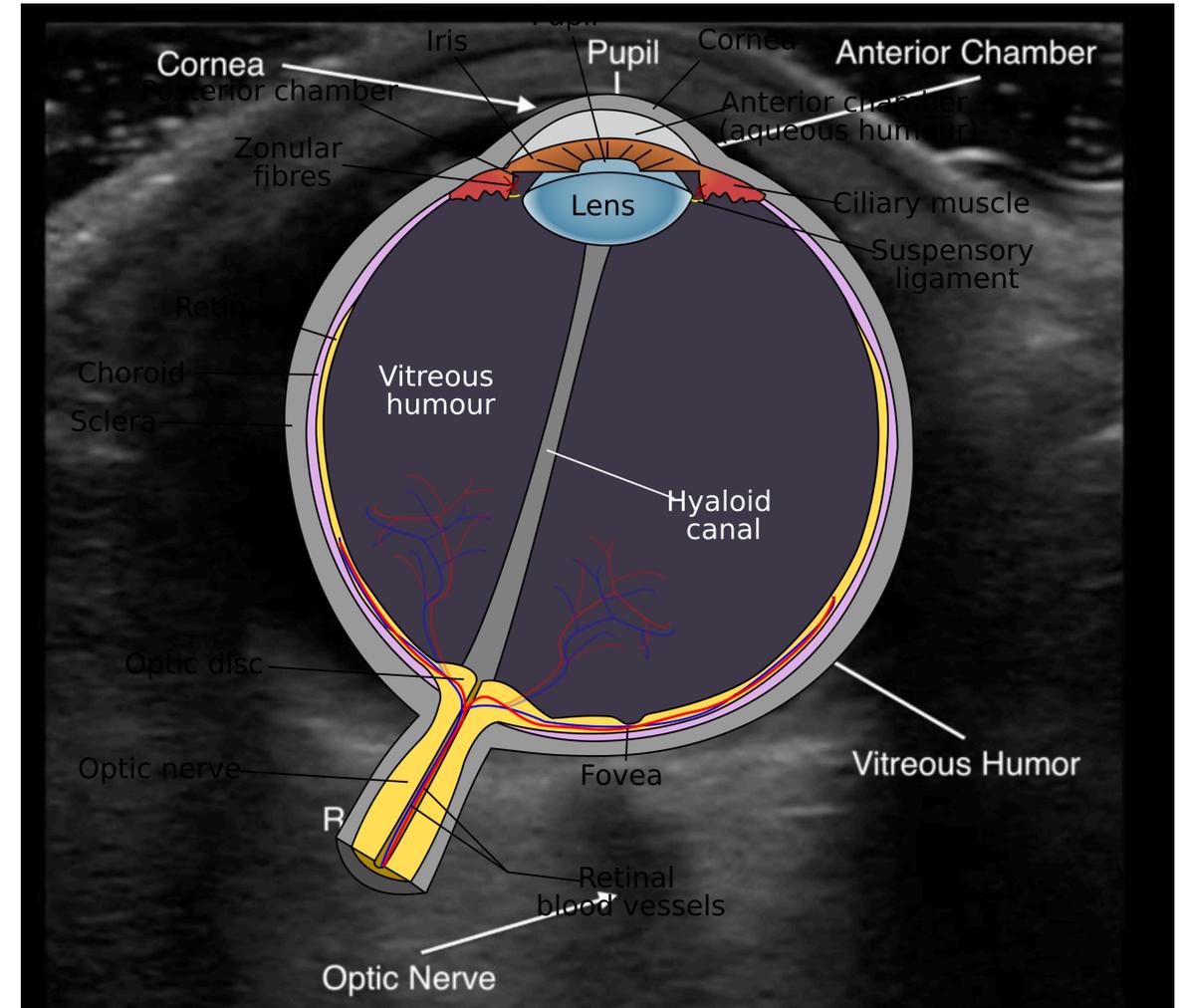
- Stroke

- **Vascular Problem**

- Central Retinal Artery Occlusion

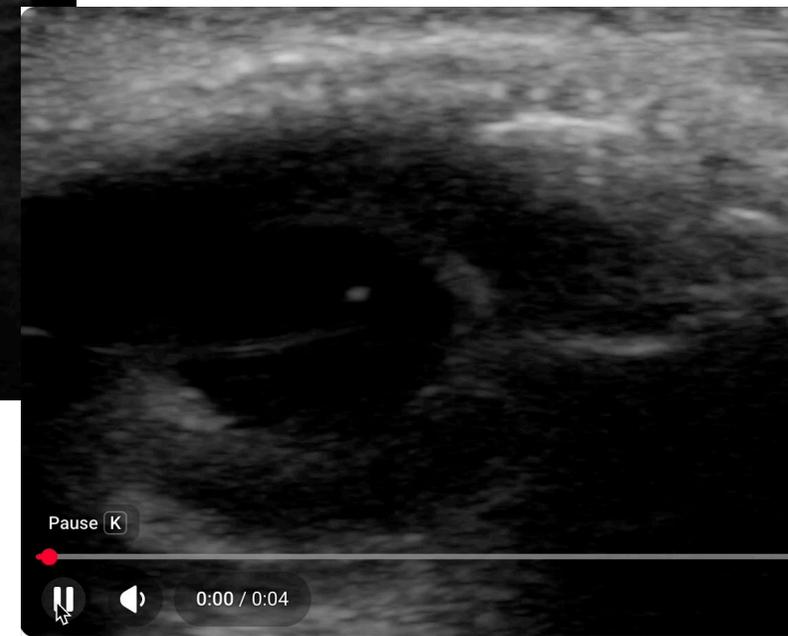
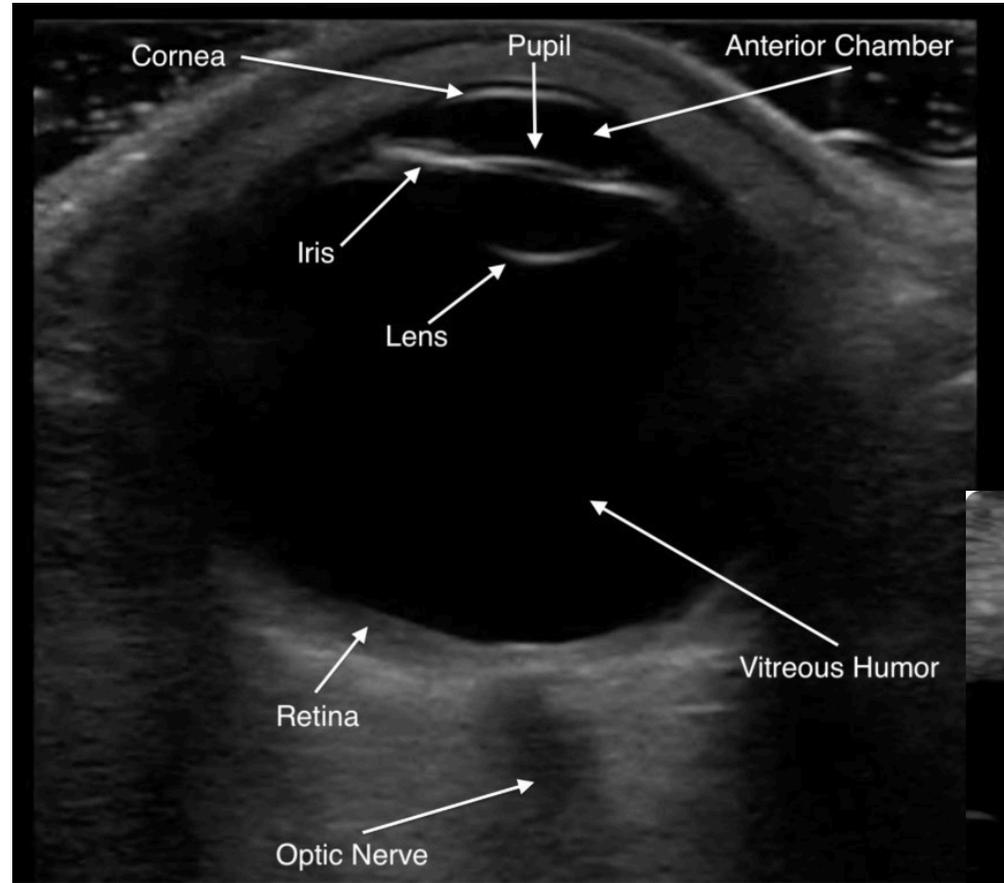


