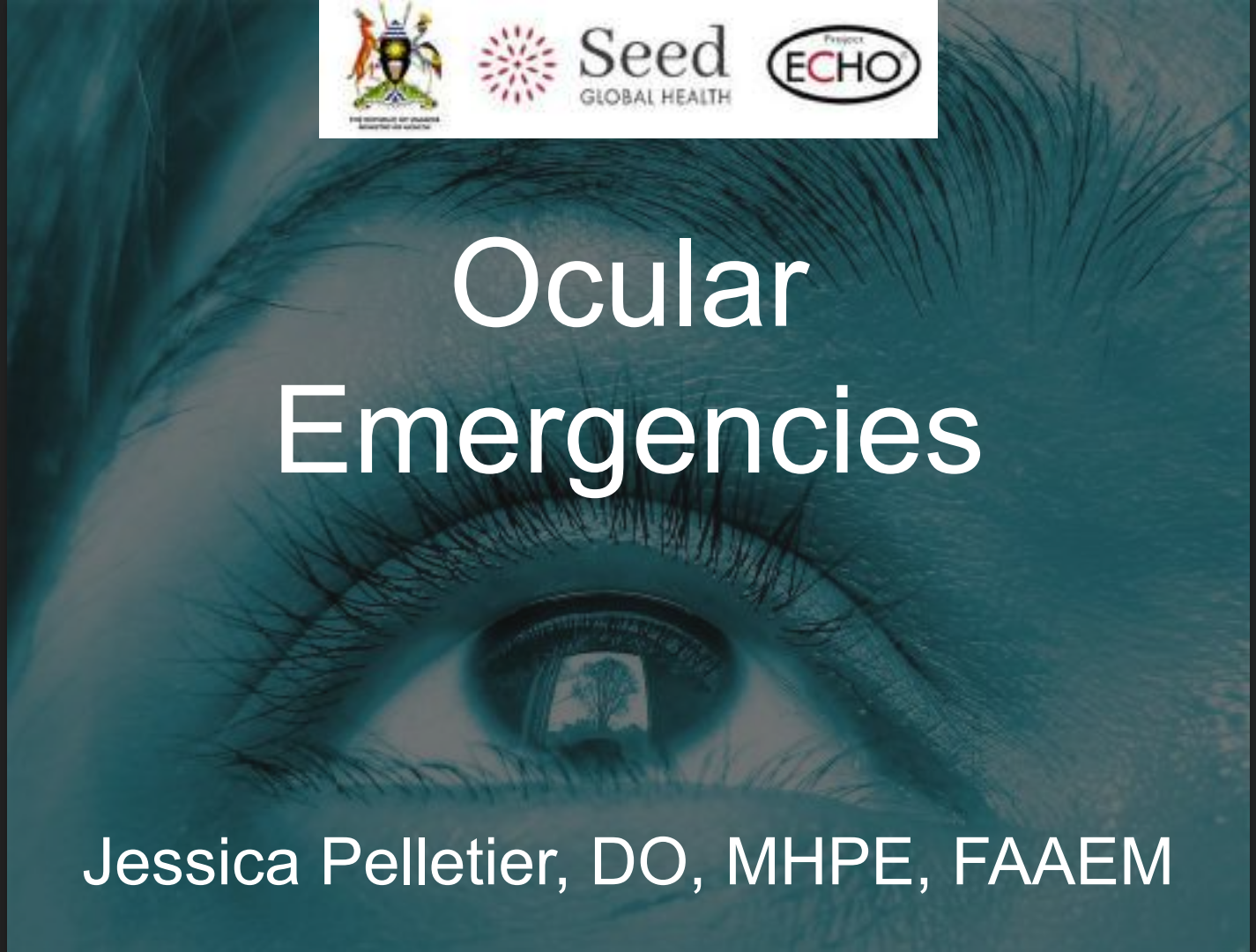


Ocular Emergencies

Jessica Pelletier, DO, MHPE, FAAEM

I have no financial disclosures.

Objectives

1. Introductions

Objectives

1. Introductions
2. Systematic approach to the eye exam

Objectives

1. Introductions
2. Systematic approach to the eye exam
3. Key eye emergencies

Introductions

The American Journal of Emergency Medicine
Volume 64, February 2023, Pages 113-120

High risk and low prevalence diseases: Open globe injury

Jessica Pelletier DO [a], Alex Koyfman MD [b], Brit Long MD [c]

The American Journal of Emergency Medicine
Volume 68, June 2023, Pages 1-9

High risk and low prevalence diseases: Orbital cellulitis

Jessica Pelletier [a], Alex Koyfman [b], Brit Long [c]

Use of An Ophthalmology Tutorial to Improve Resident Comfort with the Emergency Eye Exam

Jessica Pelletier, DO[1], John Facciani, MD[1], Francesca Gines, COA[2] and Damon Kuehl, MD[2]

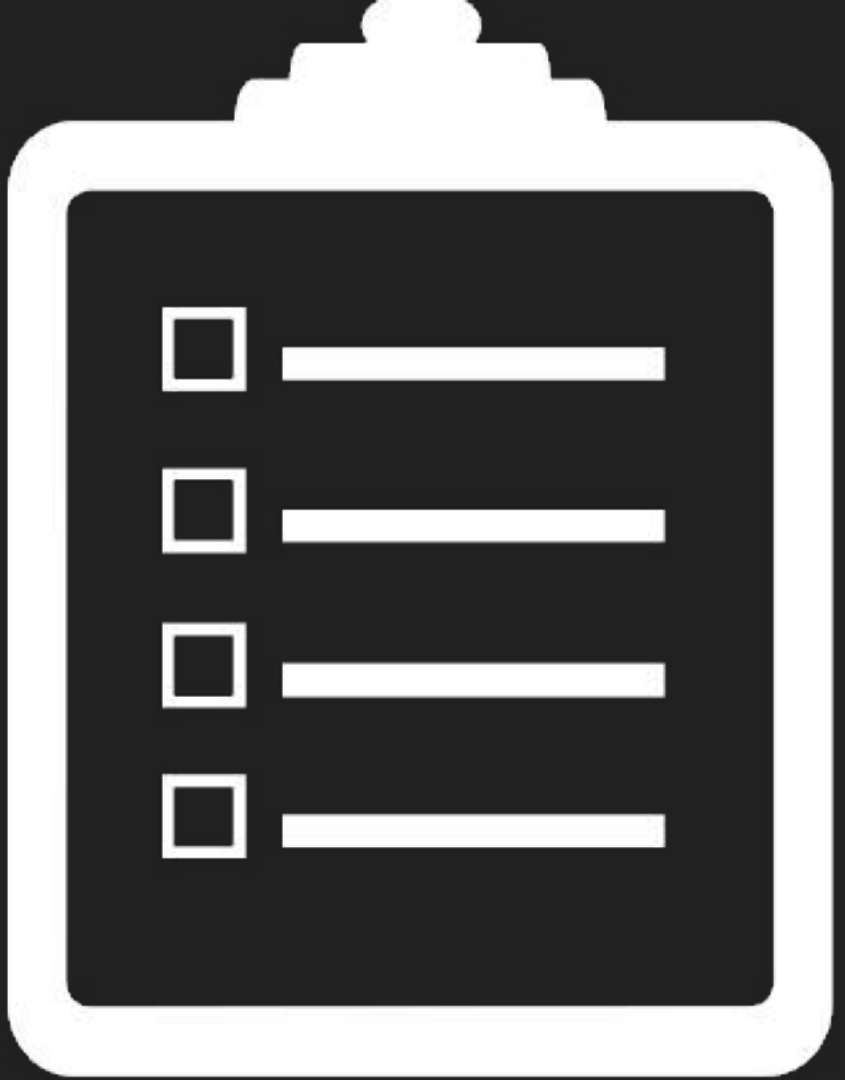
[1]Virginia Tech Carilion School of Medicine, Carilion Clinic, Department of Emergency Medicine, Roanoke, VA
[2]Vistar Eye Center Vision and Surgery Specialists, Roanoke, USA

Correspondence should be addressed to Jessica Pelletier, DO at jrpelletier@carilionclinic.org

DOI: https://doi.org/10.21980/J86H0M

Issue 2:4

Systematic approach to the eye exam



External Examination

- Bulging (proptosis)?
- Discharge?
- Lids and lashes
  - Swelling?
  - Erythema?

