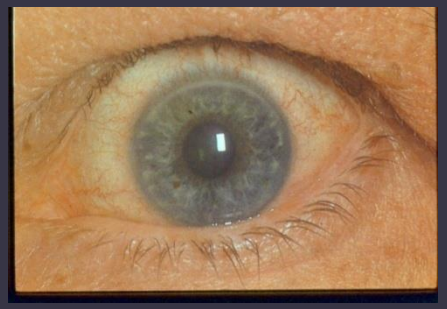
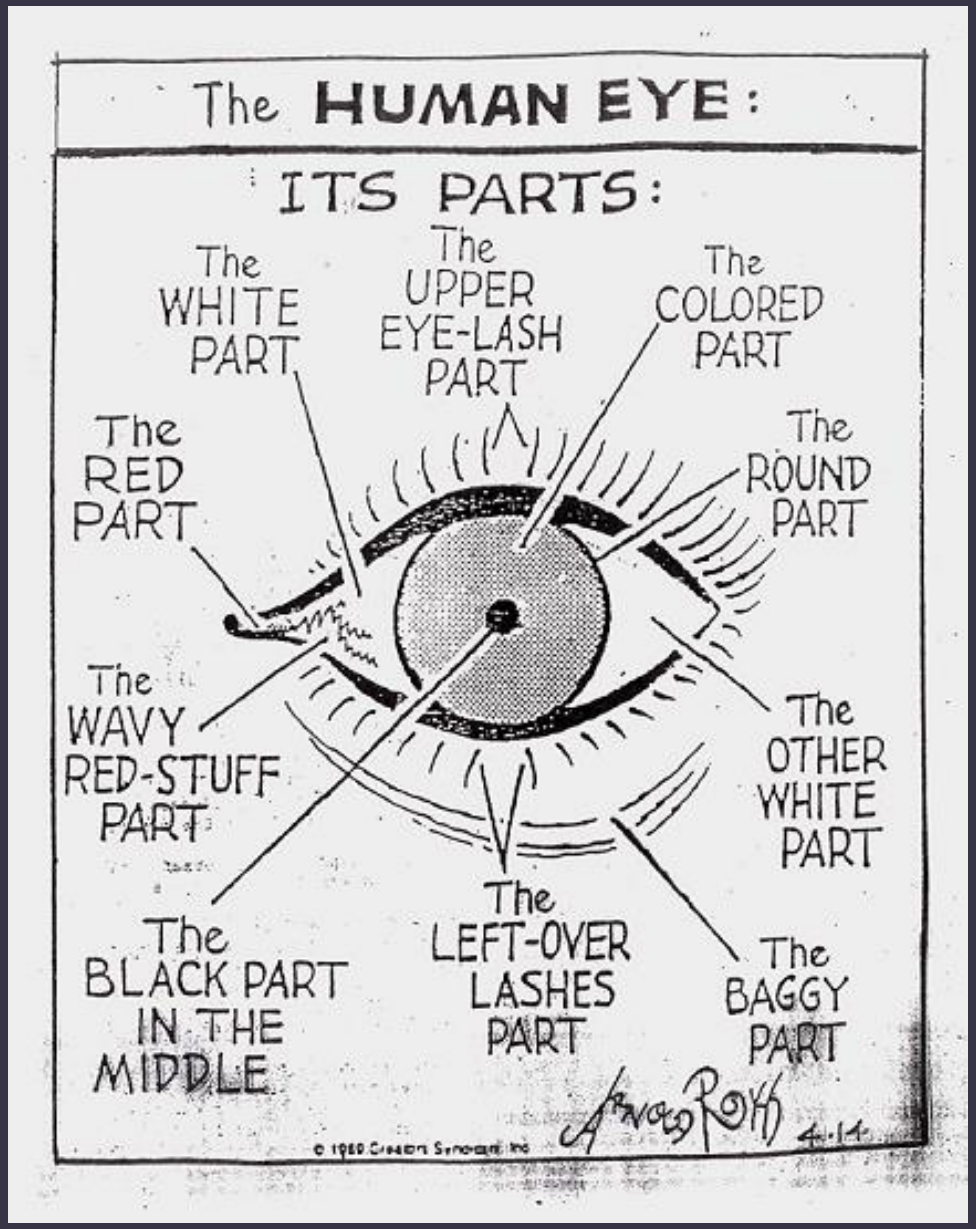


Ophthalmology in GIM: *Anterior eye*

Board Review Prep Course
ACP Washington state chapter
July 20-22, 2022

Joyce Wipf, MD, MACP
UW Professor of Medicine
GIM Section Chief VA Puget Sound


The HUMAN EYE:
ITS PARTS:
The WHITE PART
The UPPER EYE-LASH PART
The COLORED PART
The RED PART
The ROUND PART
The WAVY RED-STUFF PART
The OTHER WHITE PART
The BLACK PART IN THE MIDDLE
The LEFT-OVER LASHES PART
The BAGGY PART
Arnold Roth 4-11
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Colored Circular Lenses

Also sometimes used:
Tattooed eyeliner, eyebrows
Medication to increase lashes
Medications to improve vision short term – not for boards

Case 1.

A 79-year man comes to primary care clinic for routine follow-up. His son is concerned about his father's ability to pass an upcoming driver's license exam as he recently was diagnosed with cataract. He often drives alone to the store. The patient thinks his vision is fine.

On exam, visual acuity is:

20/30 left eye
20/50 right eye
20/30 both eyes

Case 1.
What is the best response to whether he can safely drive?