# Ocular Ultrasound

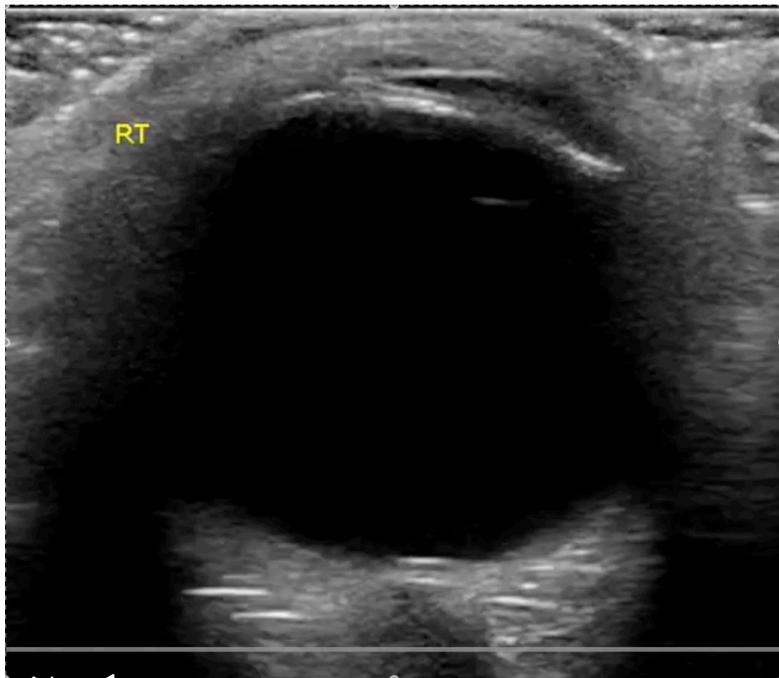


# Ocular Ultrasound

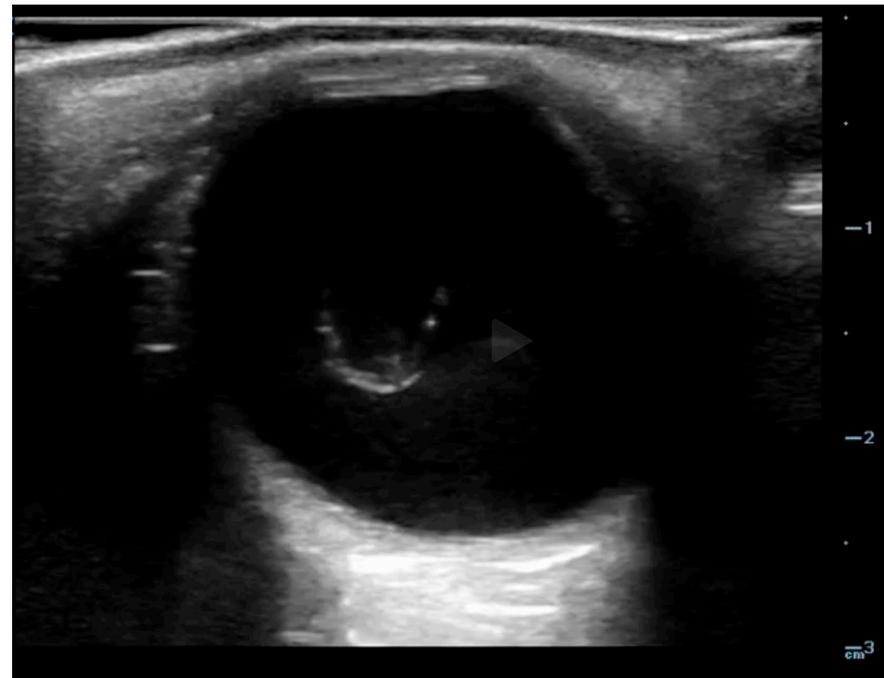
- Image both eyes
- Turn up the gain
- Retinal Detachment
- Vitreous Detachment
- Foreign Body
- Vitreous Hemorrhage
- Pupillary Exam



# Ocular Ultrasound



**Normal**



**PVD**



**RD**

# The emergency focused ocular exam, case 1

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Visual acuity

---

R 20/200 L 20/20

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Extraocular movements

---

WNL

---

Pupil exam

---

R eye less brisk

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Visual field exam

---

R eye unable to perform

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Intraocular pressure

---

WNL

---

Fluorescein exam

---

Deferred

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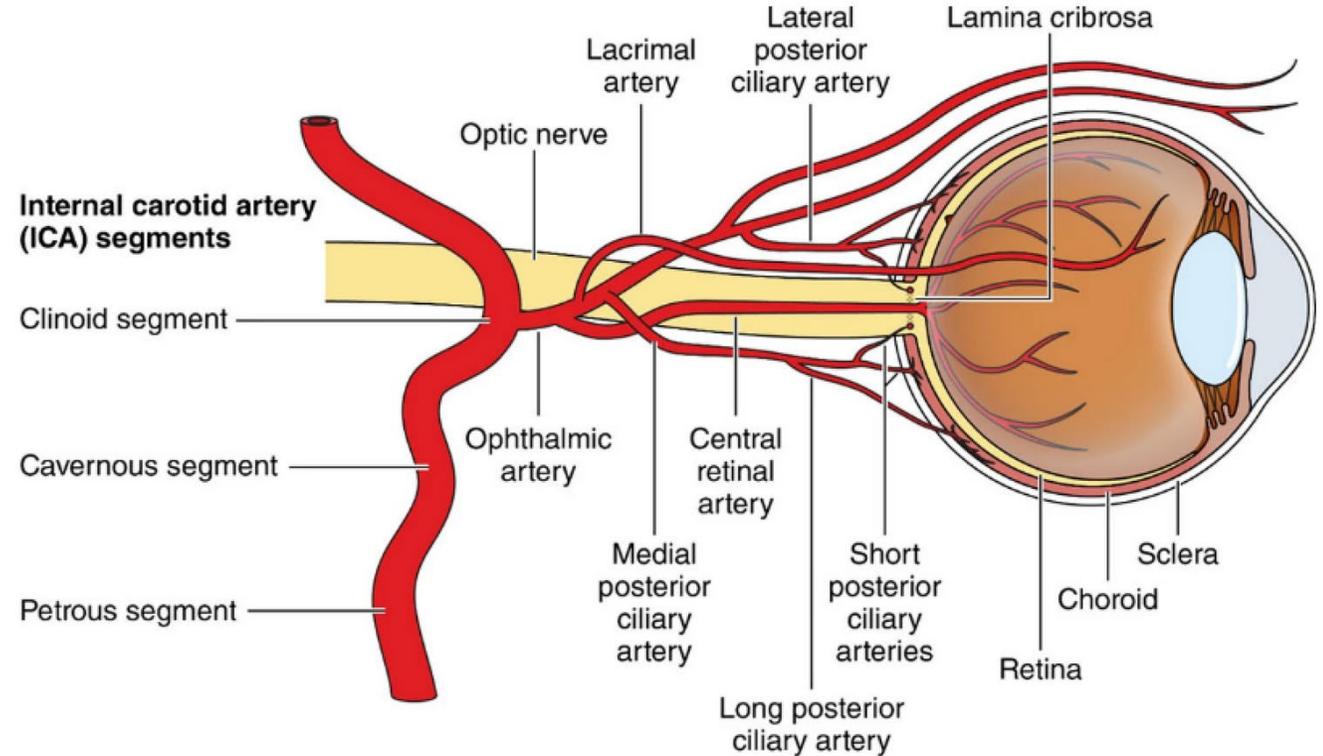
Slit lamp