“Vital signs” of the eye

1. Visual acuity
2. Pupils
3. Intraocular pressure (IOP)*

Visual acuity

Visual acuity - tips

- Start with the worse eye
- Indicate whether you tested “corrected” vs. “uncorrected”

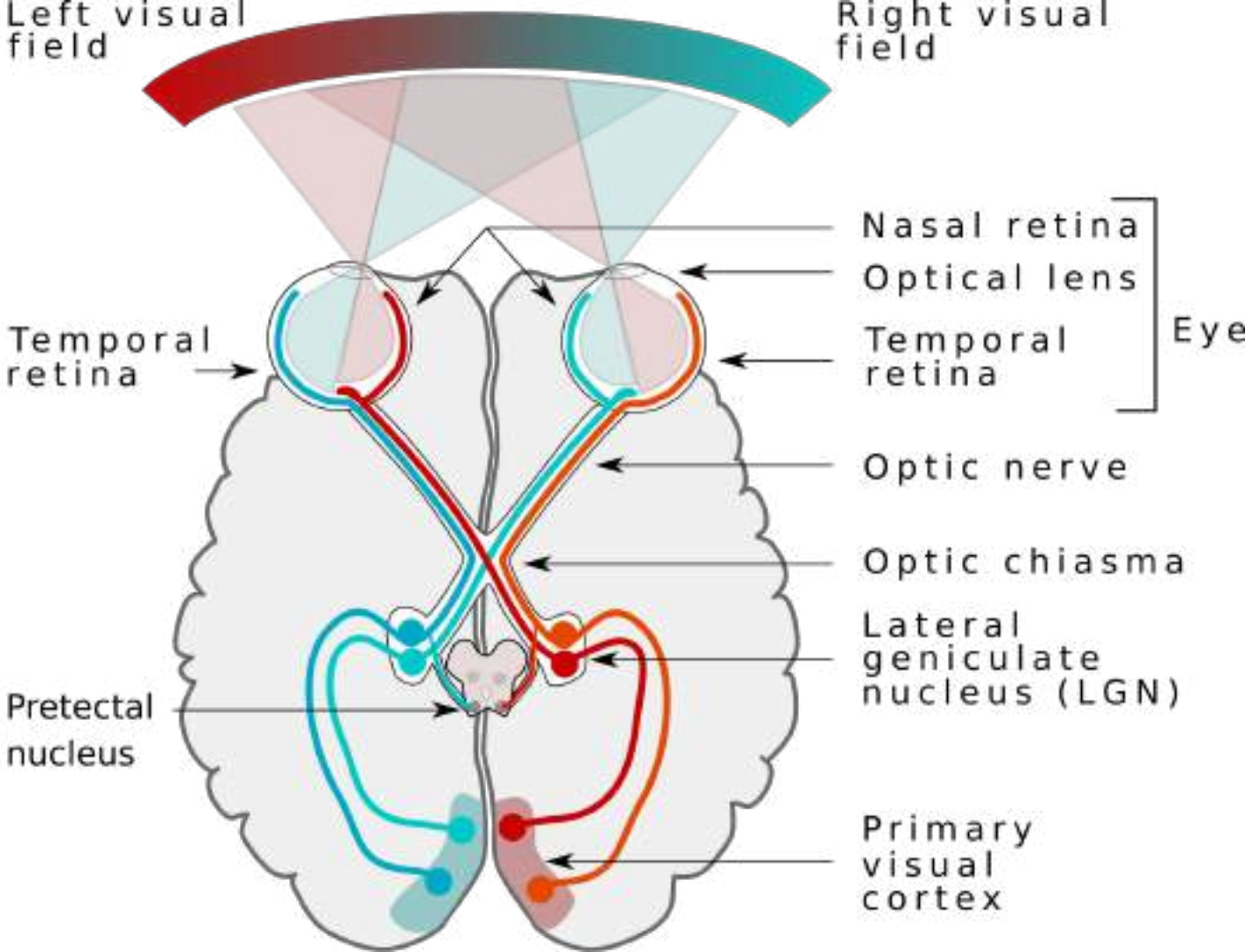
What if they don't have their glasses/contacts?

Use a near-vision card at 35 cm

Pupils

Pupils - what to look for?

- Equal?
- Round?
- Reactive?
- Afferent pupillary defect (APD)?


Left visual field
Right visual field
Nasal retina
Optical lens
Temporal retina
Eye
Temporal retina
Optic nerve
Optic chiasma
Lateral geniculate nucleus (LGN)
Pretectal nucleus
Primary visual cortex

IOP

Tonopen

iCare

IOP - tips

- Poke gently over the cornea
- May need topical anesthetic
- Normal: < 20 mmHg
- *Avoid* if you think they have an open globe injury!

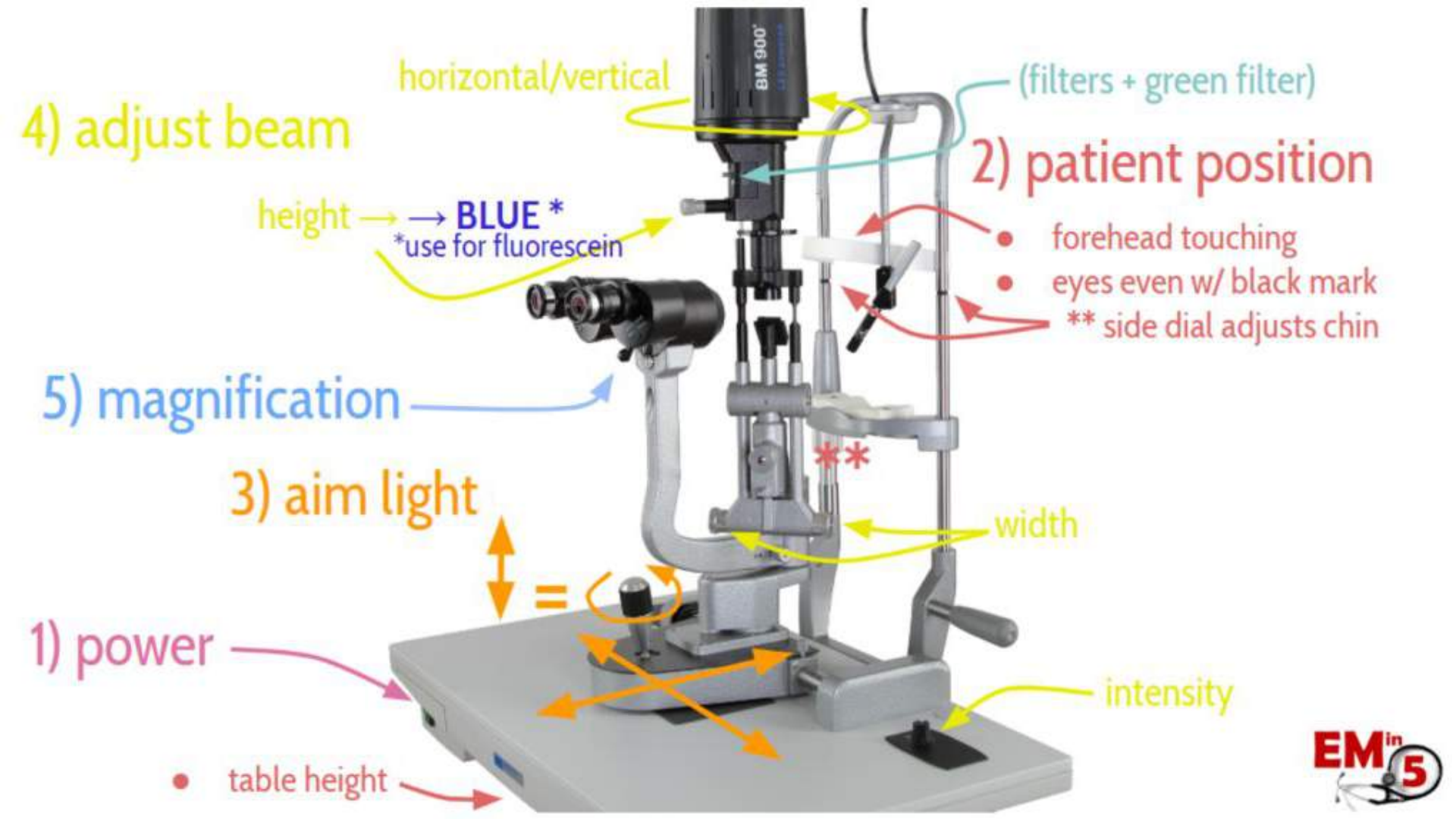
Advanced ocular exam skills

- Fundoscopy
- POCUS
- Slit lamp

Ocular Ultrasound Made *EASY*!