A. He should not drive until cataract surgery is completed on right eye
B. He is fine to drive only if another rider
C. He needs visual acuity 20/50 or better to pass his vision driver's test
D. He needs visual acuity 20/40 or better to pass his vision driver's test
E. None of the above

Impaired Vision: Definitions

Blindness

- Visual acuity worse than 20/200 with best lens correction

Significant vision loss

- Visual acuity worse than 20/60 with best lens correction (WHO criteria)
- Inability to pass driver's test (varies by state, usually fail if worse than 20/50)
- Vision loss impairing function, varies with individual

CATARACT PREVENTION

- DM: increased risk of cataracts if poor glycemic control, severe diabetic retinopathy, prolonged duration of DM and older age.
- Research suggests role of oxidative stress in formation of cataracts
  - *Am J Ophth* 2005, 139:266-70
  - *Ophthalmol* 2004; 111:75-84: Randomized trial of Vitamin E 500 IU/D x 4yrs: did not reduce incidence or progression of nuclear, cortical or posterior subcapsular cataract
- Prolonged use of topical facial, intraocular steroids or large doses of inhaled steroids are associated with cataracts.
  - Jobling, et al, *Clin Exp Optom* 2002; 85:61-75.

Hordeoleum

- Localized redness, pain, swelling on upper or lower lid; Commonly Staph aureus abscess
- External hordeoleum (stye):
  - site of infection is around lash follicle and assoc glands of Zeis/Moll, +/- blepharitis;
- Internal hordeoleum:
  - Meibomian gland abscess pointing to conjunctival surface of lid
- Rx: warm compresses, ABX (oral for internal hordoleum, ointment for external hordoleum q 3hrs); incision if not improved

Case 2.
Which topical medication would you select for blepharitis?

A. Erythromycin 0.5% ointment
B. Sulfacetamide 10% solution drops
C. Aminoglycoside (Tobramycin 0.3%, Gentamicin 0.3%)
D. Quinolone (Ciprofloxacin 0.3%, Ofloxacin 0.3%)
E. Triple antibiotic solution (Gramicidin/Neomycin/Polymyxin B soln)

Case 3.

A 37yr old woman presents for ED evaluation of left eye swelling and facial erythema for 18 hrs, preceded by sinusitis with purulent nasal drainage for 5 days.
She has noted low grade fever.

Exam:

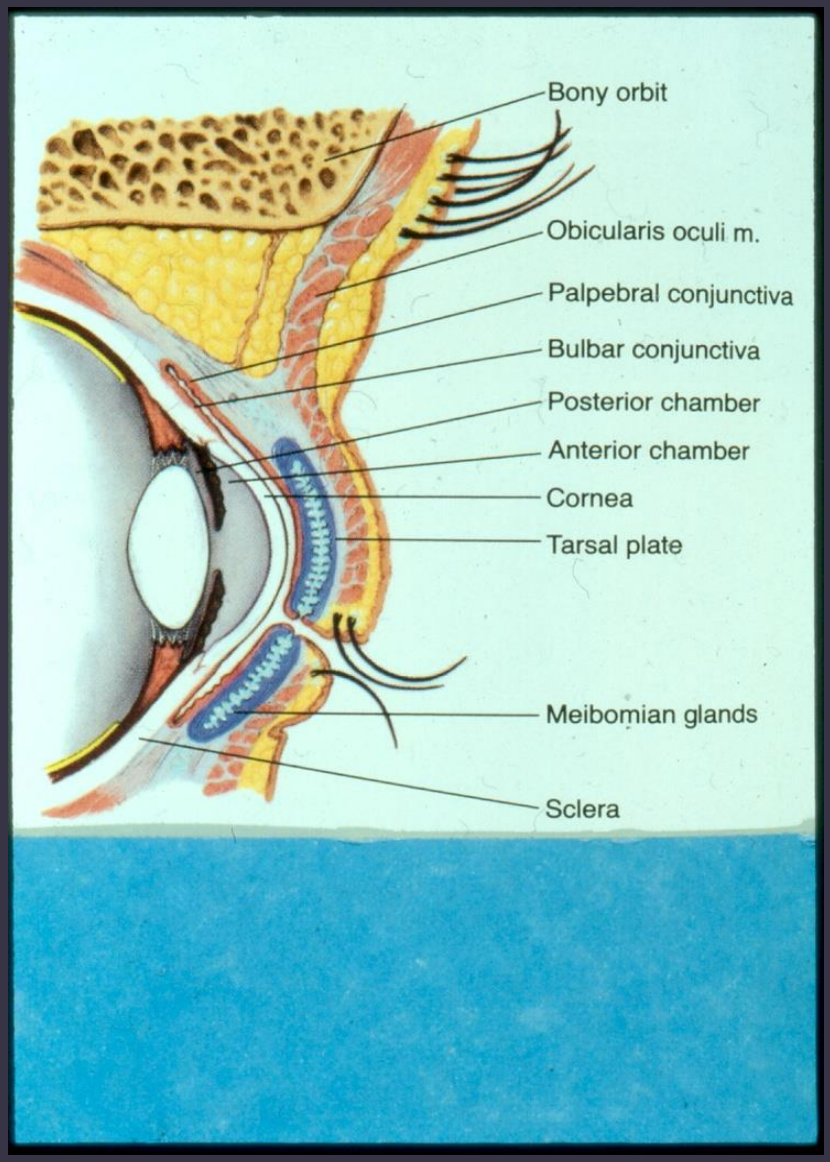
Temp 38.8 C, BP 104/70, HR 92.

Swelling of the eyelid is present with erythema extending from upper lid to lower cheek.

