Pharmaceutical Kitchen part TWO

Into the inflammatory fire of the eye

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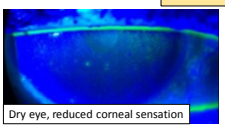
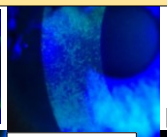
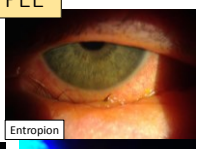
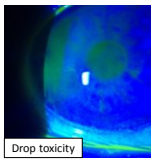
O.D., F.A.A.O.
June 10, 2017

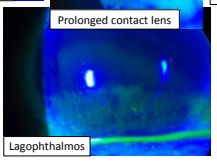
The Many Faces of PEE

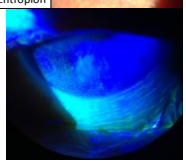

Dry eye, reduced corneal sensation

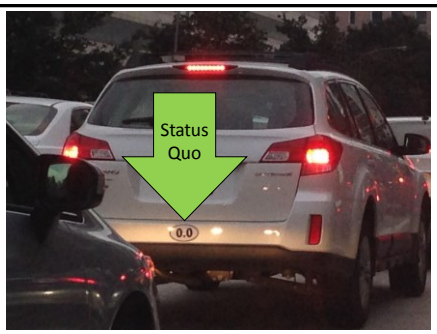

Prolonged contact lens


Entropion


Drop toxicity


Lagophthalmos





Dry Eye Option #1

How many different types of Visine on shelf?

What doesn't belong?

Dry Eye Option #2

Some statistics

- One recent study demonstrates a **self-reported** prevalence of dry eye in **14.5%** of subjects.
  - The disease is more common in **women (17.9%)** than **men (10.5%)**
- **But wait!** One recent study found that **up to 60%** of patients **with clinically significant dry eye** are **asymptomatic**.
- A recent Harris Interactive study showed that **only 29% of patients** with true dry eye disease **felt their optometrist provided adequate care and knowledge** of their disease

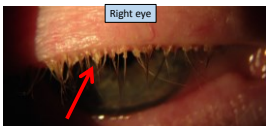
Is dry eye infectious or inflammatory?

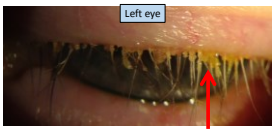
- Anterior blepharitis (debris base of eyelashes)
- Posterior blepharitis (inspissated meibomian glands)
- Exposure keratopathy secondary to lagophthalmos
- Entropion (mechanical)
- Sjogren's, other autoimmune (ex. rheumatoid arthritis)

BOTH!!!

Getting beyond artificial tears

- In-office procedure (MiboFlow & BlephEx)
- FDA Approved drugs
- Compounding pharmacy
- Amniotic Membrane





57 yo female presents with eye itchiness, eyelids are red. Constantly rubbing her eyes. Also feels burning and stinging in eyes throughout day.

What's your diagnosis and treatment?

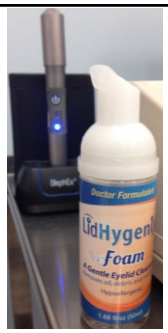
Anterior blepharitis contributing to dry eye
What else on your mind?

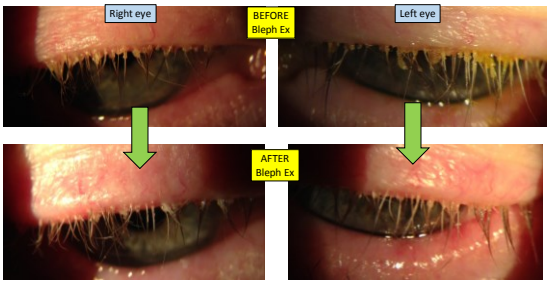
I say "Collarette"
You say _____!!!

Demodex

Tea tree oil

Eyelid hygiene





Getting beyond artificial tears

- **Name two FDA approved drugs for the treatment of dry eye???**
  - Restasis (2003) and Xiidra (2016)

New Multidose Bottle

Restasis Immunosuppressant
In patients whose tear production is presumed to be suppressed due to **ocular inflammation** associated with keratoconjunctivitis sicca, cyclosporine emulsion is thought to act as a **partial immunomodulator**. The exact mechanism of action is **not known**.