Seed GLOBAL HEALTH

ECHO


4) adjust beam
horizontal/vertical
(filters + green filter)
2) patient position
height → → BLUE *
*use for fluorescein
• forehead touching
• eyes even w/ black mark
** side dial adjusts chin
5) magnification
3) aim light
**
width
=
1) power
intensity
• table height
BM 900

emDocs

TIM ROOT
VIRTUAL EYE PROFESSOR
Visit me at TimRoot.com

Ocular emergencies: red/painful eyes

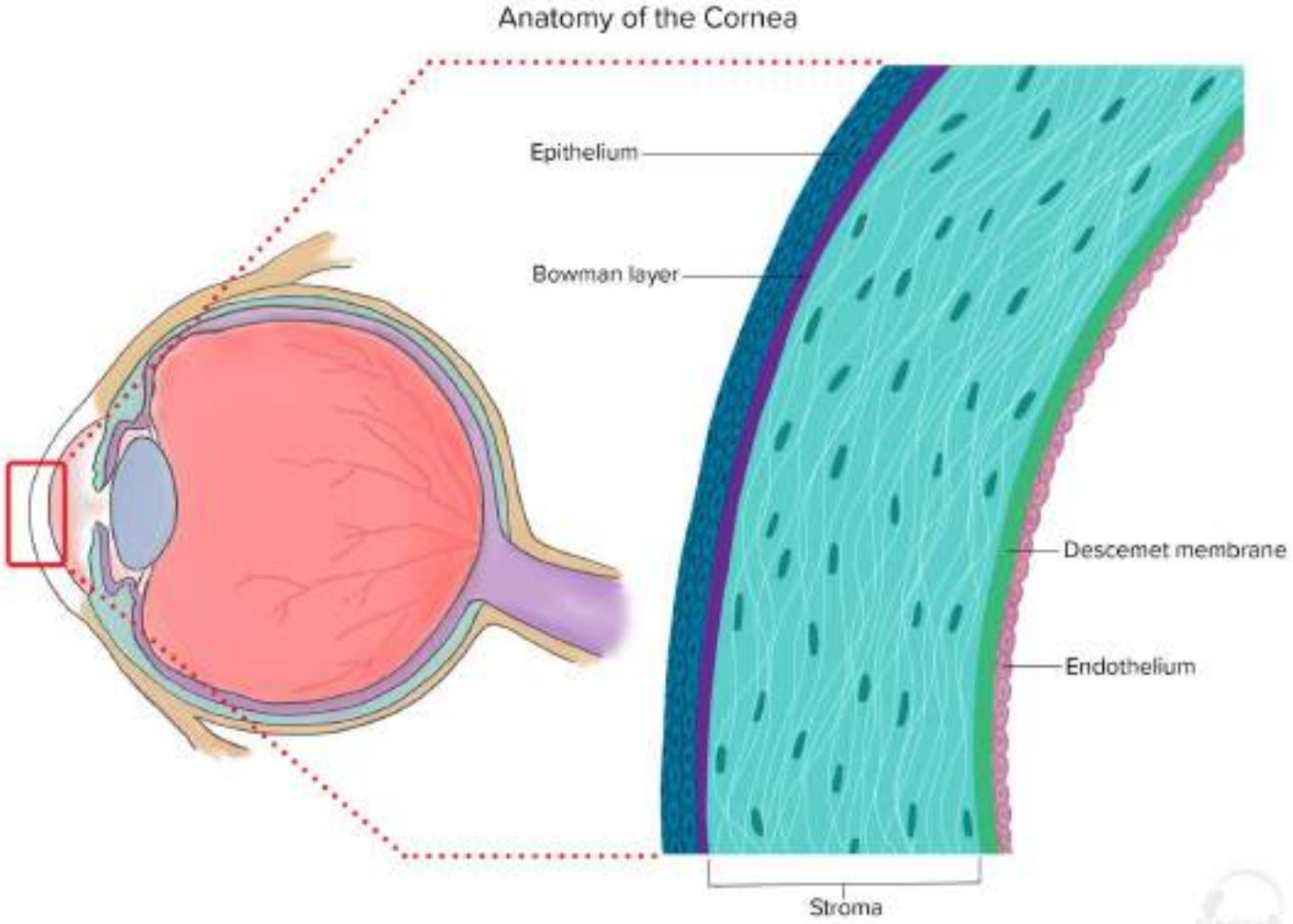
Seed GLOBAL HEALTH

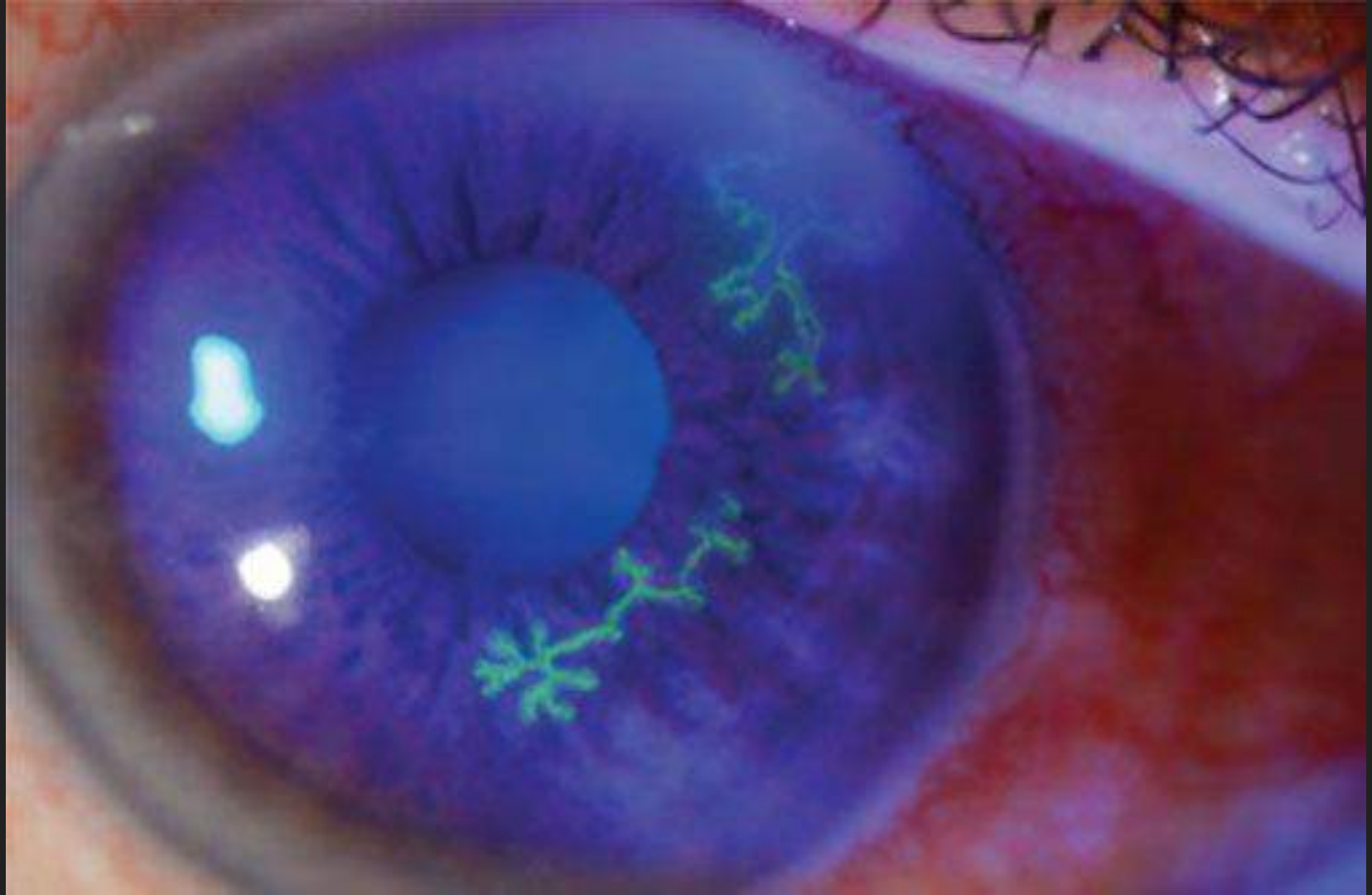
ECHO

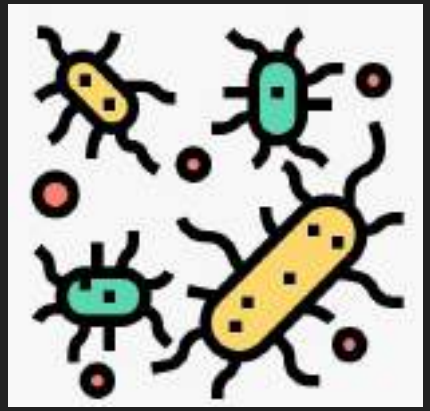
Corneal ulcer

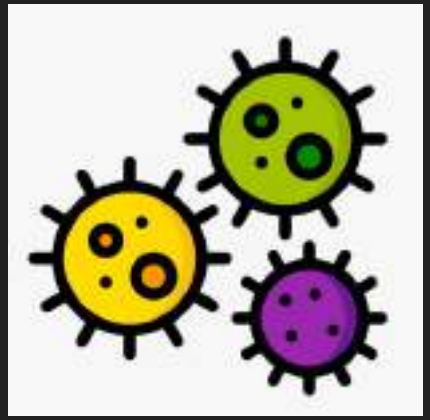
Look away if you are squeamish!