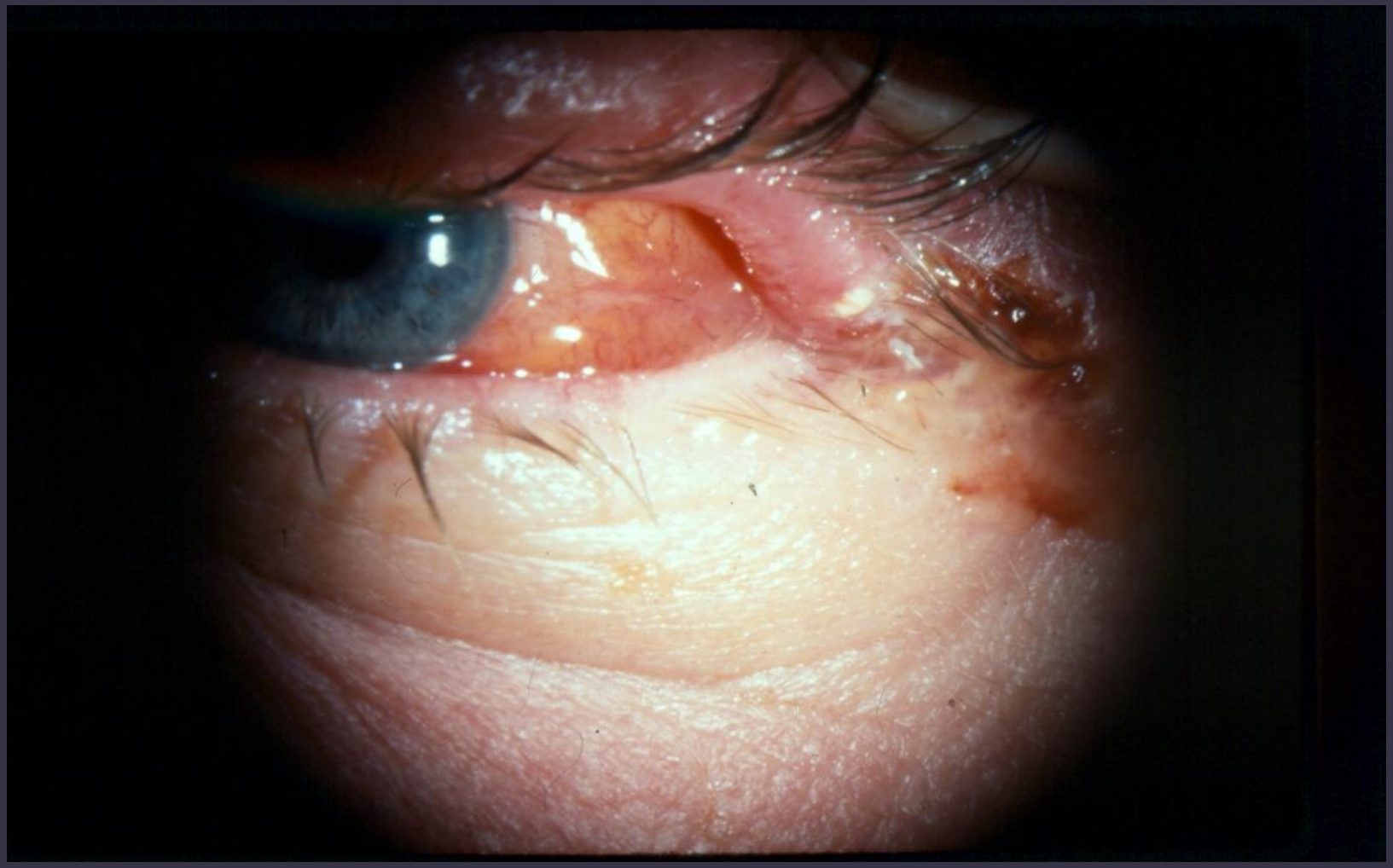
Case 3.

Which physical examination finding is most helpful to distinguish post-septal (orbital) cellulitis from pre-septal (periorbital) cellulitis?

A. Fever
B. Impaired extraocular movements
C. Difficulty opening eye fully
D. Purulent nasal drainage
E. Severity and extent of cellulitis


Bony orbit
Obicularis oculi m.
Palpebral conjunctiva
Bulbar conjunctiva
Posterior chamber
Anterior chamber
Cornea
Tarsal plate
Meibomian glands
Sclera

Preseptal cellulitis



ORBITAL CELLULITIS

- Red swollen lid and conjunctiva, +/- proptosis, +/- optic nerve involvement
- Impaired EOM: distinguishes from more superficial pre-septal cellulitis
- Etiologies: Primary (trauma) vs Secondary (eg sinusitis)
  - Organisms: Staph, Strep, HI, fungal in DM and immunosuppressed
- May lead to cavernous sinus thrombosis, meningitis
- Rx: Admit, Cx, ABX, CT scan, Ophth & ENT consults, +/- surgical debridement

Orbital Cellulitis Clinical Pearls:

Ophthalmologic emergency

Impaired EOM: distinguishes from more superficial pre-septal cellulitis

If unsure, scan the patient

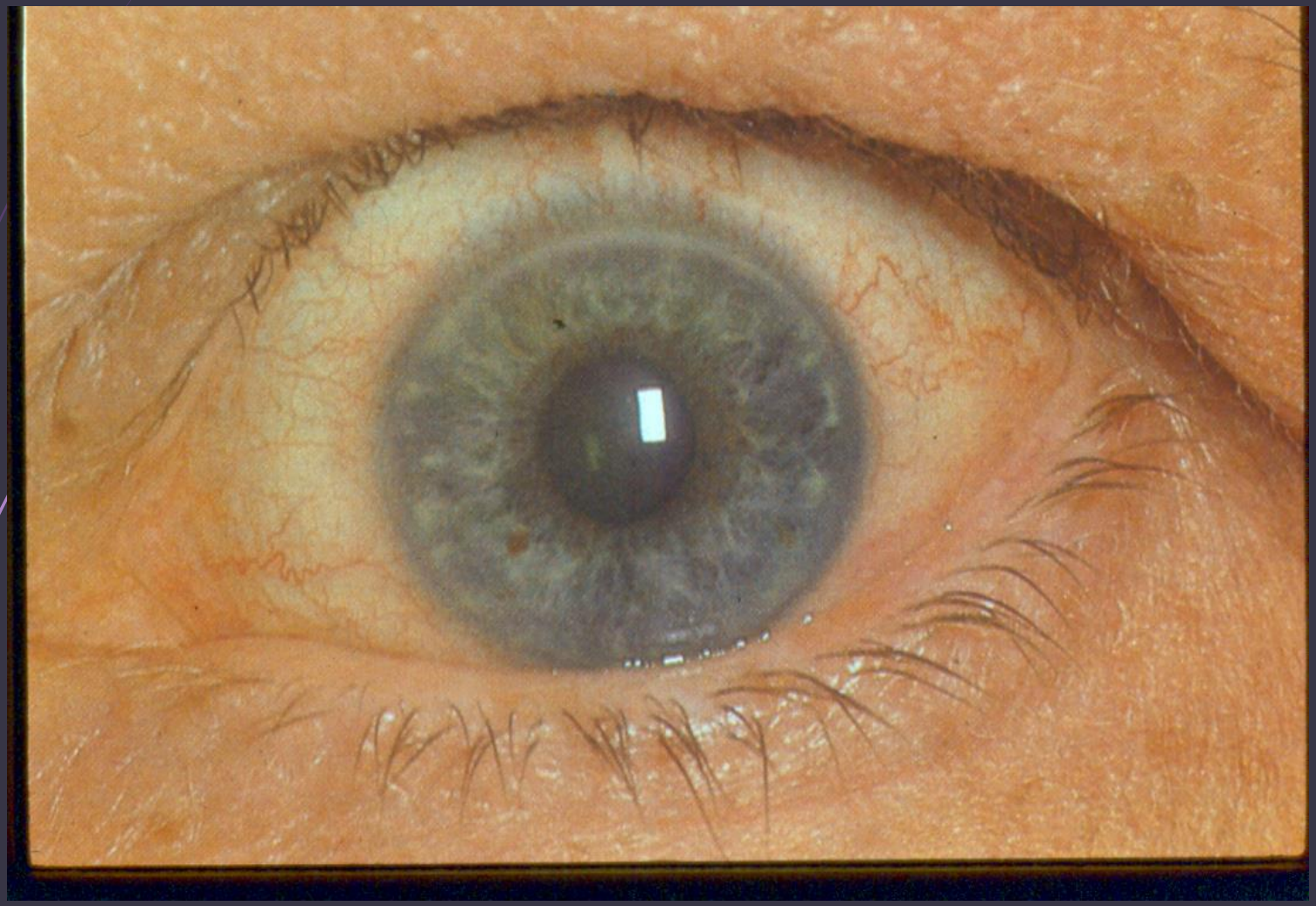
Case 4.

This patient presents with eye symptoms and occasional palpitations. She notes that her eyes "look different" and at times she has double vision.

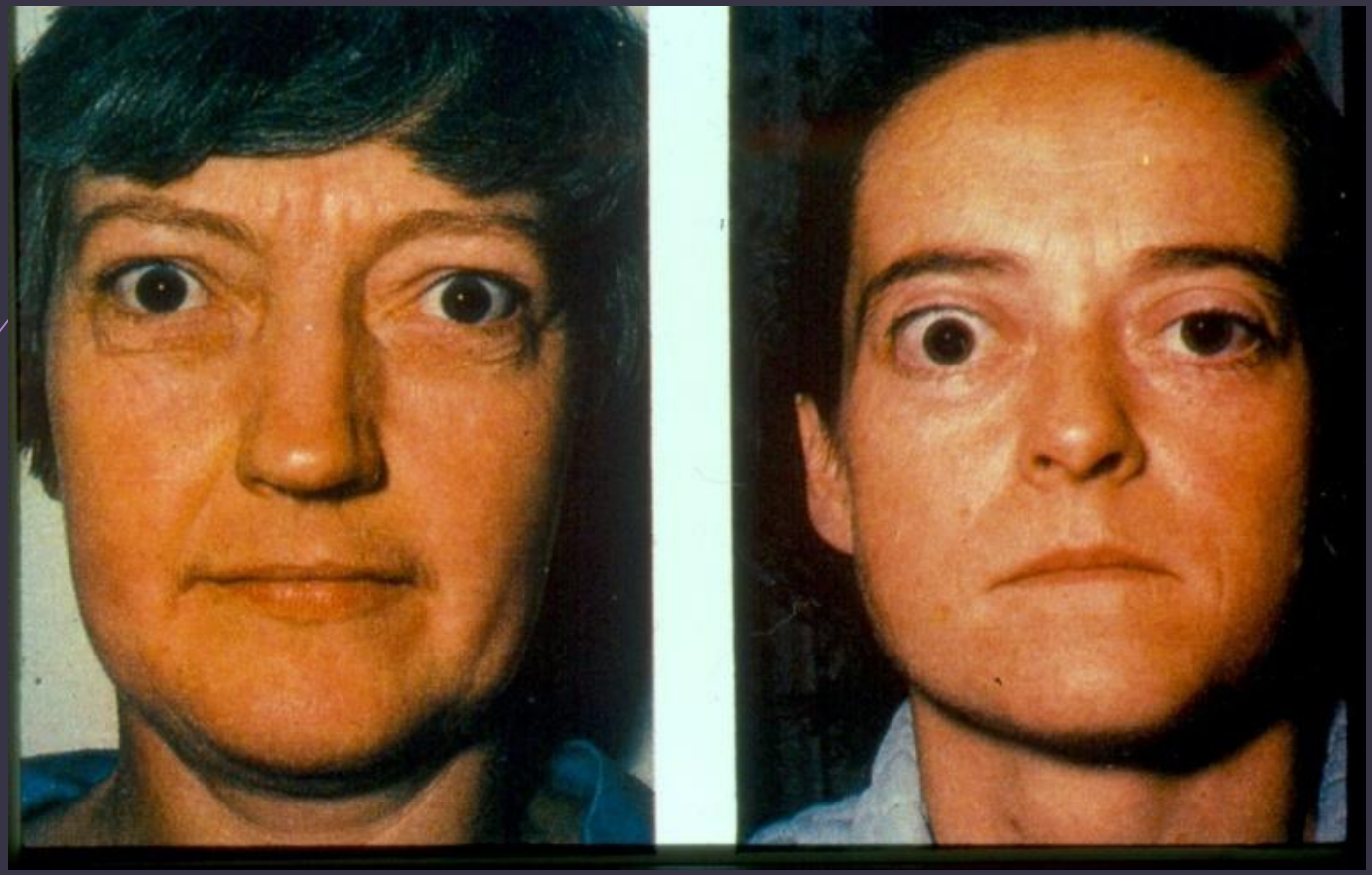
Exam shows thyromegaly, eyelids retracted. Eye exam is shown after asking the patient to look upward.