Xiidra
By binding to LFA-1, lifitegrast **blocks the ICAM-1/LFA-1** interaction.

In vitro studies demonstrated that lifitegrast may **inhibit** T-cell adhesion to ICAM-1 and the **secretion of pro-inflammatory cytokines**.

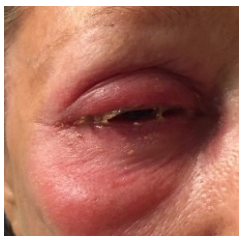
The exact mechanism of action of lifitegrast in Dry Eye is **not known**.

How aggressively should I treat?

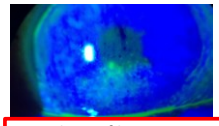
- 60 yo female with dry eye, taking artificial tears bid. Still reports gritty, sandy feeling in eyes. New to your clinic seeking relief
  - **Baby steps?** Warm compress and fish oils
  - Call patient two weeks later – **she's feeling great!!** (You're an awesome doc, right?...Wrong!!)
  - "Yeah, I went to the eye doc down the street and he prescribed **albumin eye drops**, it's working great – thanks for the call!" (*But never gonna see her again*)
- Compounding pharmacy
  - 5% Albumin eye drops 3-4 x's daily
  - Compare to autologous serum eye drops

How'd we get here?

Too aggressive? Maybe.

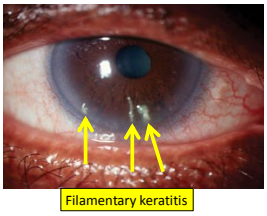


69 yo female with dry eye secondary to **Sjogren's syndrome**.
Decreased VA 20/40 OD > OS, significant NaFl staining and PEE.
Eyes feel terrible



What is filamentary keratitis, and how will you treat it?

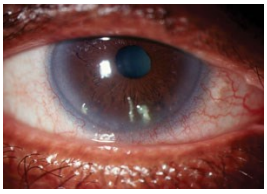
Has failed with Restasis in the past, already using copious artificial tears



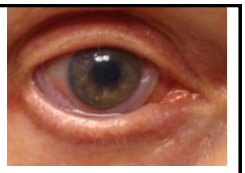
Filamentary keratitis

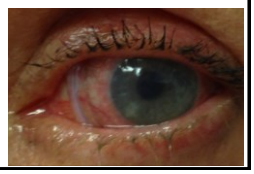
First things first, what's a filament? And how do we treat it?

- Filament: short strand of epithelial cells and mucus attached at one end to anterior surface of cornea
- Management
  - **Bandage contact lens** (protect from shearing action of lids)
  - **Lubrication**: PF artificial tears and ointment qhs
  - **Removal of filaments** with forceps
  - **Acetylcysteine 10%** qid (back to the compounding pharmacy)



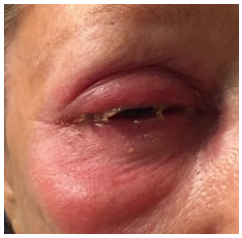
Next step???
Amniotic membrane - *Prokera*
(Freezer section)





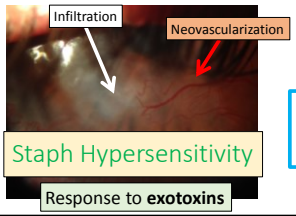
Had two incredibly successful treatments with amniotic membrane. Asked, "*How soon can we do it again*!?"

- After two days of third Prokera treatment developed incredibly red, painful, swollen right eye
- Cultured – Strep pneumoniae
- Strep Keratitis
  - Treated with oral and topical antibiotic
  - Also added topical steroid for corneal edema



38 yo Indian male, red eyes OD > OS, blurry vision.
Painful, light sensitive, difficulty opening eyes.
Crusting of eyelids and lashes
Has this happened before? *Yes, 3 months ago*

Possible Diagnosis??