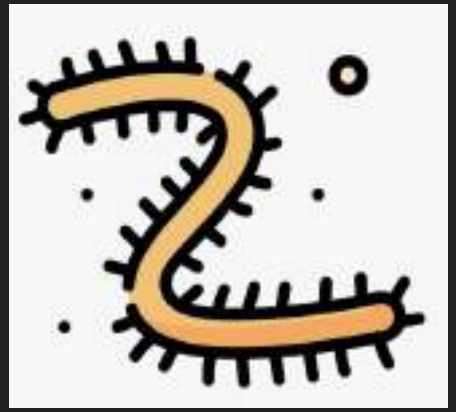

© Jessica Lim, DO


Anatomy of the Cornea
Epithelium
Bowman layer
Descemet membrane
Endothelium
Stroma

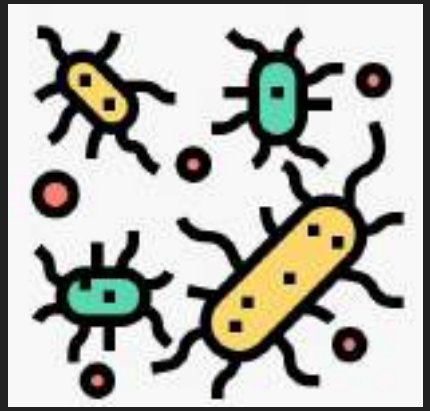


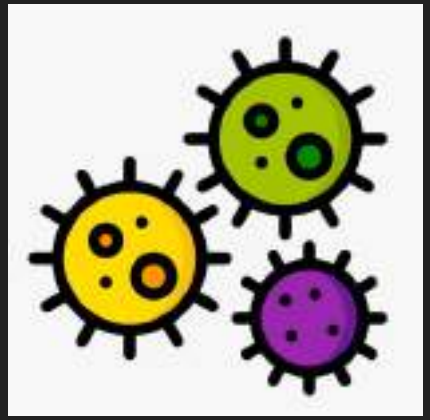


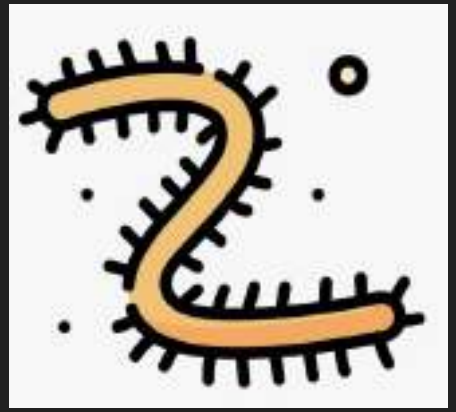




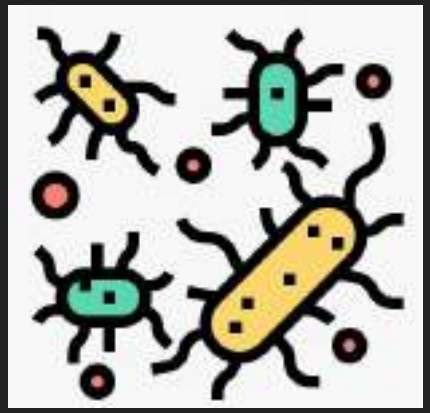

NDC 62332-518-05
Tobramycin
Ophthalmic Solution
USP, 0.3%
FOR TOPICAL APPLICATION IN THE EYE
Rx only
5 mL
Akorn

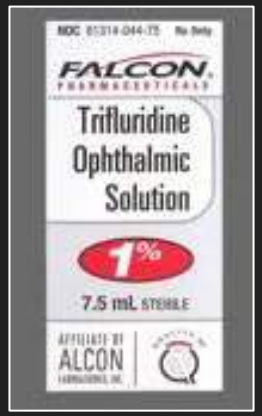


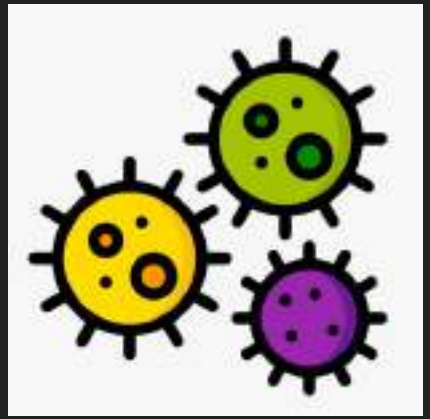


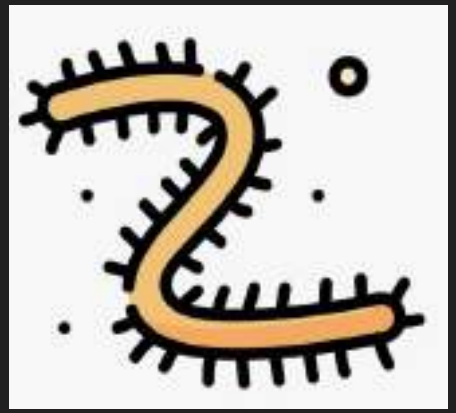



NDC 62332-518-05
Tobramycin
Ophthalmic Solution
USP, 0.3%
FOR TOPICAL APPLICATION IN THE EYE
Rx only
5 mL
Akorn

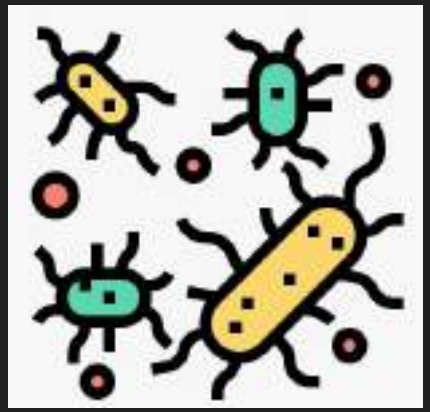


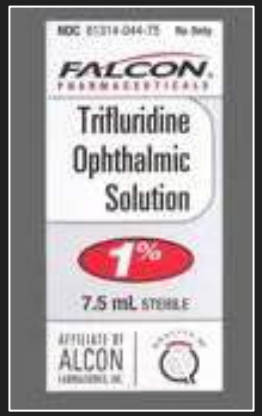

FALCON
PHARMACEUTICALS
Trifluridine
Ophthalmic
Solution
1%
7.5 mL STERILE
ALCON

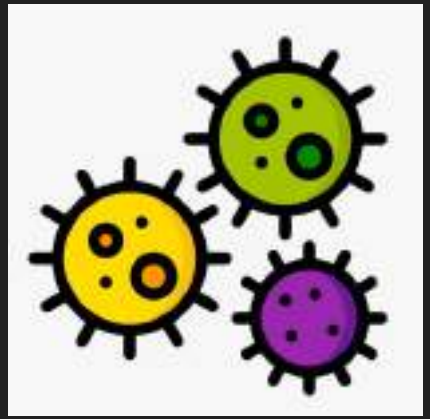


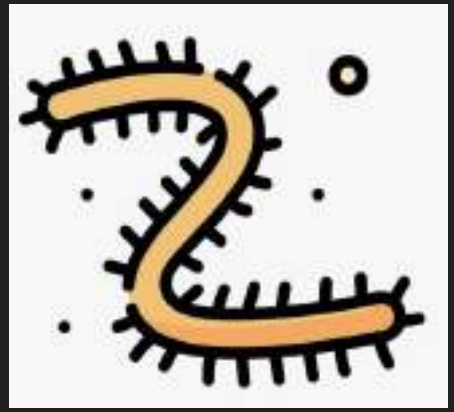



NDC 62332-518-05
Tobramycin
Ophthalmic Solution
USP, 0.3%
FOR TOPICAL APPLICATION IN THE EYE
Rx only
5 mL
Akorn

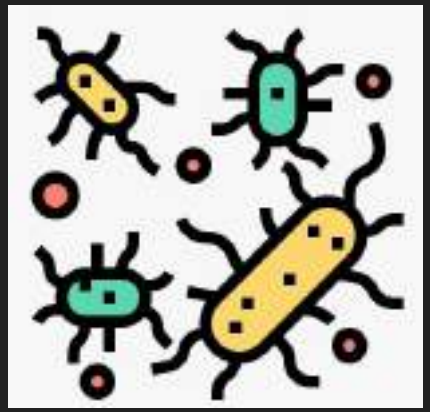


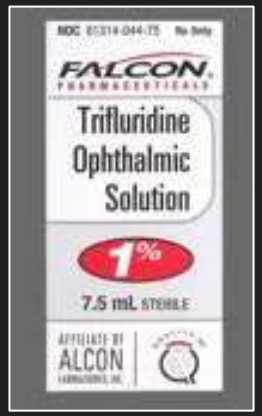

FALCON
PHARMACEUTICALS
Trifluridine
Ophthalmic
Solution
1%
7.5 mL STERILE
ALCON

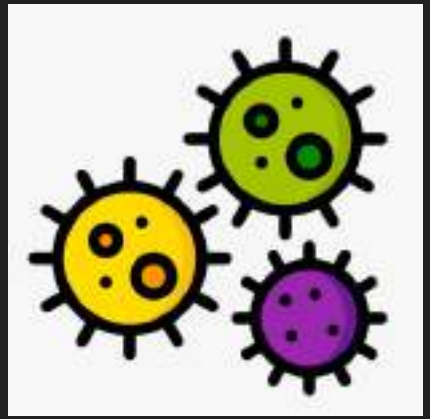


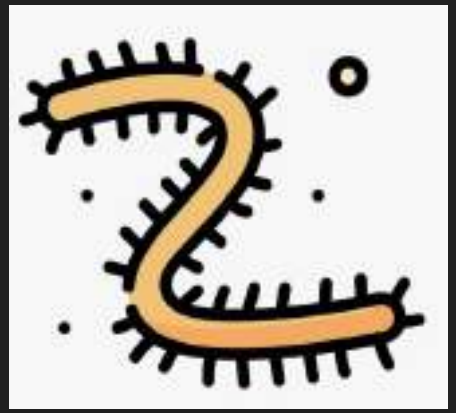


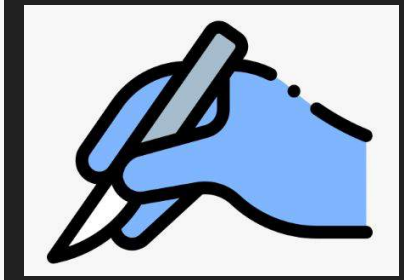

NDC 62332-518-05
Tobramycin
Ophthalmic Solution
USP, 0.3%
FOR TOPICAL APPLICATION IN THE EYE
Rx only
5 mL
Akorn