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Deferred

# Case 1 continued

- 65 year old with painless monocular vision loss, decreased right eye vision.
- You perform an excellent eye exam.
- Normal ultrasound
- CT Stroke protocol ordered
- Ophthalmology consulted
- Patient diagnosed with **CRAO**



# CRAO vs Retinal Detachment

## CRAO

- Significant vision loss
- Arterial occlusion
- “Stroke of the eye”
- Amaurosis fugax
- Thrombolysis lacks evidence
- Ocular Massage
- Full dose ASA
- Immediate consult, admission, or transfer

## RETINAL DETACHMENT

- Partial vision loss, flashes, floaters, curtain description
- Retina peeling away from posterior eye
- Diagnosed with bedside ULS
- Urgent consultation
- Surgical repair

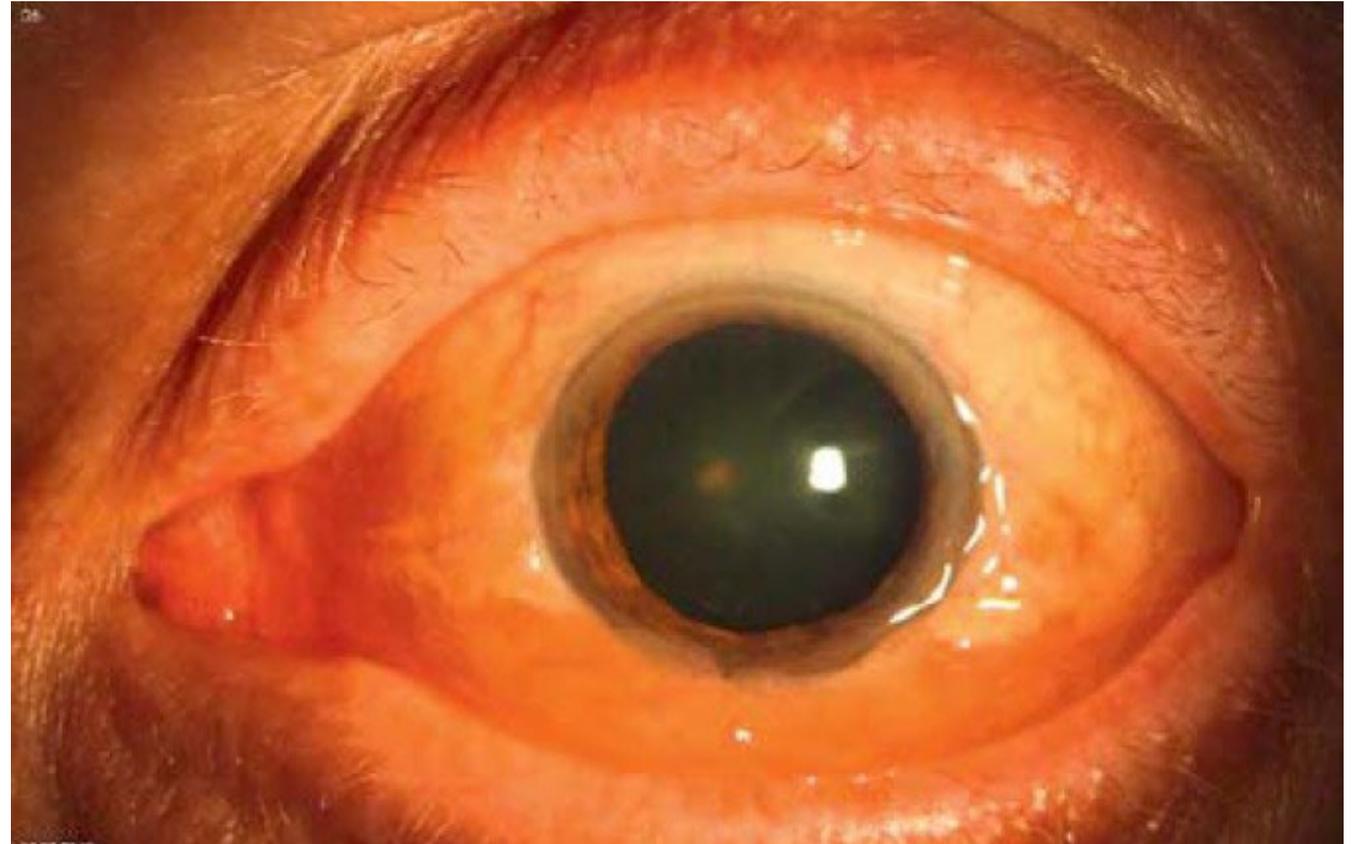


# Case 2

- 55 year old presents with acute left eye pain, redness, and blurry vision
- HPI: Went to the movies. Developed eye pain that kept getting worse and developed blurry vision, headache, and nausea. No trauma, doesn't wear contacts.
- PMH: HTN, migraines, localized breast CA s/p resection
- Vitals: T: 37 HR: 93 BP: 165/93 RR: 11 O2: 99%

# Painful Red Eye

- **Trauma**
  - Abrasions/Ulcerations
  - Contusion & Hemorrhage
- **Tissue Inflammation**
  - Cellulitis
  - Scleritis
  - Conjunctivitis
- **Chamber Problems**
  - Uveitis
  - Glaucoma