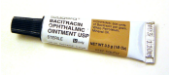
Staph Hypersensitivity

Response to **exotoxins**

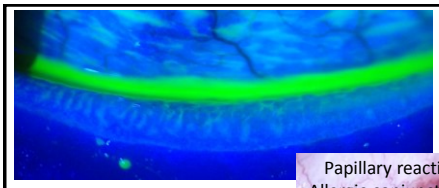
What is staph hypersensitivity, and how will you manage it?

Staph Hypersensitivity

- What's an infiltrate?
  - Noninfectious reaction of the host's antibodies to bacterial antigens in the setting of staphylococcal blepharitis (***antibody response to exotoxins***)
  - Ocular rosacea may also be contributing factor
- Treatment of staph hypersensitivity
  - Mild
    - Warm compresses, hygiene, fluoroquinolone antibiotic qid and bacitracin ointment qhs
  - Moderate to Severe
    - Add **low dose topical steroid** with an antibiotic

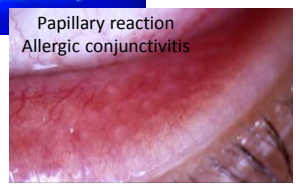


STEROIDS		CHEM SPECS
Alrex	(suspension)	loteprednol etabonate 0.2%
Durezol	(emulsion)	difluprednate 0.05%
Flarex	(suspension)	fluorometholone acetate 0.1%
FML	(suspension)	fluorometholone alcohol 0.1%
FML ointment		fluorometholone alcohol 0.1%
FML Forte	(suspension)	fluorometholone alcohol 0.25%
Inflamase Forte	(solution)	prednisolone sodium phosphate 1.0%
Lotemax	(suspension)	loteprednol etabonate 0.5%
Lotemax	(ointment) & (gel)	loteprednol etabonate 0.5%
Pred Forte	(suspension)	prednisolone acetate 1.0%, 1/8%



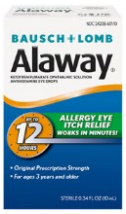
Was Rx'd Lotemax bid x 1 week, then qd x 1 week

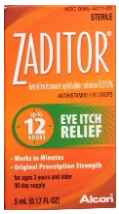
38 yo radiologist, works at dental institute. Started taking Claritin one week ago for allergies (runny nose).
But eyes are still red and itchy



Papillary reaction
Allergic conjunctivitis

Also discussed topical Anti-Allergy

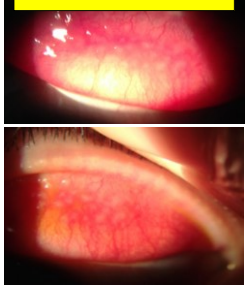




Ketotifen fumarate 0.025%
(Equivalent to 0.035%)

Olopatadine

How 'bout dem contacts?

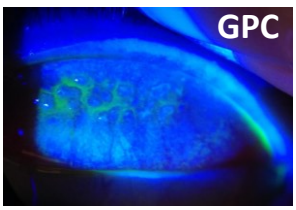


38 yo hispanic female (***head optician***). Was fit for contacts two weeks ago. Returns with itchy, watery eyes, OS worse.
Does she have glasses?? NO!

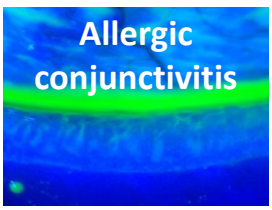
What's your diagnosis, and how will you treat it?

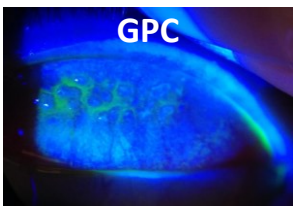
Giant Papillary Conjunctivitis

- Giant papillae on superior tarsal conjunctiva
- EVERT upper eyelid
- Other causes?
  - Atopic/vernal conjunctivitis
  - Exposed suture
  - Ocular prosthesis
- Steroid?
- Mast cell stabilizer?
  - Alamast (*pemirolast potassium*)
  - Alocril (*nedocromil sodium*)
  - Alomide (*lodoxamide tromethamine*)
  - Opticrom/Crolom (*cromolyn sodium*)



What's the difference?

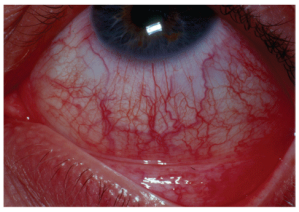




Allergy to medications:
Neomycin causes visit to Emergency Room?