FALCON
PHARMACEUTICALS
Trifluridine
Ophthalmic
Solution
1%
7.5 mL STERILE
AN ALCON LABORATORIES, INC. AFFILIATE

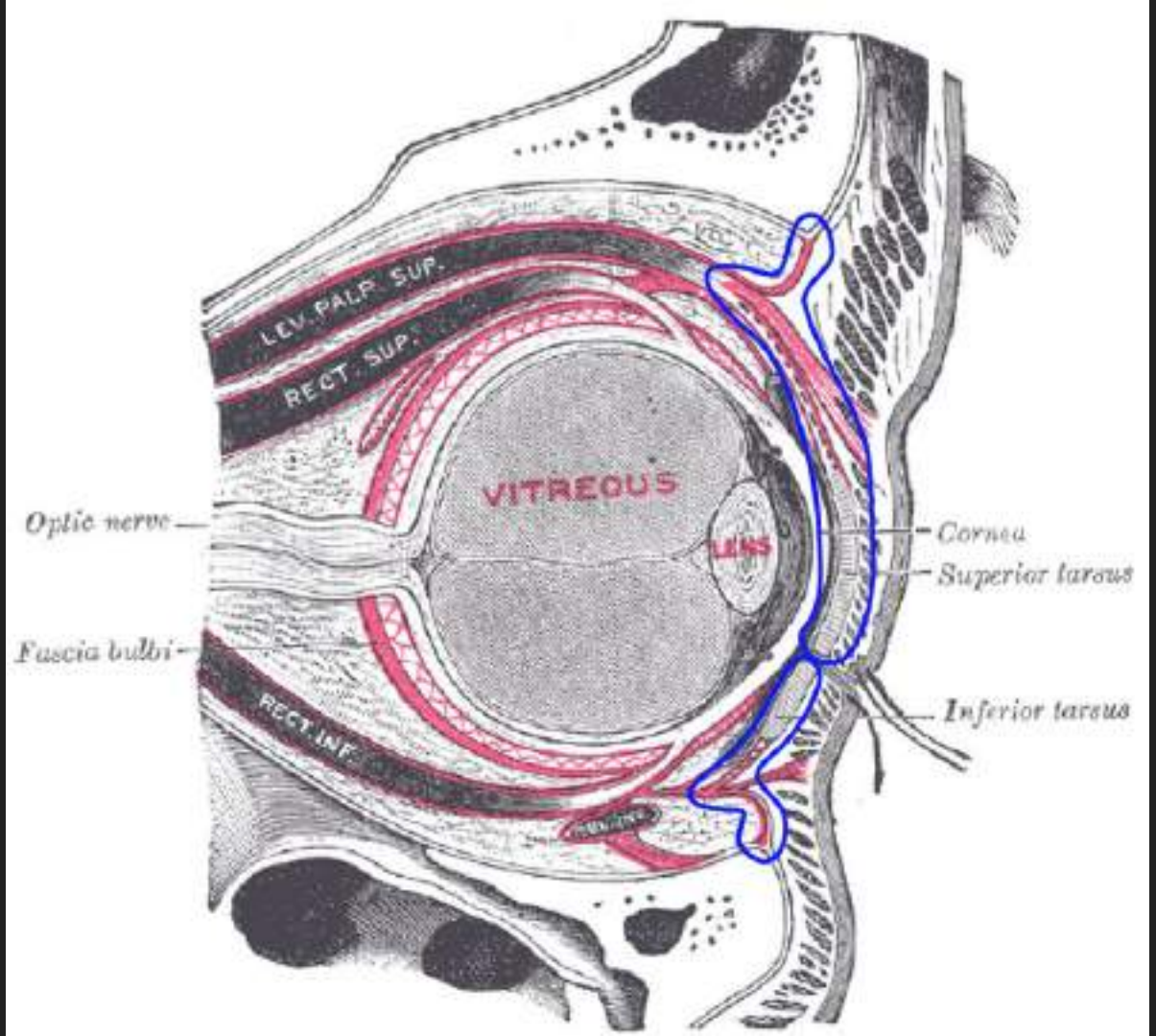


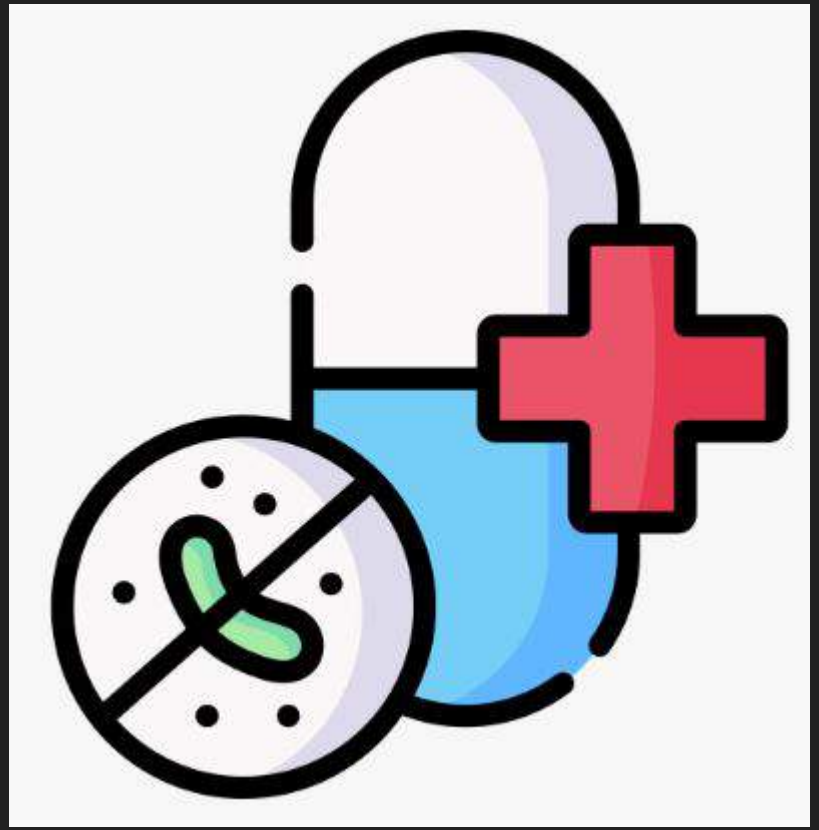




Preseptal cellulitis


© Jessica Mason, MD


LEV. PALP. SUP.
RECT. SUP.
VITREOUS
LENS
Optic nerve
Fascia bulbi
RECT. INF.
Cornea
Superior tarsus
Inferior tarsus



Seed GLOBAL HEALTH

ECHO

Table: Antibiotic Options for the Treatment of Preseptal Cellulitis

CorePendium

ONE of the following:	
Trimethoprim-sulfamethoxazole (TMP-SMX) (dose based on TMP)	*Children*: 8-12 mg/kg/day by mouth every 12 hours *Adults*: 1-2 double-strength tablets (160 mg TMP/800 mg SMX) by mouth every 12 hours
Clindamycin	*Children*: 10 mg/kg by mouth every 8 hours (maximum dose 300 mg) *Adults*: 300 mg by mouth every 8 hours

Table: Antibiotic Options for the Treatment of Preseptal Cellulitis

CorePendium

ONE of the following:	
Trimethoprim-sulfamethoxazole (TMP-SMX) (dose based on TMP)	*Children*: 8-12 mg/kg/day by mouth every 12 hours *Adults*: 1-2 double-strength tablets (160 mg TMP/800 mg SMX) by mouth every 12 hours
Clindamycin	*Children*: 10 mg/kg by mouth every 8 hours (maximum dose 300 mg) *Adults*: 300 mg by mouth every 8 hours
PLUS one of the following:	
Amoxicillin	*Children*: 20 mg/kg by mouth every 12 hours (maximum dose 875 mg) *Adults*: 875 mg by mouth every 12 hours
Amoxicillin-clavulanic acid	*Children*: 45 mg/kg/day by mouth every 12 hours *Adults*: 875 mg by mouth every 12 hours
Cefpodoxime	*Children <12 y old*: 5 mg/kg by mouth every 12 hours (maximum dose 200 mg) *Children >12 y old*: 400 mg by mouth every 12 hours *Adults*: 400 mg by mouth every 12 hours
Cefdinir	*Children*: 7 mg/kg by mouth every 12 hours (maximum dose 300 mg) *Adults*: 300 mg by mouth every 12 hours