Case 4.
Which of the following is correct?

A. The patient has weakness of the superior rectus/ oblique muscles
B. This is also called “lid lag”
C. The patient may have multi-nodular goiter
D. The globe is pushed outward (exophthalmos)



Lid retraction in exophthalmos



Case 5.
What is the most common ocular finding in Grave's disease?

A. Conjunctivitis
B. Anterior uveitis
C. Increased intraocular pressure
D. Pupils unequal
E. Exophthalmos

Hyperthyroidism Clinical Pearls:

The normal position of the lid is 2mm below limbus edge

White conjunctiva seen above the iris suggests lid retraction or exophthalmos

Exophthalmos in hyperthyroidism is due to infiltrative mucopolyglycans (Grave's disease)

FDA approved medication for Thyroid eye disease:
Teprotumumab (2020)

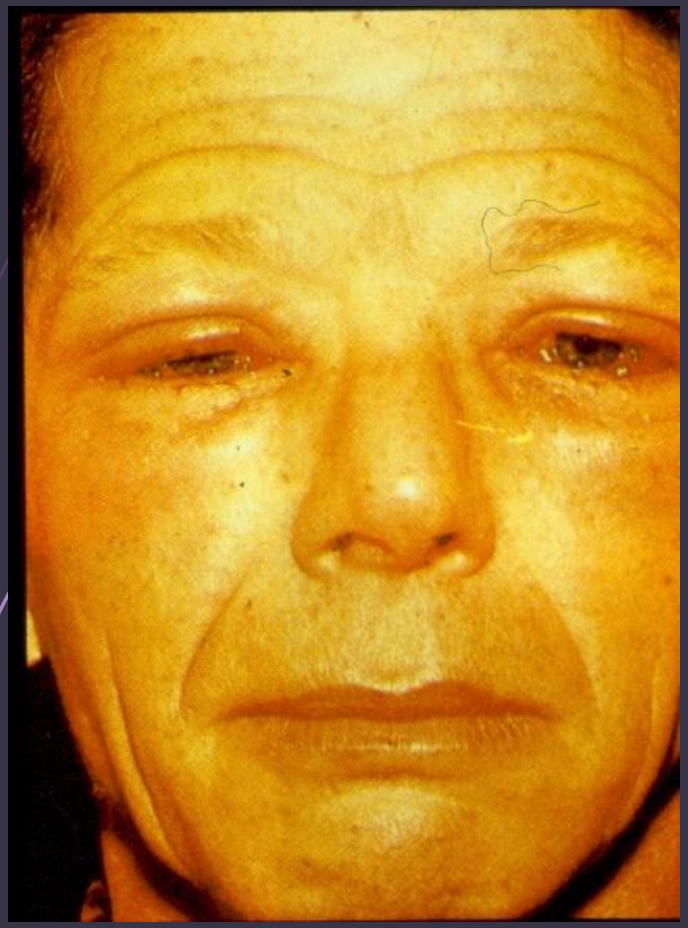
Subconjunctival hemorrhage

Case 6.

You are evaluating a 39 year old man in the ED who c/o red eye pain bilaterally for 2 days. No recent Upper Respiratory infection.

PMH: Arthritis with LBP and joint stiffness; conjunctivitis left eye and diarrheal illness requiring Rx last yr.

MEDS: NSAID (Ibuprofen)



Exam: Pt looks uncomfortable, afebrile. BP 146/92.

VA 20/40 bilat, pupils 3mm bilat and reactive, eyes tearing and marked injection bilat

Case 6.
What is the *most likely diagnosis and recommended Rx of this patient:*

A. Mild bacterial conjunctivitis : Rx with ophthalmic antibiotic drops
B. Viral conjunctivitis: Rx with lubricrating drops (ie *IsoTears*) for irritation
C. Iritis: Rx with steroids
D. Keratitis: Rx with acyclovir

Eye Pain
Clinical Pearls:

Not all red eye is benign conjunctivitis

Distinguish eye discomfort from true eye pain

Eye pain and red eye – consider iritis (=anterior uveitis)

If suspect iritis → urgent ophthalmology referral

Case 7.
What is the most common bacterial cause of acute conjunctivitis?

A. Staphylococcus aureus
B. Streptococcus pneumococcus
C. Hemophilus influenza
D. Chlamydia trachomatis
E. Escherichia coli

CONJUNCTIVITIS

Viral:

- Classic "pink eye", often with URI sx
- Preauricular and/or submandibular LAN
- Lid edema, serous discharge, follicles
- Adenovirus most common, contagious for 12 14 days
- Rx: Handwashing, topical lubrication

Eversion of the eyelid is an important part of the exam for red eye.

WHY?

Eversion of the eyelid is an important part of the exam for red eye. WHY?

- Viral conjunctivitis is associated with whitish-gray precipitates or "follicles" on the tarsal conjunctiva
- Bacterial conjunctivitis or allergic conjunctivitis may have hyperemia of the conjunctiva
- The tarsal conjunctiva is NOT affected in iritis

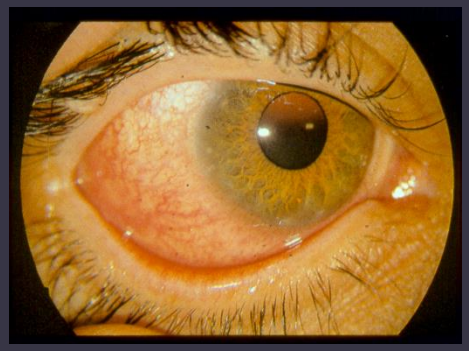
Follicles of the conjunctiva:

Viral conjunctivitis

Viral Conjunctivitis Clinical Pearl:

Most common cause of viral conjunctivitis is adenovirus, which is highly contagious!