- Patient put on Maxitrol for conjunctivitis on Thursday.
- ER doc called late Saturday night 11pm, said patient presented with worsening redness and pain in eye
- He switched patient to erythromycin (was concerned with **allergy**)
  - 1 in 6 have neomycin allergy
  - 2010 Allergen of the Year

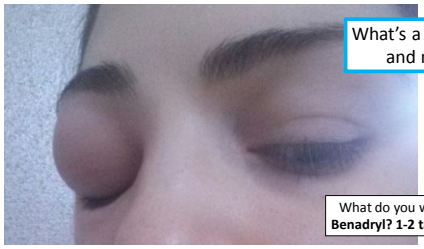
Similar problem with different drug
What's in Combigan?



Brimonidine (Alphagan)
&
Timolol

Another similar problem?

24 yo female, calls emergency line on Saturday morning (*while doctor is enjoying a wonderful bike ride of course*). Says she woke up with very swollen eyelid, NO pain, NO redness
Can I send you a pic?

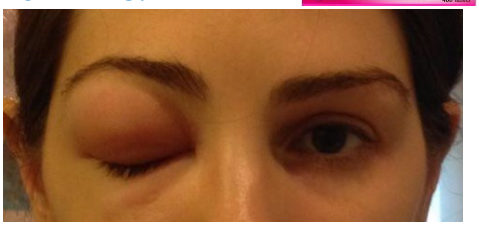


What's a possible diagnosis and management?

What do you want to recommend?
Benadryl? 1-2 tablets every 4-6 hours

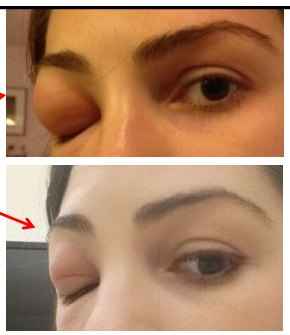
Called patient later that day for update
What was she doing??

SLEEPING!

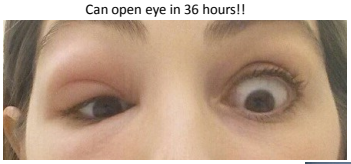


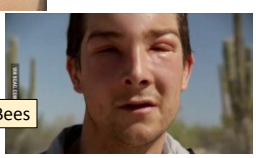
Later that evening

Next morning glamour shot



Can open eye in 36 hours!!

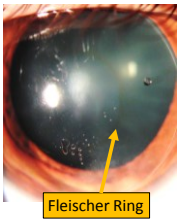


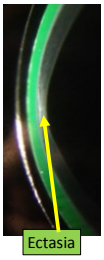


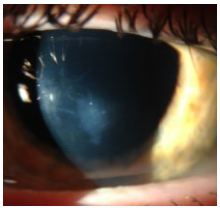
Man vs Wild Bees

Switching gears to

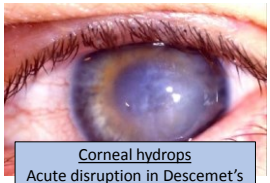
Keratoconus

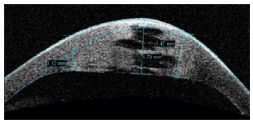






41 yo keratoconic female, wears scleral lenses. Reports sudden decrease in vision OD, (-) pain Says her "eye changed color, looks blue now"





Corneal hydrops
Acute disruption in Descemet's membrane with subsequent corneal edema

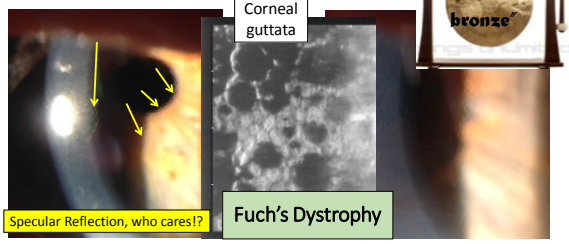
What's your diagnosis, and how will you treat it?