Orbital cellulitis

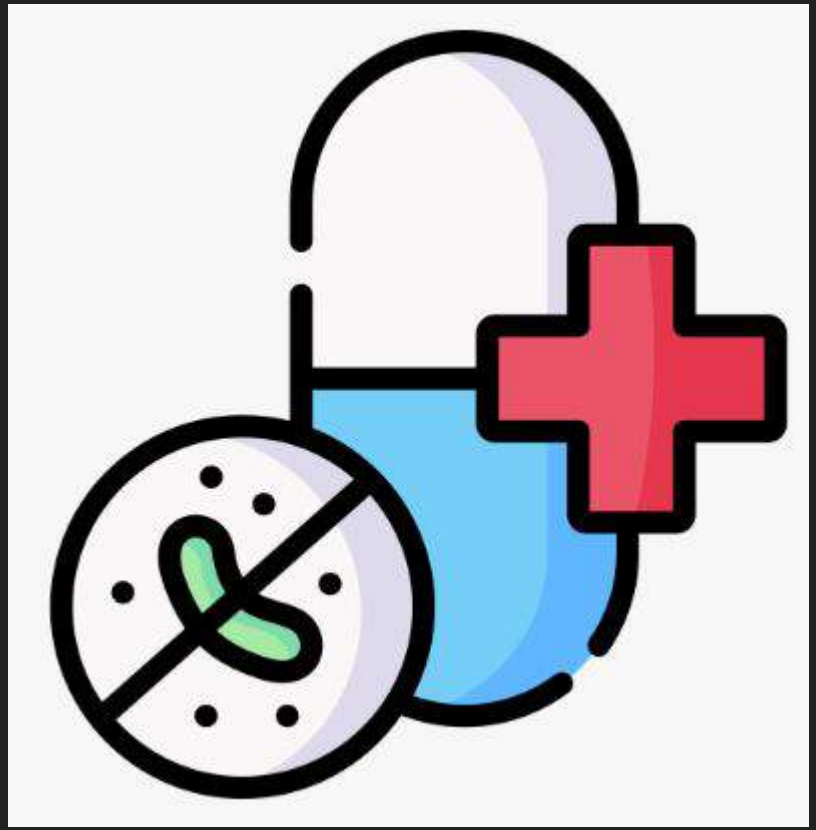
Table 2
Predictive value of signs and symptoms in the diagnosis of orbital cellulitis [13,18,24,35,48].

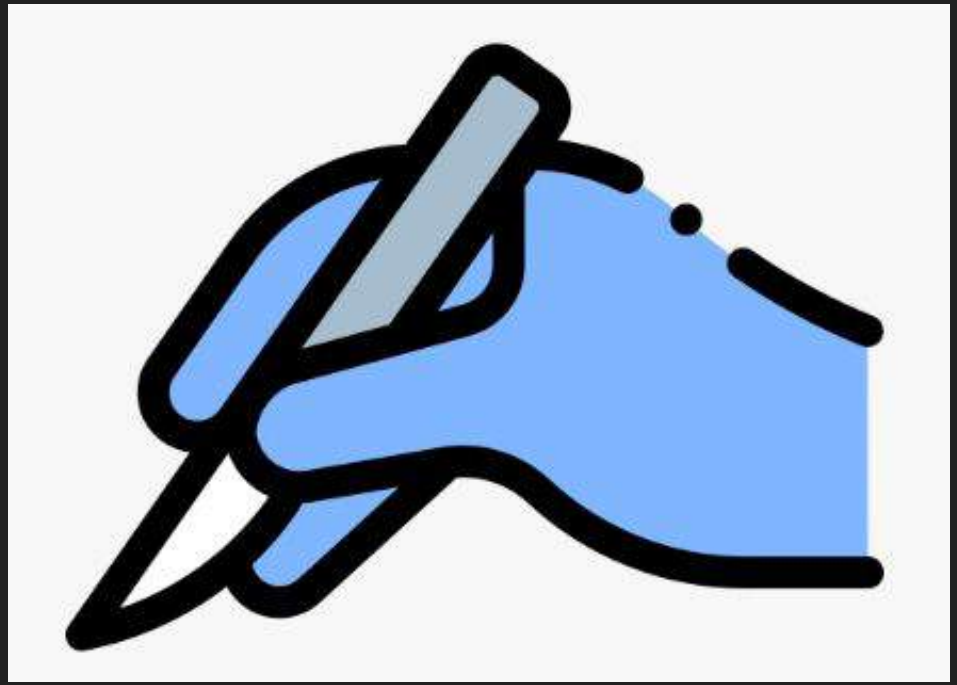
Sign/Symptom	Prevalence in orbital cellulitis population
Eyelid swelling	89.7–100%
Periorbital erythema	79.2%
Eyelid erythema	77.7–100%
Eye movement restriction	65–100%
Eye pain	61.5–62.5%
Chemosis	51.9–75%
Nasal congestion	43.6%
Fever	37–70.9%
Pain with eye movement	33.3–55.0%
Photophobia	20.8%
Headache	18.5%
Purulent eye discharge	16.7%
Diplopia	14.8%
RAPD	10%
Proptosis	8.3–46.2%
Decreased visual acuity	8.3–20.5%

Table 1
Chandler [1] and Jain [4] classification systems for periorbital infections.

Chandler	Jain
Group 1 - Preseptal cellulitis	Preseptal cellulitis
Group 2 - Orbital cellulitis	Orbital cellulitis (with or without intracranial complications)
Group 3 - Subperiosteal abscess	Orbital abscess (with or without intracranial complications)
Group 4 - Intraorbital abscess	• Intraorbital abscess
Group 5 - Cavernous sinus thrombosis	• Subperiosteal abscess