CONJUNCTIVITIS



Mild Bacterial conjunctivitis:

- Lateral conjunctival redness
- Staph aureus, strep pneumo,
- HI, M. catarrhalis

- *Rx mild, mucopurulent discharge:*
  topical abx drops q 2hrs WA x 2 days, then qid until 2 days after eyes clear
  (phone f/u to be sure improving

Case 8.

Which topical medication would you select for mild bacterial conjunctivitis in adults?

A. Erythromycin 0.5% ointment
B. Sulfacetamide 10% solution
C. Aminoglycoside (Tobramycin 0.3%, Gentamicin 0.3%)
D. Quinolone (Ciprofloxacin 0.3%, Ofloxacin 0.3%)

Topical medication for mild bacterial conjunctivitis in adults

Erythromycin 0.5% ointment →ointment blurs vision x 20 min, so can't drive, read, etc immediately; preferred for children or if difficulty getting drops in

Sulfacetamide 10% solution

Aminoglycoside (Tobramycin 0.3%, Gentamicin 0.3%) → toxic to corneal epithelium; can cause reactive keratoconjunctivitis

Quinolone (Ciprofloxacin 0.3%, Ofloxacin 0.3%) →quinolones effective but concern re: resistance, high cost; Rx rec for corneal ulcer

Severe Bacterial Conjunctivitis:

Gonorrhea, Chlamydia

- *Rx severe, copious discharge*:
  Emergent Ophthalmology, culture
  * GC: IM/IV ceftriaxone
  * Chlamydia: Doxy for 2 wks

Allergic Conjunctivitis

- Affects 25% of the population
- Mild ocular symptoms respond to allergy avoidance, artificial tears
- Avoid rubbing the eyes or wearing contacts
- Topical antihistamines/vasoconstrictor use <2 weeks
  - Most common is nephazoline/pheniramine (inexpensive)
- No real role for oral antihistamines in allergic conjunctivitis
- Long term Rx: topical mast-cell stabilizer (Cromolyn, Ketotifen), H1 blocker

Clinical Pearl

Allergic conjunctivitis is best managed with topical antihistamines short term, more effective than oral antihistamines

Case 9.

44-year-old patient comes to the ED with vesicular skin lesions on the face, present x 2 days.

He denies eye pain or ocular sx, but the skin lesions are painful.

Case 9.
Which of the following is correct?

A. Hutchinson's sign (lesions on tip of nose) is negative; thus there is no eye involvement.
B. The absence of eye pain makes herpes keratitis unlikely.
C. The incidence of zoster ocular complications is unrelated to severity of the rash.
D. This patient needs anti-viral therapy within 7 days to reduce risk of post-herpetic neuralgia

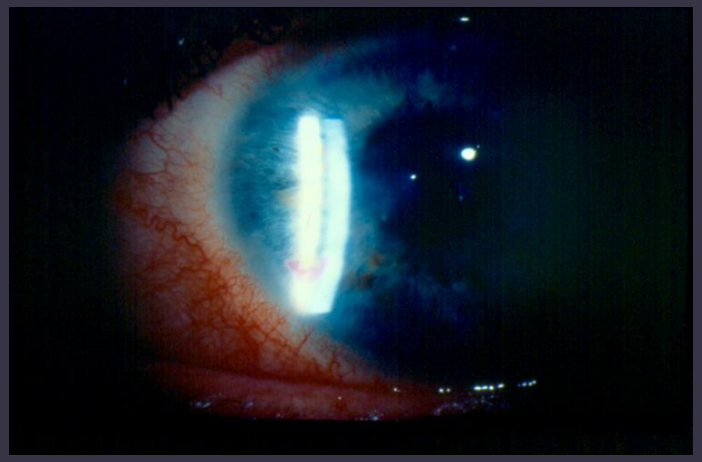
Clinical Pearls:

Herpes Zoster and Herpes Simplex keratitis associated with hypoesthesia of the cornea (no pain)

Facial zoster needs eval for Keratitis

Reduced visual acuity or severe foreign body sensation in red eye requires urgent ophthalmology referral

Slit lamp exam



- Valuable in localizing inflammation to cornea (keratitis) or iris (iritis)
- If not available, usually enough other clues from history and eye examination to determine whether ophthalmology referral is indicated

Case 10.

A 21 year old college student presents with red left eye. He wears extended wear contact lenses.

Which organism is most likely the source of the infection?

A. Staphylococcus aureus
B. Streptococcus pneumoniae
C. Hemophilus influenza
D. Pseudomonas aeruginosa
E. Candida albicans

Keratitis: contact lenses wearers

- Most freq GNR/pseudomonas), also Staph/ strep; less common fungal, other
- Ophthalmology referral
  - Other non-infectious corneal conditions to consider in contact lens use: abrasions, etc
- Front-line ER/urgent care: Infectious keratitis dx
  - Red eye (conjunctival vascular injection)
  - Reduced visual acuity (especially if the central cornea is involved)
  - Pain, photophobia

Infectious Keratitis contact lenses - 2

Ophthal eval and Rx:

- Corneal culture done if severe infection
- Rx variety of options:
  - Topical 4th gen Flouroquinolone: gatifloxacin (superior to cipro or levofloxacin in studies as covers GPC), moxifloxacin
  - Less expensive Rx (alternate cefazolin with aminoglycoside drops)
- Usually steroids avoided

Case 11.

Which of the following features of a patient with red eye would be most consistent with iritis?