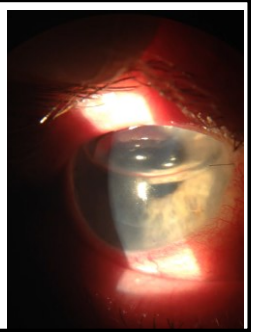
Corneal hydrops treatment

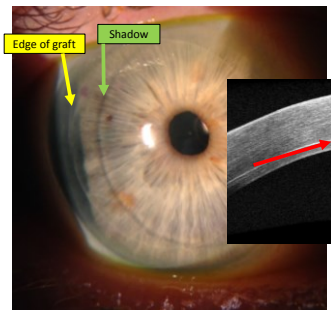
- Cycloplegic agent (cycloplentolate 1%)
- Sodium chloride 5% (Muro 128)
  - Tewksbury, Mass.
- Prednisolone topical qid in some cases
- Bacitracin ointment qid
- Brimonidine 0.1% bid to tid (*treat the ocular hypertension caused by reactive inflammation*)

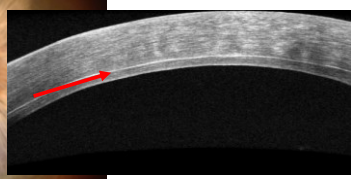
75 yo female with gradually decreasing vision, worsening glare and haloes, especially while driving at night. (-) pain

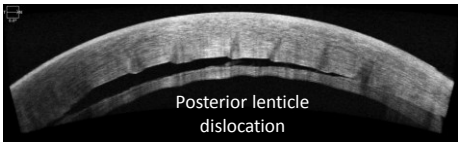
Another one for 5% sodium chloride (Muro 128)??

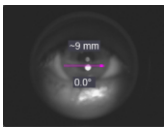


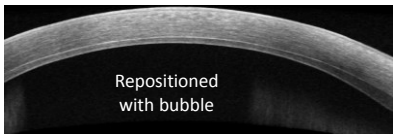


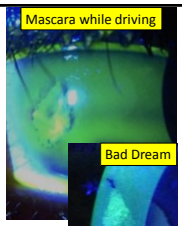




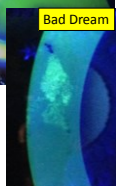


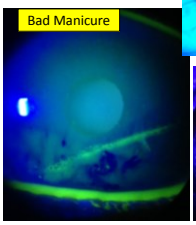


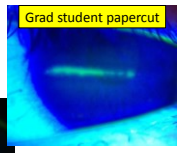




Who's scratched their eye before?

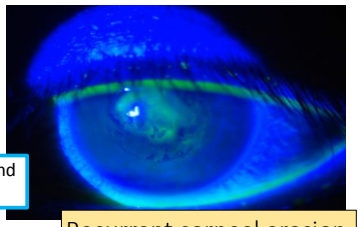






32 yo female calls the emergency line on Saturday, says she felt **terrible pain upon awakening and opening eye**. Has had similar episodes in past, causes anxiety when waking up. Hx of corneal abrasion

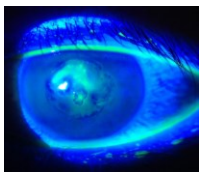
All in a Saturday's work



What's your diagnosis and initial management?

Recurrent corneal erosion

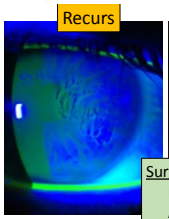
Recurrent corneal erosion



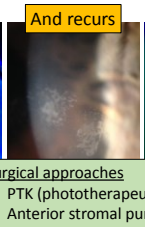
- **Cycloplegic** (cyclopentolate 1% qid for pain)
- **Antibiotic ointment** (erythromycin or polymyxin B/bacitracin)
- **Sodium chloride 5%** (Muro 128 ointment at bedtime)
  - May improve epithelial adhesion
- **Bandage contact lens**

22 yo male, red, light sensitive, painful left eye upon awakening, Hx of corneal abrasion.
Worker's comp case. States while at work, "a napkin hit his eye one month ago"

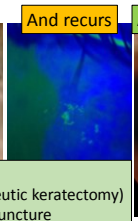
Recurs



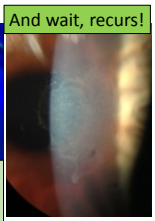
And recurs



And recurs



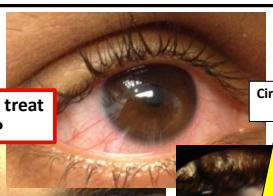
And wait, recurs!