# The emergency focused ocular exam, case 2

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Visual acuity

---

R 20/20 L 20/40

---

Extraocular movements

---

WNL, painful

---

Pupil exam

---

L pupil fixed, large

---

Visual field exam

---

WNL

---

Intraocular pressure

---

R 17 mmHg L 61 mmHg

---

Fluorescein exam

---

Normal

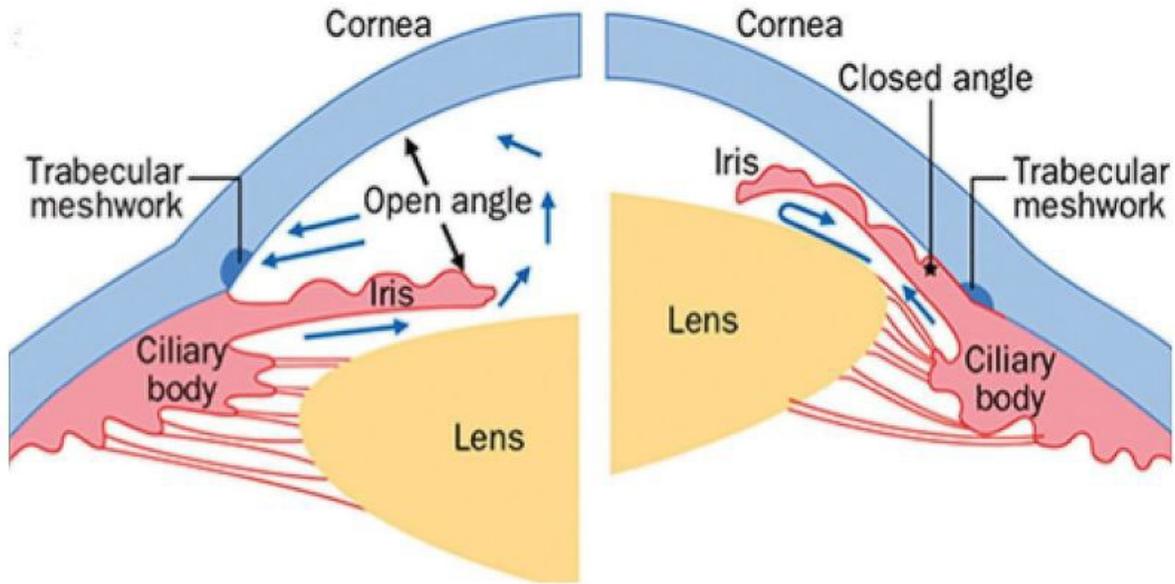
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Slit lamp

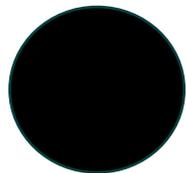
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Normal

# Acute Angle Closure Glaucoma



- Fixed Pupil
- Ciliary Flush
- Mydriasis
- Nausea/Vomiting
- Visual Halos
- (Not Miosis)



• **Consult Ophthalmology**

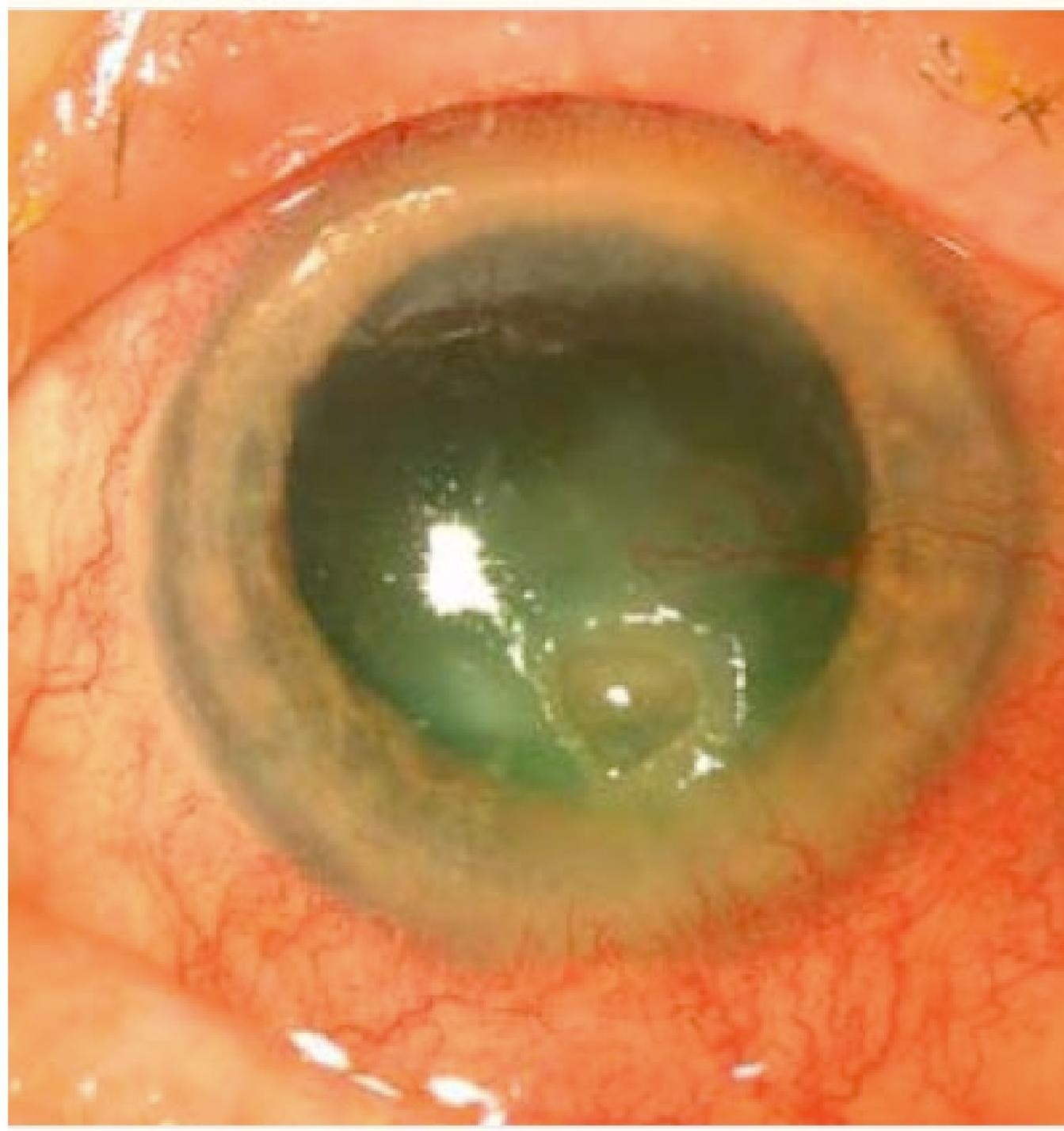


• **Treatment options**

- B blocker (timolol)
- Alpha 2 agonist (apraclonidine)
- Miotic agents (pilocarpine)
- IV/PO Acetazolamide
- IV Mannitol
- Surgical intervention

# Corneal Abrasion vs Ulcer

- Abrasions, superficial, benign
  - Pseudomonal risk w/ contact lens
- Ulcerations, deep, high risk for perforation
- May require ophthalmology consultation & admission



# Case 3

- 38 year old present with eye pain
- HPI: Pt was at work shelving heavy boxes. A box fell onto his face, the corner hit him in the face/eye. He now has right eye pain, headache, nausea, blurry vision.
- PMH: none
- Vitals: T:35.7 HR: 85 BP: 141/79 RR: 13 O2:97%