P

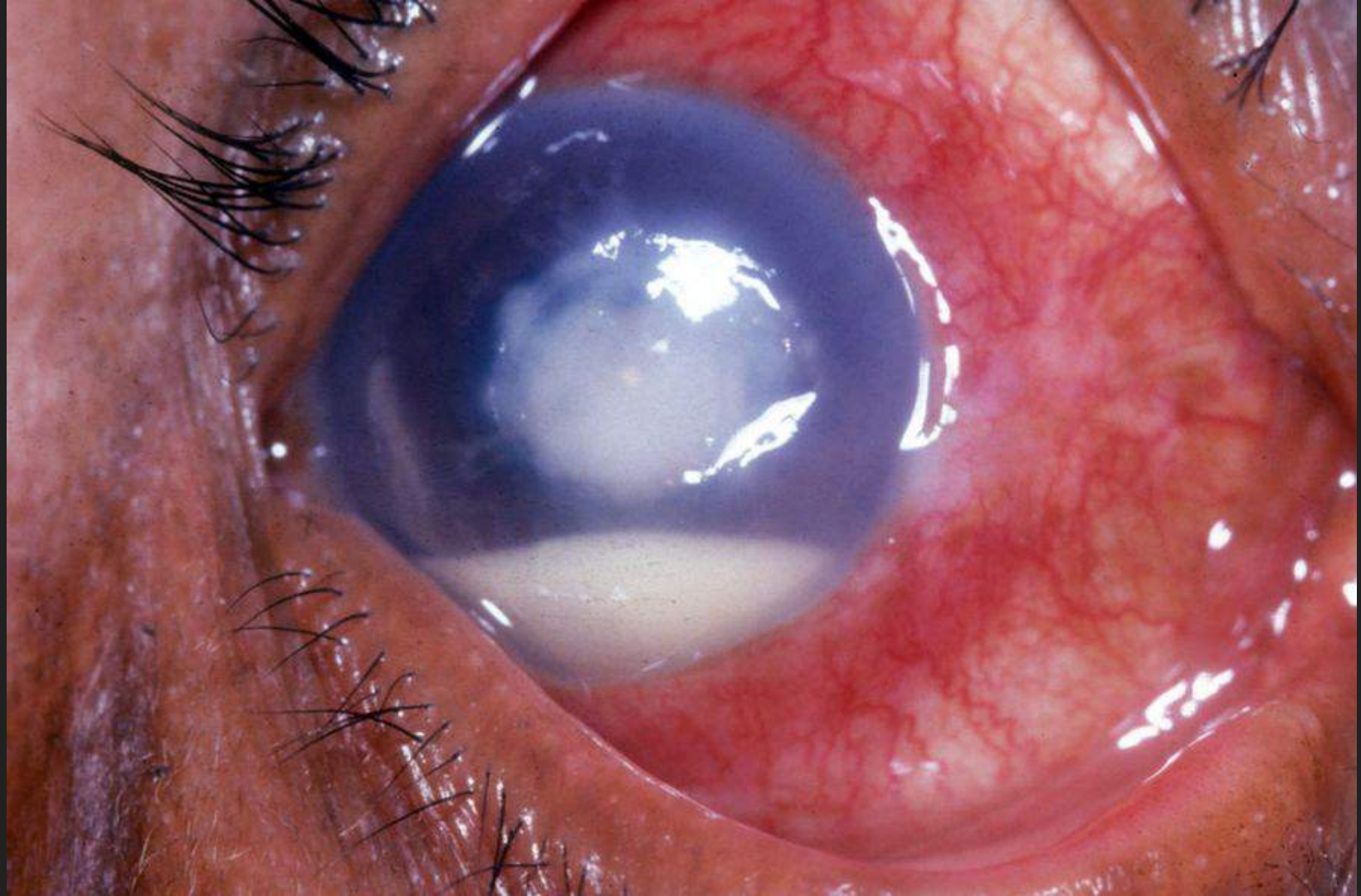




Seed GLOBAL HEALTH

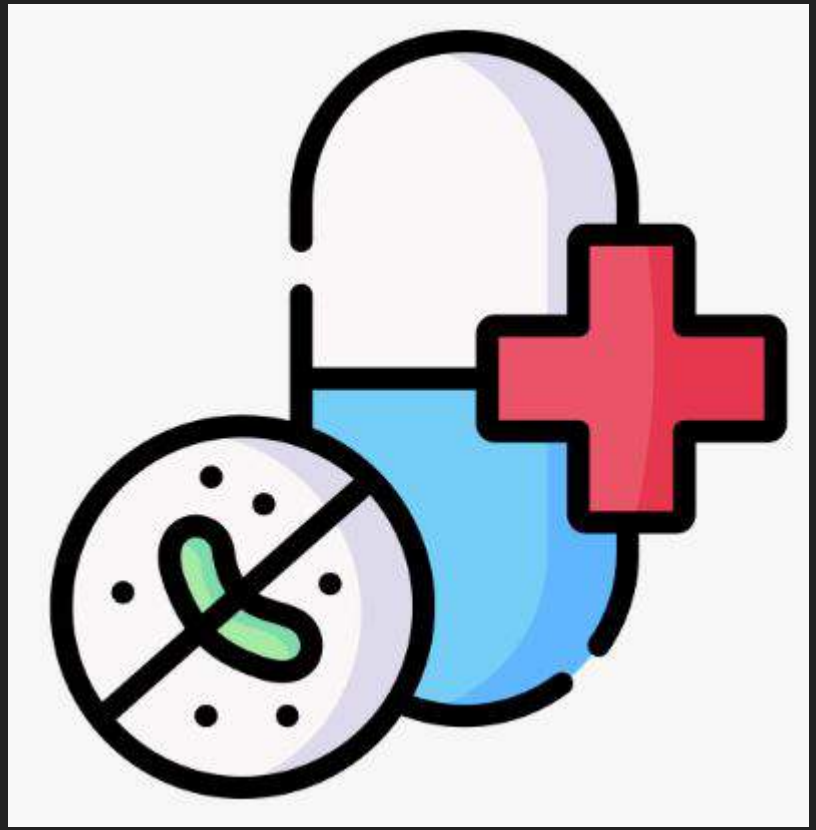
ECHO

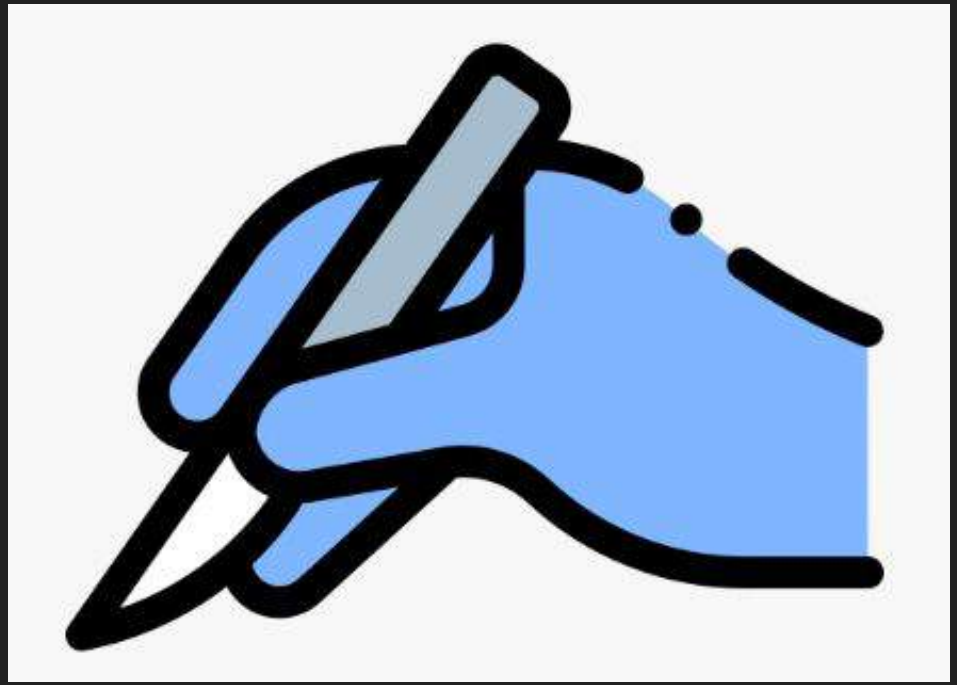
Endophthalmitis



Endophthalmitis

- Infection of the globe itself - not just the eye socket
- Usually caused by surgery/trauma
- Key finding: hypopyon (pus in anterior chamber)