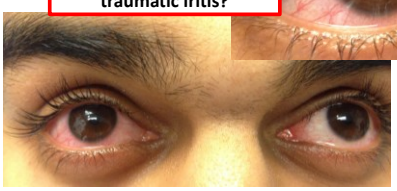


Surgical approaches
- PTK (phototherapeutic keratectomy)
- Anterior stromal puncture
- Epithelial debridement

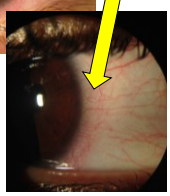
27 yo male, hit in right eye with nerf gun dart two days ago. Eye throbbing, painful, and red. Vision slightly blurry

How do you want to treat traumatic iritis?



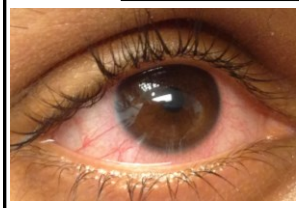


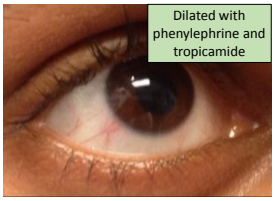
Circumlimbal flush



Instant Cure??

Is phenylephrine the miracle cure!!!!???





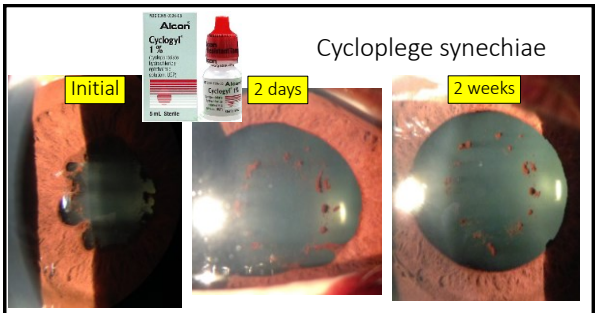
Not really, sorry….

No Instant Fix for Uveitis

Cycloplegics (*Dilate Pupil*) and Anterior uveitis

- **Cycloplegics** serve three purposes in the treatment of anterior uveitis
  - To **relieve pain** by immobilizing the iris
  - To **prevent adhesion** of the iris to the anterior lens capsule (**posterior synechia**), which can lead to iris bombe and elevated IOP
  - To **stabilize the blood-aqueous barrier** and help **prevent further protein leakage** (flare)

Cycloplege synechiae



Cholinergic vs Adrenergic

- **Phenylephrine, 2.5%,** is an **adrenergic agonist** that causes dilation by **direct stimulation of the iris dilator** muscle.
- All cycloplegic agents are **cholinergic antagonists** which work by **blocking neurotransmission** at the receptor site of the **iris sphincter and ciliary muscle**. (ex. **Tropicamide 1%**)
- Two iris muscles: sphincter and dilator

Phenyl's role in anterior uveitis?

- **Phenylephrine, 2.5%,** is an adrenergic agonist that causes dilation by **direct stimulation of the iris dilator muscle**
- Because phenylephrine has neither a cycloplegic nor anti-inflammatory effect and *may cause a release of pigment cells into the anterior chamber*, it is generally not recommended as an initial part of the therapeutic regimen
- *Phenylephrine may*, however, help *break recalcitrant posterior synechia*

What agent should you use to cycloplege?

Dilating agents duration of action

Cholinergic Antagonist	Mydriasis	
	Maximal (~minutes)	Recovery (days)
atropine	35	7-10
scopolamine	25	3-7
homatropine	50	1-3
cyclopentolate	45	1
tropicamide	25	0.25

Steroids and Anterior Uveitis

- The role of **corticosteroids** is to decrease inflammation
  - by reducing the production of exudates
  - stabilizing cell membranes
  - inhibiting the release of lysozyme by granulocytes
  - suppressing the circulation of lymphocytes
- Sometimes dose steroid as high as every hour initially
  - TAPER: every hour, then every two hours, 6x's/day, qid, tid, bid, qd, etc.