# Ocular Trauma

- **Bony Injuries**

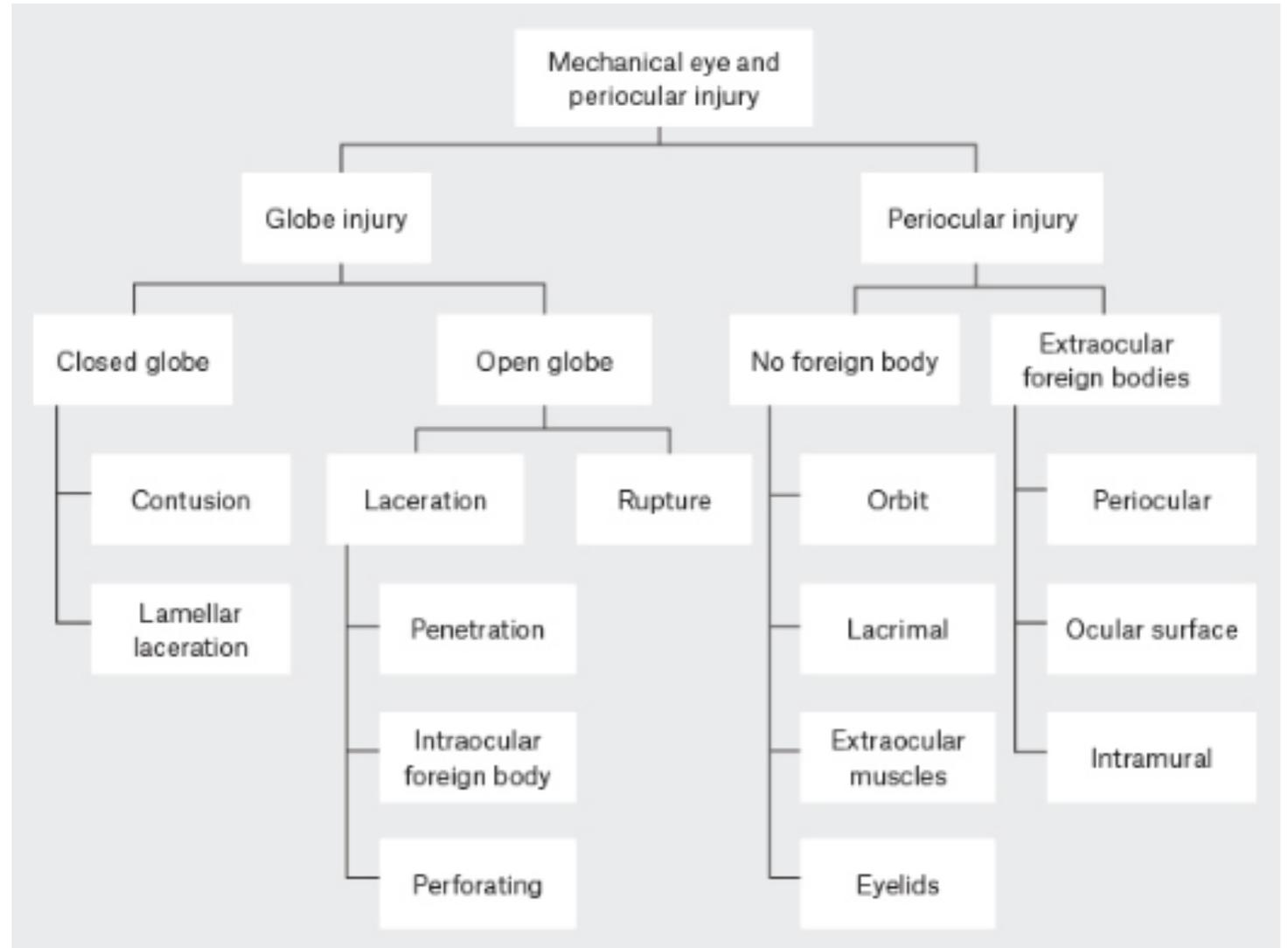
- Orbital Wall

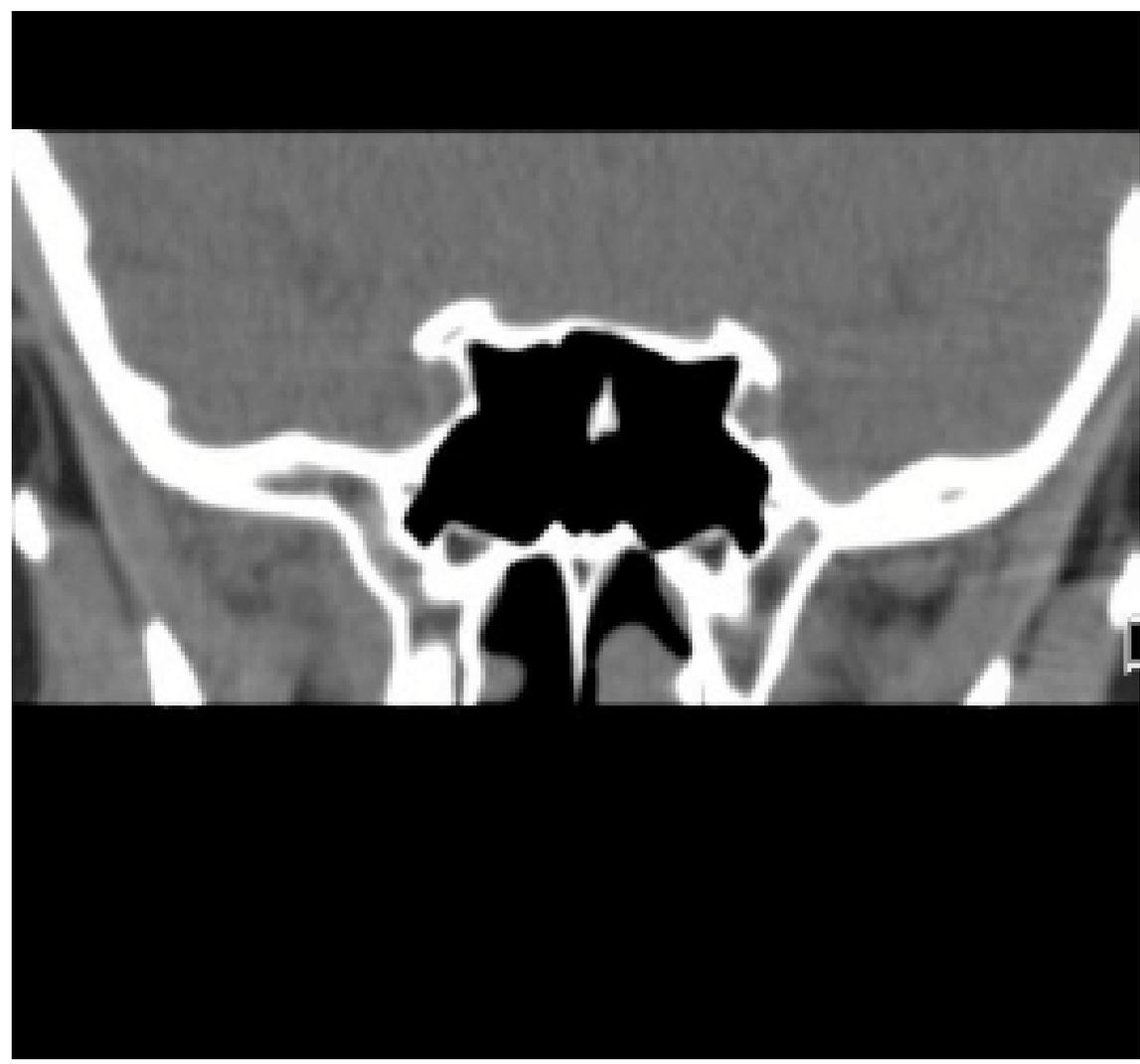
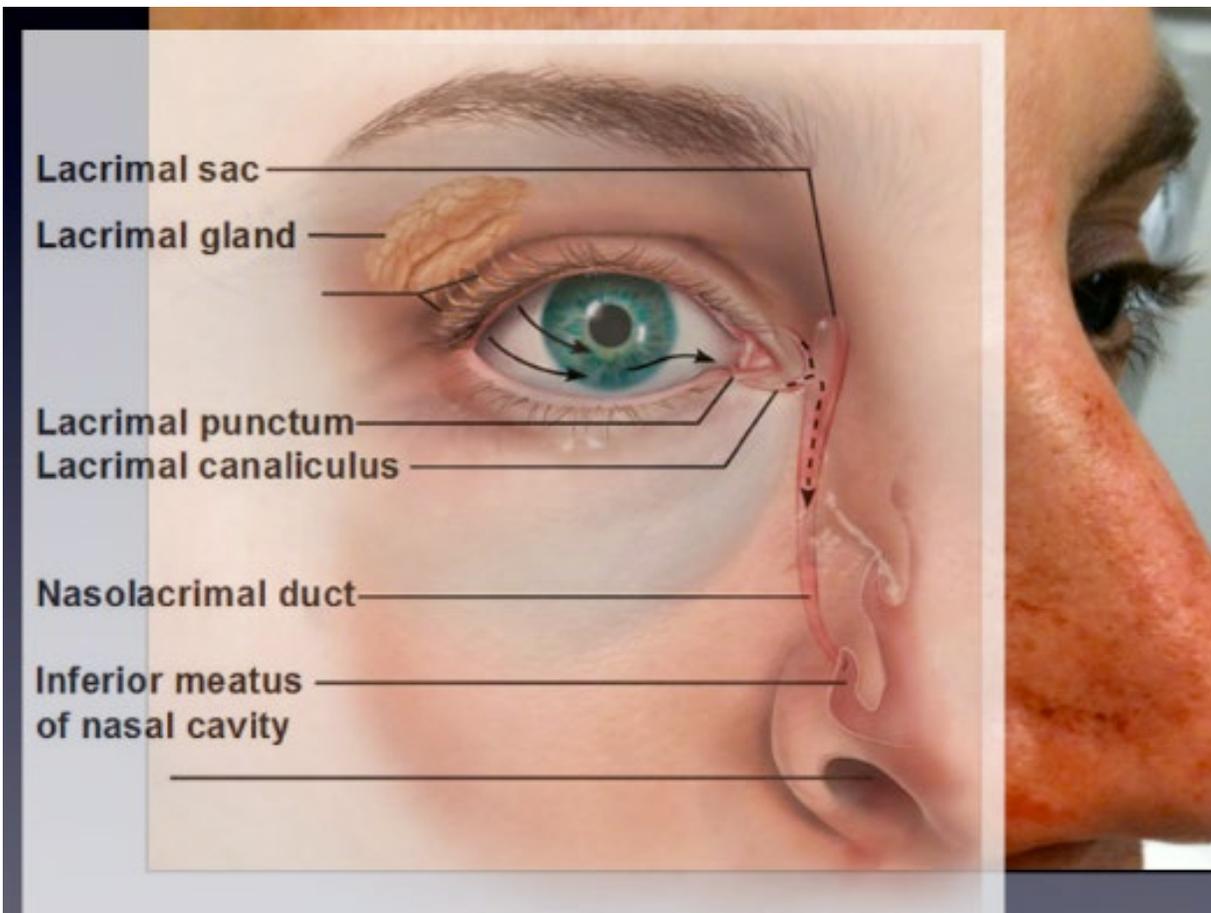
- **Globe Injuries**