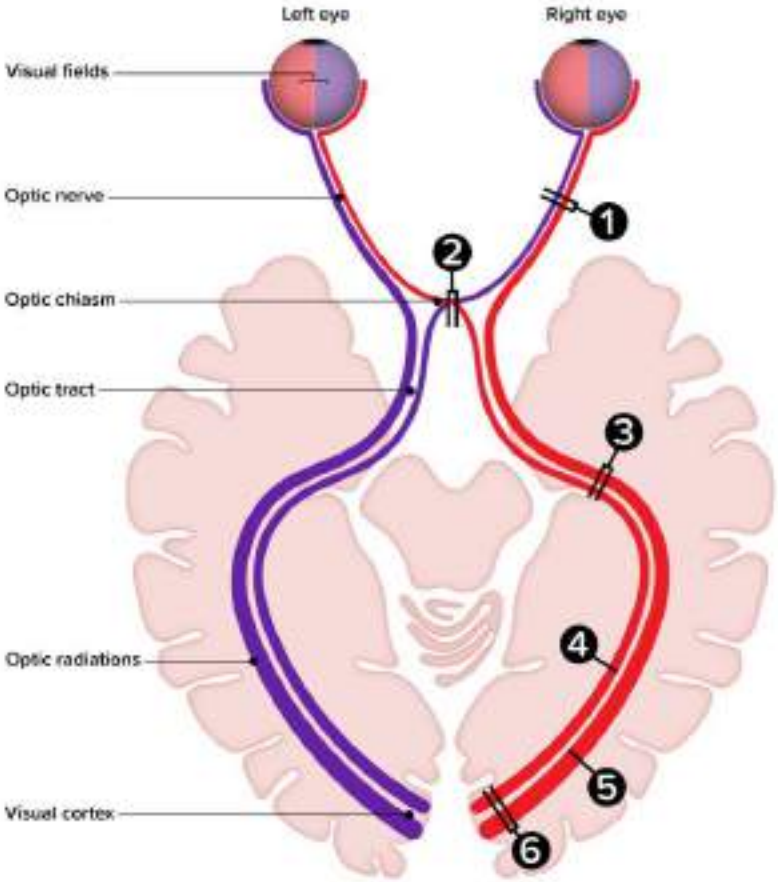


Seed GLOBAL HEALTH

ECHO

Vision loss

Visual Field Defects



Black = vision loss
Red = left visual field
Purple = right visual field

Key point: binocular vision loss is a STROKE until proven otherwise

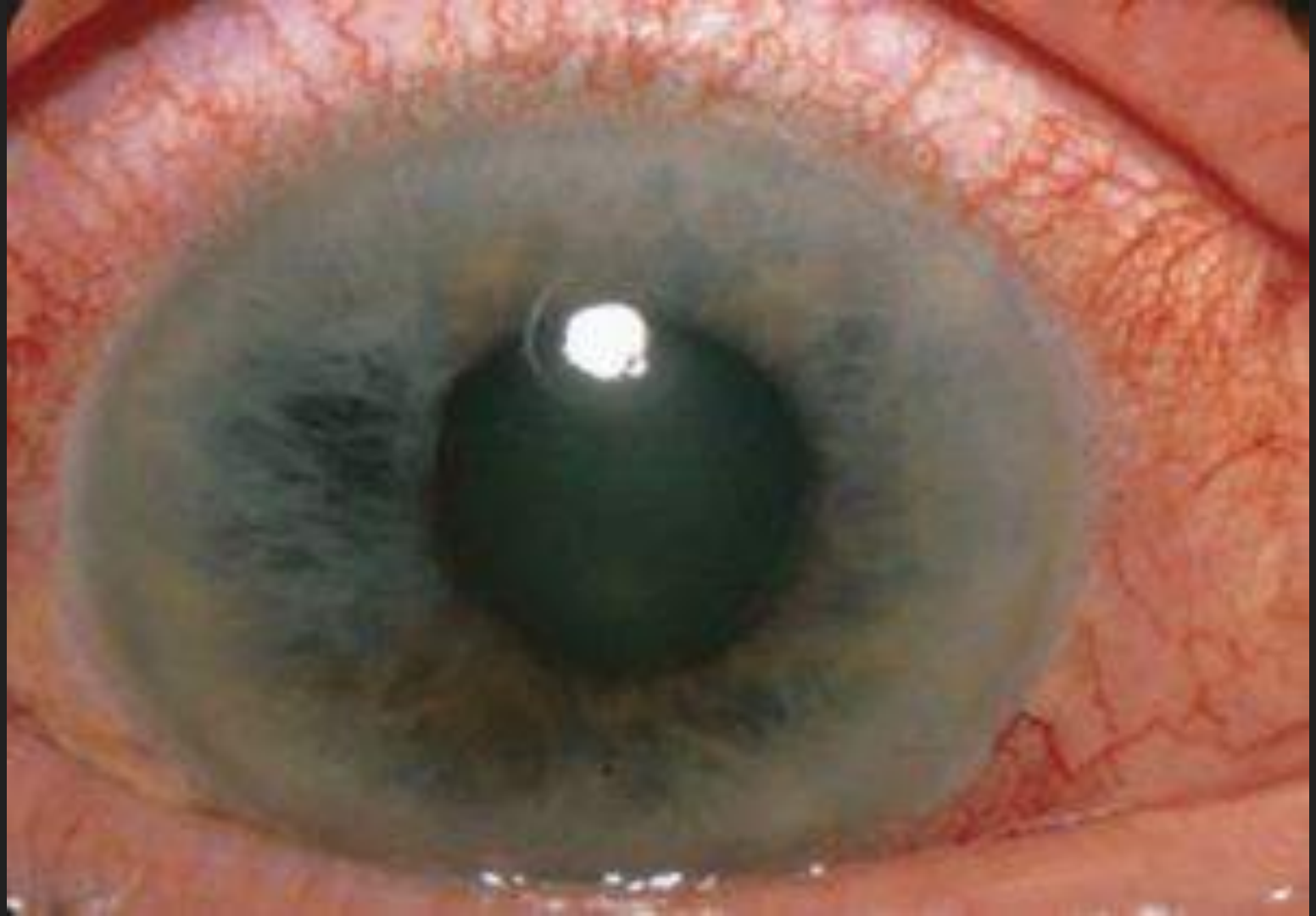
Monocular vision loss: Painless

Monocular painless vision loss

- Potential causes:
  - Central retinal artery occlusion
  - Central retinal vein occlusion
  - Lens dislocation
  - Retinal detachment
  - Vitreous hemorrhage or detachment
- Require advanced skills to diagnose (fundoscopy, POCUS)
- Some of these diagnoses are TIME-SENSITIVE
  - Need ophthalmology evaluation

Monocular vision loss: Painful

Acute angle closure glaucoma



Tim


And
Tim


Tim
And
Andrea


Tim
And
Andrea
Go to
the
Movies

And Andrea

Go to the Movies


Rising
Timolol Maleate
STERILE OPHTHALMIC SOLUTION, USP
0.5%
Timolol Equivalent (Timolol Maleate 6.8 mg/mL)
For Topical Application In The Eye
5 mL
Rx Only
NDC 61314-665-05
Apraclonidine Ophthalmic Solution 0.5% as base
0.5%
Rx Only
STERILE
5 mL
FOR TOPICAL OPHTHALMIC USE ONLY
SANDOZ
And Andrea
Go to the Movies

And
Andrea

Go to
the
Movies

And


Rising
Timolol Maleate
STERILE OPHTHALMIC SOLUTION, USP
0.5%
Timolol Equivalent (Timolol Maleate 6.8 mg/mL)
For Topical Application In The Eye
5 mL
Rx Only


NDC 61314-665-05
Apraclonidine Ophthalmic Solution 0.5% as base
0.5%
Rx Only
STERILE
5 mL
FOR TOPICAL OPHTHALMIC USE ONLY
SANDOZ

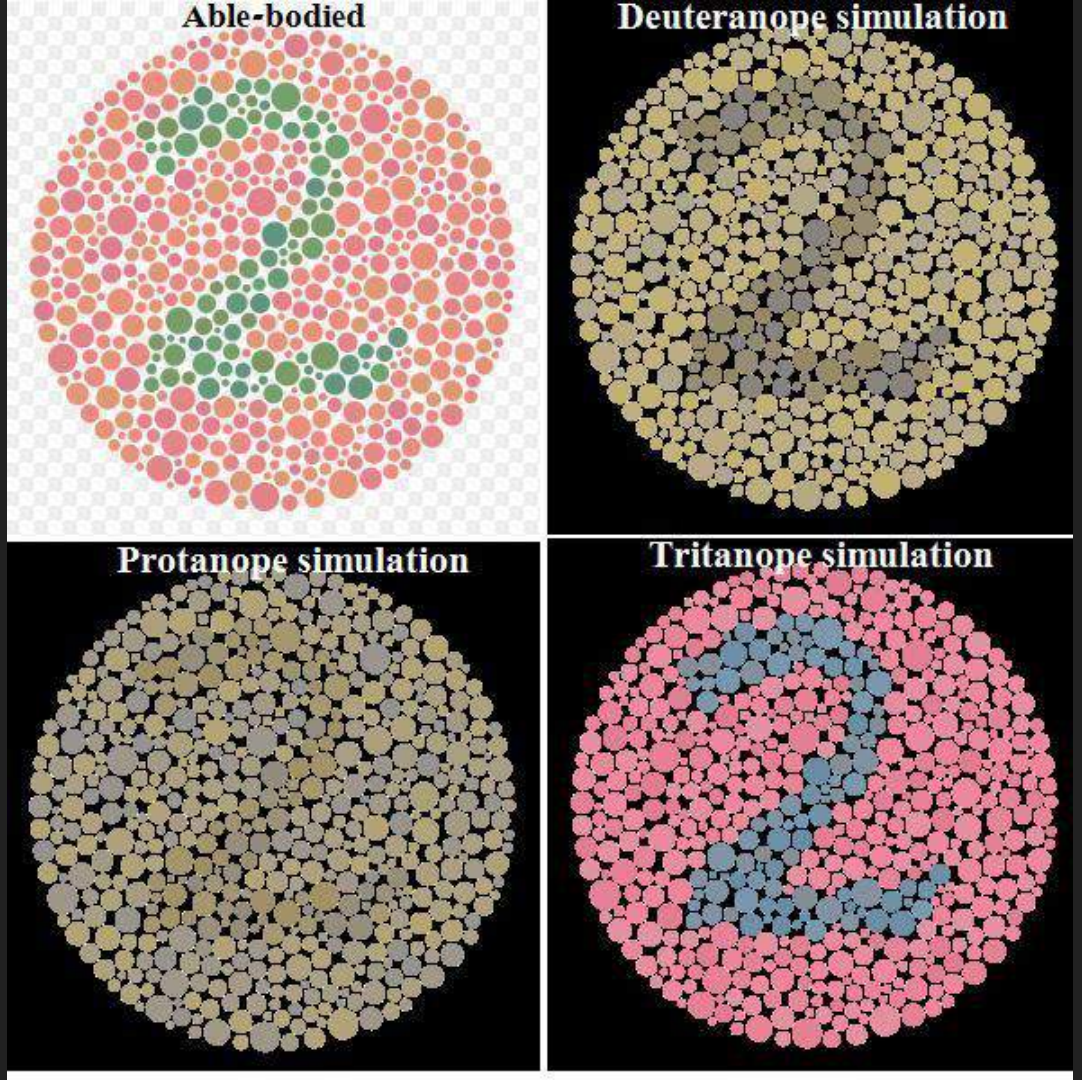

NDC 39822-0190-1
AcetaZOLAMIDE for Injection, USP
500 mg
FOR INTRAVENOUS USE


50 mL Single-dose
25% MANNITOL
Injection, USP
(12.5 g Total)
For I.V. Use Only
WARNING: SEE INSERT REGARDING CONTRAINDICATION IN SEVERE RENAL IMPAIRMENT

Optic neuritis

Optic neuritis

- Monocular vision loss, *usually* painful
- Often have color vision loss
- Need to see neurology/ophthalmology right away


Able-bodied
Deuteranope simulation
Protanope simulation
Tritanope simulation

Giant cell/temporal arteritis

Giant cell arteritis

- Monocular vision loss, *usually* painful
- May be preceded by unilateral headache
- *Usually* older adults
- *Usually* elevated ESR/CRP
- Treatment is high-dose steroids
- Need to see ophthalmology right away

Take-Home Points

- Do a complete eye exam for ANY visual complaint

Take-Home Points

- Do a complete eye exam for ANY visual complaint
- VItal signs of the eye: acuity, pupils, IOP

Take-Home Points

- Do a complete eye exam for ANY visual complaint
- VItal signs of the eye: acuity, pupils, IOP
- Binocular vision loss = brain problem

Take-Home Points

- Do a complete eye exam for ANY visual complaint
- VItal signs of the eye: acuity, pupils, IOP
- Binocular vision loss = brain problem
- Worried about vision-threatening problem? Call ophthalmology early

References

Contact:

+1 540 212 0449

Questions?