A. Vision loss, eye pain, lack of discharge, and circumcorneal redness
B. Vision loss, small pupil, mucopurulent discharge and circumcorneal redness
C. Small pupil, eye pain, mucopurulent discharge, and lateral redness
D. Eye irritation, large pupil, lack of discharge, benefit with NSAID

THE RED EYE: IRITIS

- Vision mild to moderate blurring
- Eye pain and photophobia present, unlike conjunctivitis
- Pupils small
- Eye injected, including at limbus edge (ciliary flush)
- Look for associated systemic disease

IRITIS: Etiology

- *In 60% of pts no cause identified*
- May occur in association with HLA-B27 expression not linked to AS or systemic disease
- May be an isolated eye disorder (several syndromes)
- May occur following surgery
- May occur as an adverse drug or hypersensitivity reaction

IRITIS: Associated Medical Conditions
(Classic paper: "An internist's View"; Rosenbaum *Arch Intern Med* 1989)

- Arthritis
  - Ankylosing Spondylitis
  - RA, Reactive Arthritis, Psoriatic Arthritis
- Systemic Infections
  - Viral: HSV, VZV, HIV, CMV
  - Bacterial: Syphilis, TB, Leprosy
  - Fungal
  - Parasitic
- Systemic diseases
  - Sarcoidosis

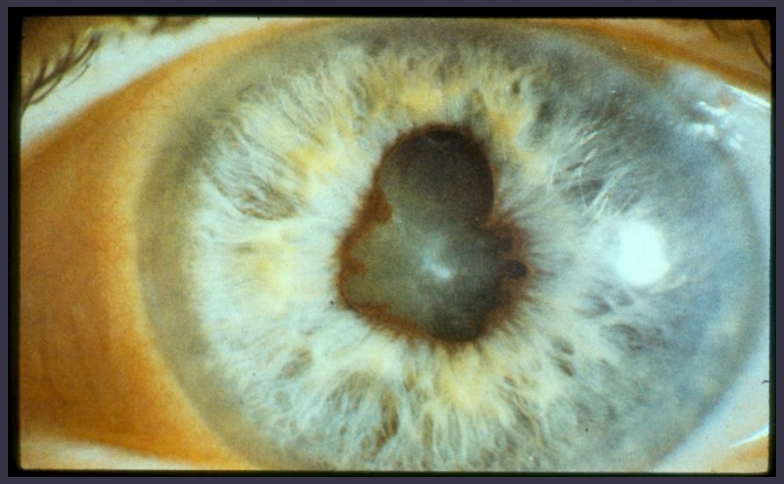
Rx of Iritis

- Topical steroids standard Rx since 1950s
- Trials of types of steroid: Prednisolone 1% as good or better than others for initial Rx
  - Foster et al. *Am J Ophthal* 1996
  - Loteoprednol E. US Uveitis Study Group *Am J Ophthalm* 1999
- Nonsteroidal drops sometimes added
  - RCTs of nonsteroidal vs steroidal drops

*Non-steroidal similar to placebo and lower % cure vs steroid (47% vs 69%)

Iritis: Prognosis

- Often iritis is self-limiting
- Complications:
  - Posterior synechiae (adhesions between iris and lens capsule)
  - Cataract
  - Glaucoma
  - Chronic iritis (lasting more than 6 wks)
  - Vision loss



Vision Outcome in Iritis

- Study of 154 pts (232 eyes)
- 119 pts were HLA-B27+
- Visual acuity:
  - 20/20-20/30 in 70%
  - Better than 20/60 in 85%
  - 20/60 or worse in 10%
  - Worse than 20/200 (legally blind) in 5%
- HLA-B27 status made no signif difference in rate of complications or visual outcome

Linssen et al *Am J Ophthalm* 1995; 120:351-361

Iritis (Anterior uveitis) Clinical Pearls:

Hx: Eye pain, blurred vision, +/- systemic disease

Exam: Pupils small, eye injected at limbus
edge (ciliary flush)

Urgent Ophthalmology referral

Value of extensive w/u for cause debated

Case 12.

Pt was admitted on a Friday night for mild dyspnea after running out of his inhalers days after being discharged from his NH for ETOH intoxication. PMH vasculitis, on chronic prednisone 40mg q D Exam: pt irritable, NAD. 1 day later c/o discomfort right eye.

Exam: trace conj injection, o/w neg including exam of tarsal conjunctiva, VA 20/30 right eye, 20/25 left eye.