- Open globe
- Bleeding/Hyphema
- Lens dislocation
- Superficial injuries

- **Periocular Injuries**

- Tear duct
- Entrapment
- Retrobulbar hematoma





# The emergency focused ocular exam, case 3

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Visual acuity

---

R 20/100 L 20/20

---

Extraocular movements

---

R eye decreased upwards gaze

---

Pupil exam

---

Equal

---

Visual field exam

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WNL

---

Intraocular pressure

---

R 41 mmHg L 19 mmHg

---

Fluorescein exam

---

Normal, no Seidel's sign

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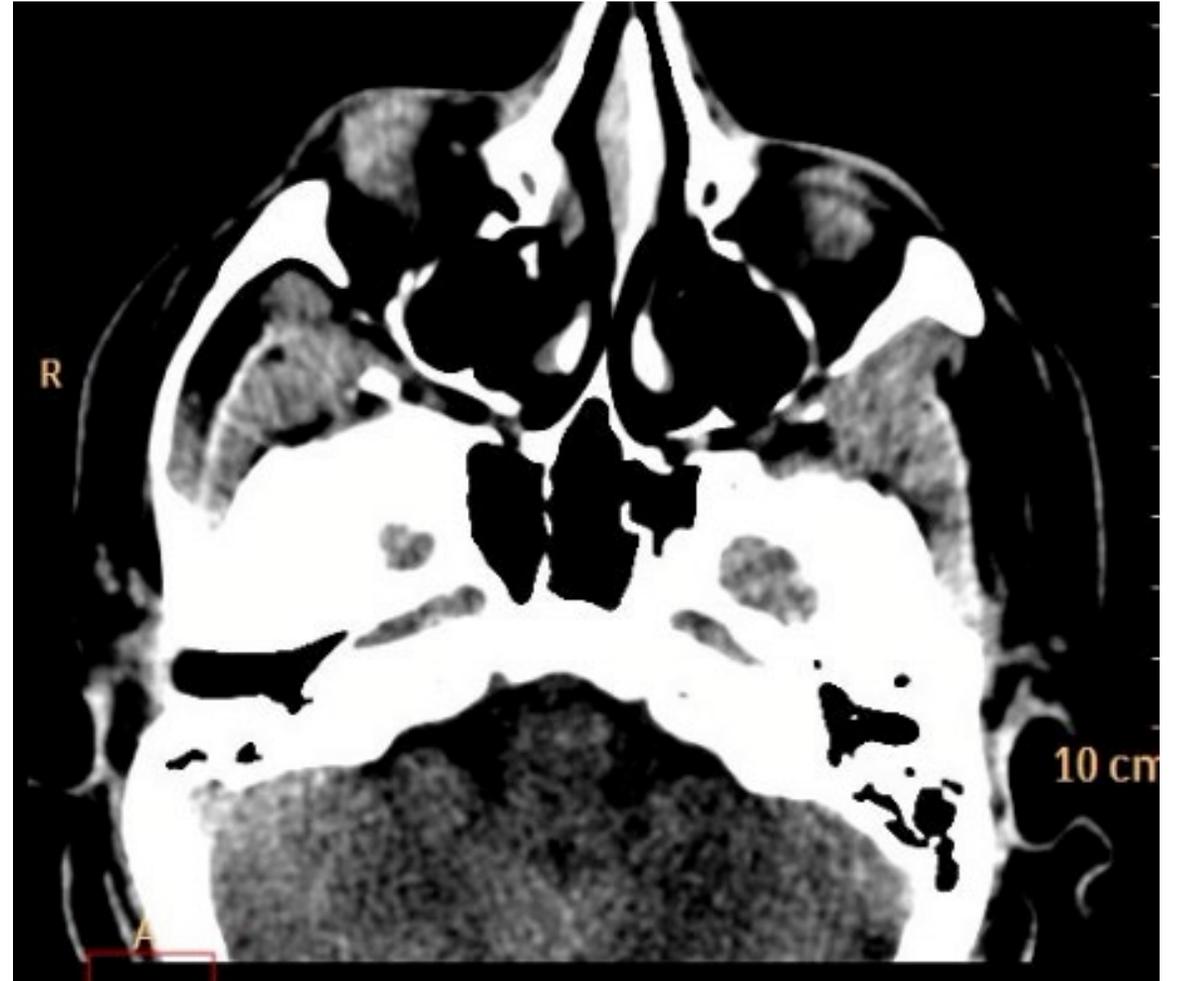
Slit lamp