Steroid responder

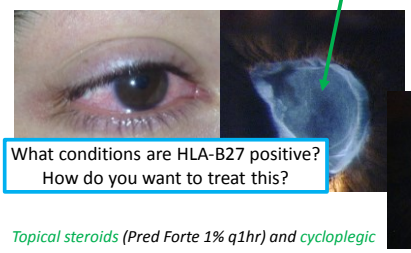
- **1 in 3** may experience an *increase in IOP* in response to the local or systemic use of corticosteroids
- Specifically, the IOP rose
  - from a mean of **16.9 to 32.1** mm Hg in **patients diagnosed with glaucoma**,
  - from a mean of 17.1 to 28.3 mm Hg in glaucoma suspects
  - from a mean of 13.6 to only 18.2 mm Hg in control subjects without glaucoma.
- Most patients with elevated IOP in steroid-response glaucoma experience a **return to pretreatment IOP levels within 10 days to 3 weeks** *after the discontinuation of steroid therapy*
- IOP spikes may occur hours to weeks after the initiation of steroid therapy

24 yo healthy male (body builder) with red eye x 3 days. Light sensitive, a little watery, (-) mucous. Decreased vision 20/40

What's this?

Fibrinous exudate (more common in ***HLA-B27***)

Reactive arthritis
Inflammatory bowel disease
Psoriatic arthritis
Ankylosing Spondylitis



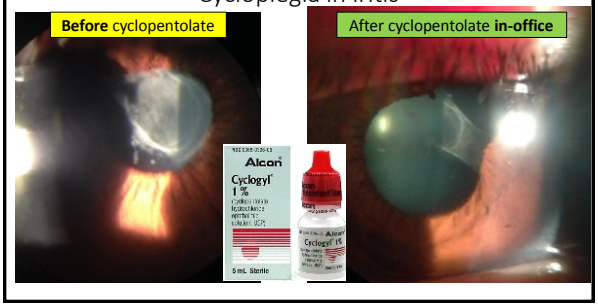
What conditions are HLA-B27 positive?
How do you want to treat this?

Topical steroids (Pred Forte 1% q1hr) and cycloplegic

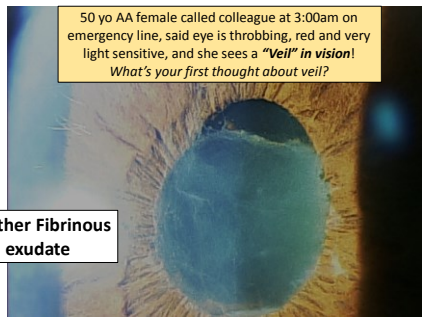
Cyclopegia in iritis

Before cyclopentolate

After cyclopentolate **in-office**



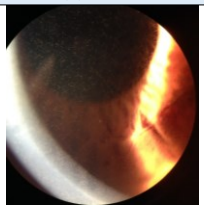
50 yo AA female called colleague at 3:00am on emergency line, said eye is throbbing, red and very light sensitive, and she sees a ***"Veil" in vision***!
What's your first thought about veil?

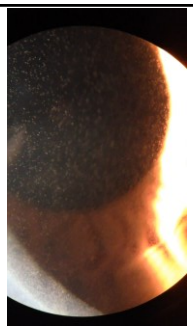


Another Fibrinous exudate

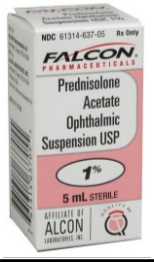
What do cells look like in Anterior Chamber?

34 yo male of Iranian descent. Bilateral red eye x 3 days, light sensitive. *(+) ulcerative colitis*





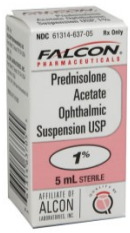
Name Brand vs Generic



Pred Forte vs generic

What does Allergan say?

- **Pred Forte** molecules are **smaller** compared to generic, penetrate better
- Micro-fine suspension is
  - more ***uniform***
  - ***remains longer*** in the conjunctival sac
  - ***minimizes*** mechanical ***irritation*** to the eye



Patient Instruction for Suspension??

Irving Gass

Before cataract surgery

After cataract surgery