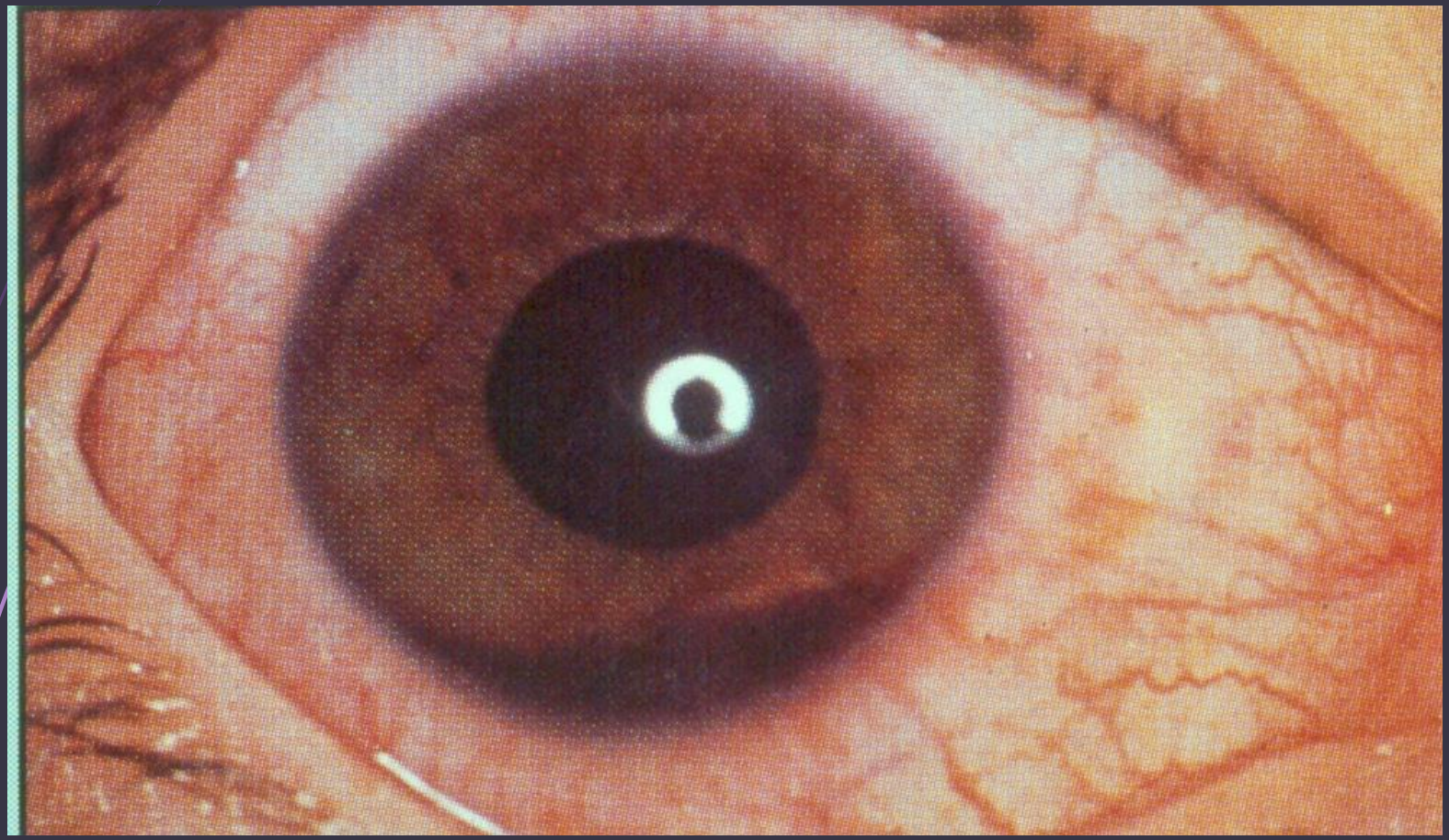
Next AM, pt says, "I can't see". Exam as shown. VA right eye light perception only.

Case 12.

Patient with rapid loss of vision R eye. Exam shows opaque lower anterior eye with fluid level.

What finding does the patient have?

A. Hemorrhage subconjunctival
B. Hypopyon
C. Hyphema
D. Hyperkeratosis
E. Hyperbole



ENDOPHTHALMITIS

- Inflammatory process involving an ocular cavity, often synonymous with infection involving the vitreous humor
- Etiologies:
  - Exogenous:
    - Post-operative (0.08-0.5% after cataract surgery)
    - Traumatic
  - Endogenous: Hematogenous spread of infection from distant site
    - Metastatic from meningitis, endocarditis, GU/GI tracts, skin, puerperal, lungs
- Usually bacterial, occasionally fungal

ENDOPHTHALMITIS: Dx and Management

- Aspiration of pus for Cx
- IV and Intravitreal ABX
- Search for source of metastatic infection
- Evacuation of pus
- Steroids: controversial
- *Prognosis:* outcome is usually blindness

Case 13.

An 11 yr old patient is evaluated for acute red eye. The patient is often outside and had an eyelid injury age 2. Exam is shown with Fluorescein stain.

What is the most likely diagnosis?

A. Dry eyes (keratoconjunctivitis)
B. Bacterial conjunctivitis
C. Viral conjunctivitis
D. Corneal abrasion
E. Iritis (anterior uveitis)

Going to see Scott, the Vet

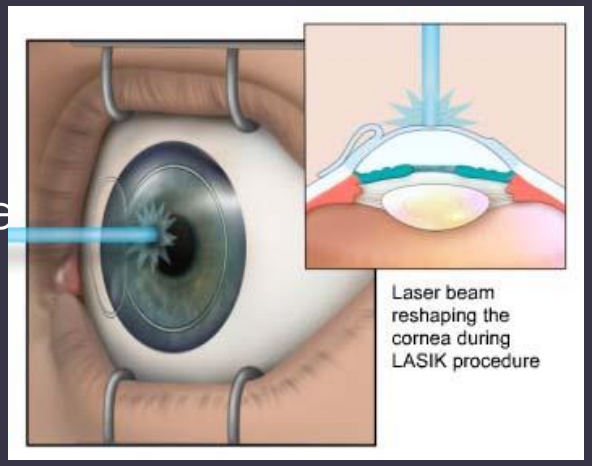
Debridement

Dry eyes:
decreased quantity and quality of tears with aging

Laser eye surgery to correct vision

- LASIK (Laser-assisted in-situ keratomileusis) very popular (700,000 US procedures per year)
- Generally safe (~4% complications, unsuccessful in 2-3% of cases). Results may diminish with age in farsightedness)

FDA website



Laser eye surgery to correct vision

- LASIK (Laser-assisted in-situ keratomileusis)
- Concern about complications of LASIK (per FDA panel review; follow-up studies)
  - Loss of vision
  - Dry eyes
  - Double vision
  - Poor night vision
  - Corneal ectasia (thinning)
- Some conditions increase risk of LASIK (ie pre-existing dry eyes, large pupils)
- RLE (Refractive lens exchange): new lens placed to improve vision.

Correct answers: Anterior eye

- Case 1 = C
- Case 2 = A
- Case 3 = B
- Case 4 = D
- Case 5 = A
- Case 6 = C
- Case 7 = A
- Case 8 = B
- Case 9 = C
- Case 10 = D
- Case 11 = A
- Case 12 = B
- Case 13 = D