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Deferred

# Case 3 continued

- CT scan shows inferior orbital wall fracture, possible fat vs muscle herniation into interior wall. Globe has a normal shape. Retrobulbar hematoma. Proptosis.
- Pt says vision is getting worse, he has a headache and nausea.
- Repeat tonometry reveals R eye pressure of 45 mm Hg



# Lateral Canthotomy

- Ophthalmology consultation!
- Indicated in suspected orbital compartment syndrome with
  - IOP > 40 mm Hg
  - Vision changes
  - Proptosis



- Anesthesia with proparacaine, lidocaine (consider sedation)
- Clamp lateral canthus
- Incise along lateral canthus
- Retract inferior lid
- Bluntly dissect down to lateral canthal tendon
- Cut inferior (and superior) crus of lateral canthal tendon
- Repeat exam including pressure

# **Lateral Canthotomy and Cantholysis**

# Painless vision loss

- **Retinal Problem**

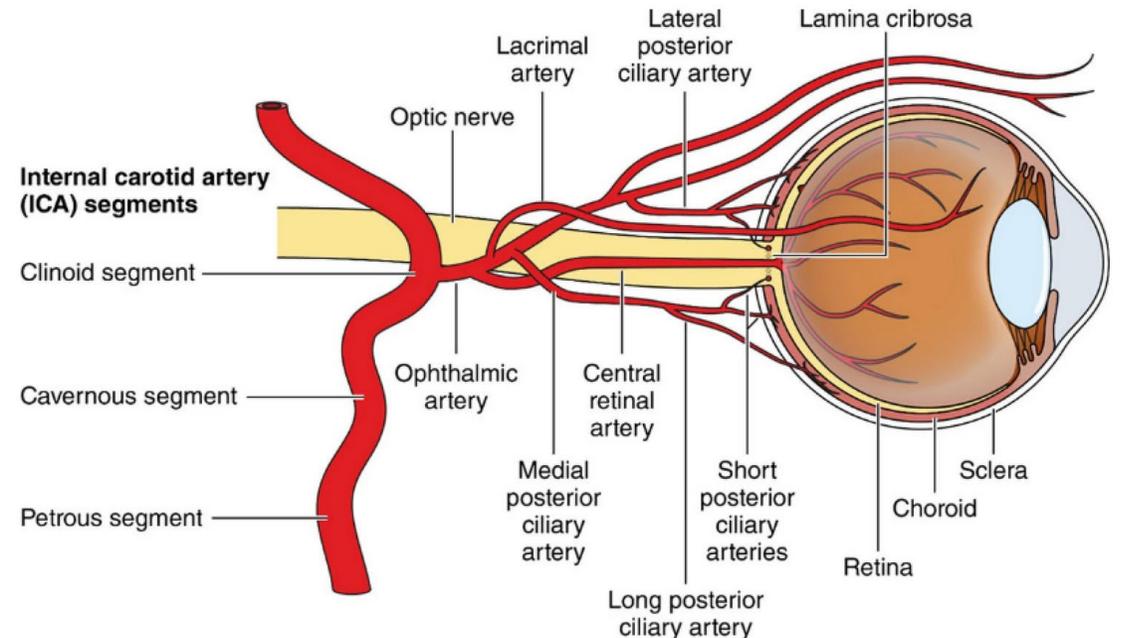
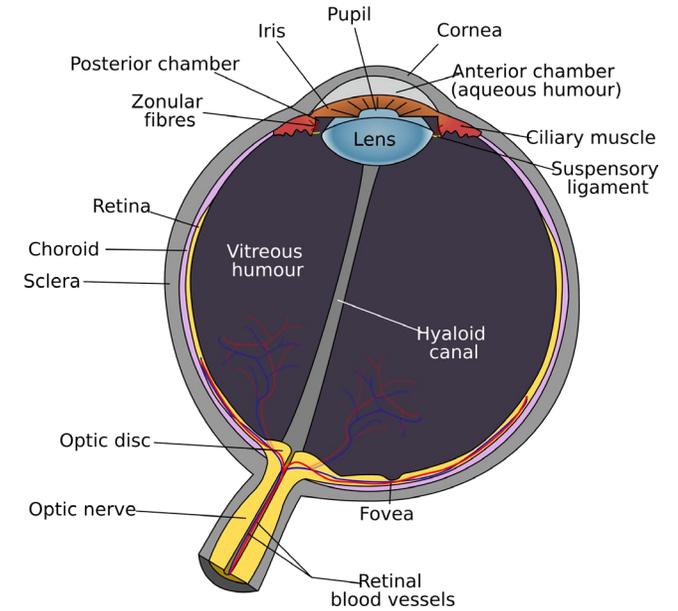
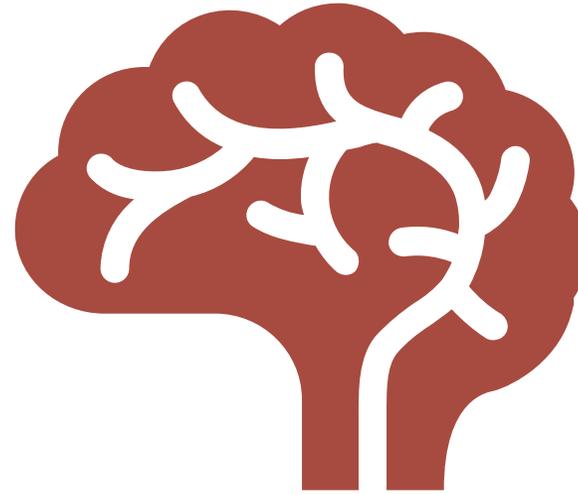
- Retinal detachment
- Posterior vitreous detachment

- **Brain Problem**

- Stroke

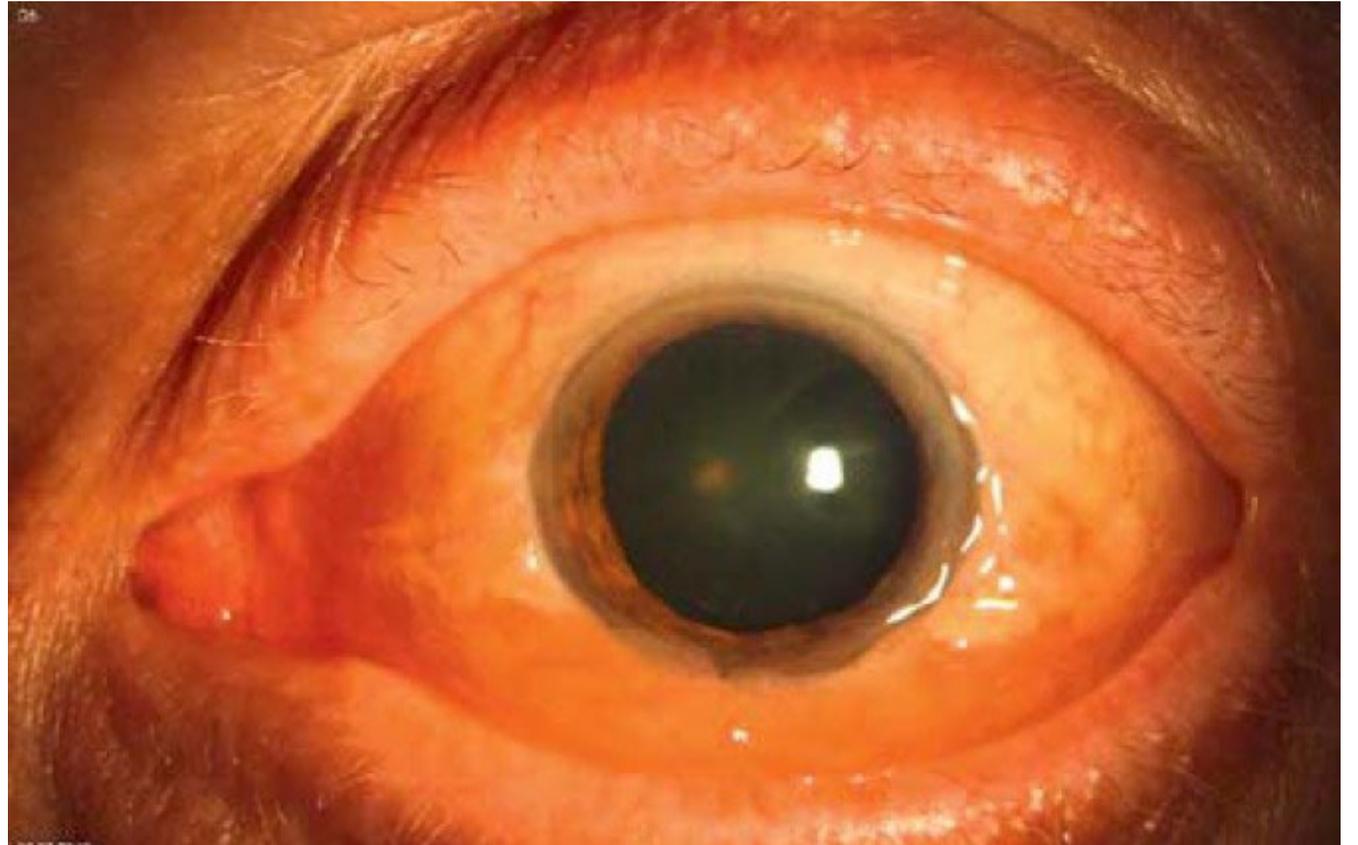
- **Vascular Problem**

- Central Retinal Artery Occlusion



# Painful Red Eye

- **Trauma**
  - Abrasions/Ulcerations
  - Contusion & Hemorrhage
- **Tissue Inflammation**
  - Cellulitis
  - Scleritis
  - Conjunctivitis
- **Chamber Problems**
  - Uveitis
  - Glaucoma



# Ocular Trauma

- **Bony Injuries**

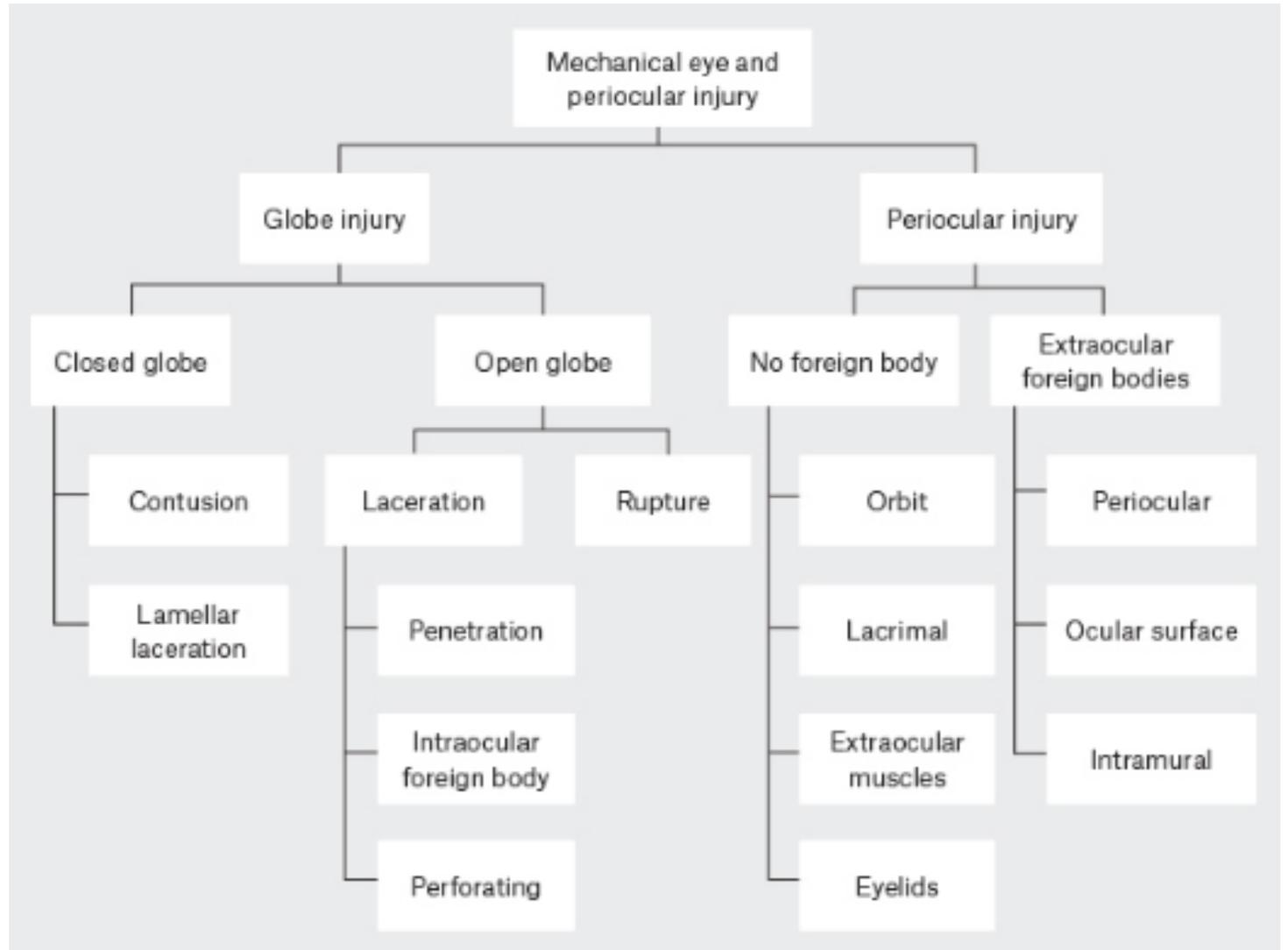
- Orbital Wall

- **Globe Injuries**

- Open globe
- Bleeding/Hyphema
- Lens dislocation
- Superficial injuries

- **Periocular Injuries**

- Tear duct
- Entrapment
- Retrobulbar hematoma



# Review



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Do a thorough eye examination including visual acuity, EOM, pupils, fields, intraocular pressure, fluorescein and slit lamp examination for depth and anterior chamber.

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Familiarize yourself with ultrasound, useful for RD, PVD, FB, hematoma

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Monocular vision loss is anterior to the optic chiasm

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Full vision loss requires emergent ophthalmology team evaluation

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The painful red eye can be caused by deep lesions (ulcers, glaucoma, orbital cellulitis) that require immediate intervention

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Evaluate for open globe, fracture, and retrobulbar injuries in trauma and be ready to canthotomize

# References and resources



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- **UCSF Ophthalmology Department.** University of California, San Francisco.