Five Layers
A Thousand Mysteries

A Cornea and Anterior Segment Review

Kimberly Kohne, O.D., F.A.A.O.
Khash Tonekaboni, O.D.
Indiana University School of Optometry

We lied--*Possibly*

- There is a sixth layer (as yet unconfirmed)
  - "Dua's" Layer
  - From Dr. Dua of University of Notthingham
  - It is a 15-micrometer collagen layer
  - It is the *new* fourth layer
    - Epithelium
    - Bowman's
    - Stroma
    - Dua's
    - Descemet's
    - Endothelium
  - Implications for graft surgery and corneal hydrops and descemetocele.

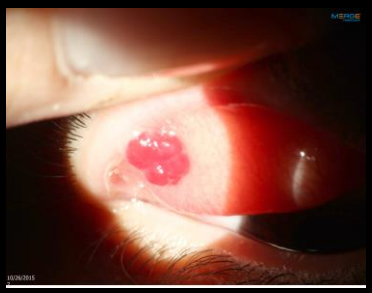
When Is a "Stye" Not a "Stye"?

- 41-year-old female – CC: "I've had this bump that I feel in my lid for a month now."
- Has been to walk-in clinic in town; was given topical antibiotic ointment. Told to use hot compresses.
- Treatment has been ineffective
- Preliminary and cursory evaluation reveal no pertinent information.
- NOTE: Patient has had a Hx of "idiopathic blind spot enlargement" in 2011.

A Stye or Not a Stye

- No neurologic cause discovered in spite of months of investigation.
- Overall health normal now. Patient is not under treatment for any systemic condition at this time.
- Upon lid eversion, this is what we see.

➢ Any thoughts?



Pyrogenic Granuloma

- Also known as:
  - Lobular capillary hemangioma
  - Granuloma telangiectaticum
    - Occur mostly in children and young adults, especially in pregnant women
    - Benign
    - Can be self-limiting (drain)
    - Or can be removed particularly if bleeding excessively (which is a possibility)

Granuloma

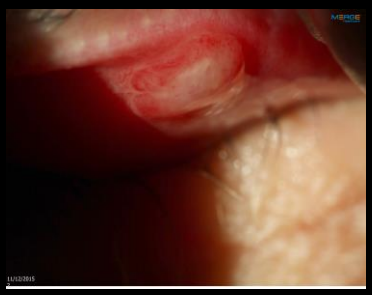
- Topical antibiotics, observation and education will form the bulk of therapy.
- As stated, removal is an option
- Other causes include
  - Trauma
  - Infections secondary to manipulation
  - Insects

Stye not a Stye

- 55-year-old woman, Caucasian. CC: "Bump upper left lid since last May."
- Had been evaluated by PC, give antibiotic drops and had attempted hot compresses
- No effect
- Does this sound familiar?

- Preliminary and cursory findings not pertinent. Patient in good health and prefers not to take medication in general
- Patient on herbal supplements
- Physical exam indicated (wait for it…)

➢ This—what do you think?



Stubborn Episcleritis?

- 25 year-old patient woke up with a red right eye "several" days ago. No burn, no sting, no tearing, more sensitive to light OD and "throbbing". 4 out of 5 on the severity scale. Started Pred Forte TID OD for 3 days, BID for 3 days, QD for 3 days. "Drops do give relief." 90% improvement, thinks skin is hot to touch, feels puffy and swollen. Similar episodes started 3 years ago, has had 6 episodes total. Takes Aleve for the throbbing. Sees a rheumatologist for unspecified CT disorder.
- Meds: Zinc, Vitamin D, Aleve
- No allergies

Scleritis

- VAs OD 20/20-, OS 20/20 3-
- Entrance testing: Normal
- Adnexa: Puffy appearance to cheeks right/left
- Conjunctiva:
  - OD bulbar gr 3 diffuse injection, most dense temporal and superior, trace chemosis. Sclera gr 3 diffuse injection temp/superior/nasal with thickening temporal and superior.
    OS normal
- Cornea: Clear
- Anterior Chamber: Clear
- Posterior:
  - ONH good color, distinct margins, OD 0.35/0.35, OS 0.3/0.3, +FLR, No H/B/T 360 OU

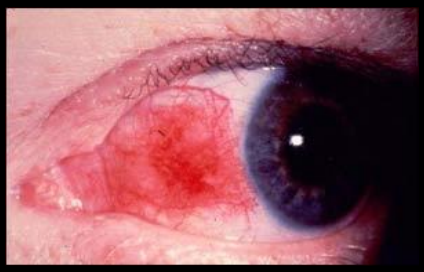
Scleritis

http://www.differencebetween.net/science/health/difference-between-scleritis-and-episcleritis/

Differential: Episcleritis

- Treatment
  - Varied for the severity of the case
  - AT, steroids, NSAID
  - Why did we go with a combo drop on this case?
- When to run a blood work up?
- What to order?
  - 1st CBC with diff
  - 2nd testing specific for episcleritis causes

Episcleritis



Episcleritis

Scleritis

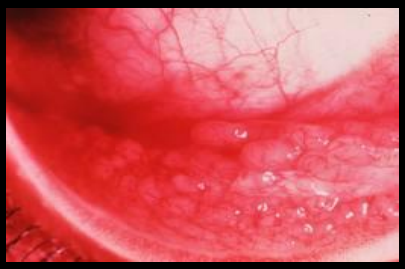
- Assessment:
  - 1. Anterior Scleritis OD
- Plan
  - 1. Ed pt on today's findings. Spoke with pt's rheumatologist on the phone. Agreed to have pt start Ibuprofen 600mg TID until signs and symptoms resolve. Will follow up in two weeks and reassess at that time. Rheumatologist plans to start the pt on a systemic medication for unspecified connective tissue disorder.

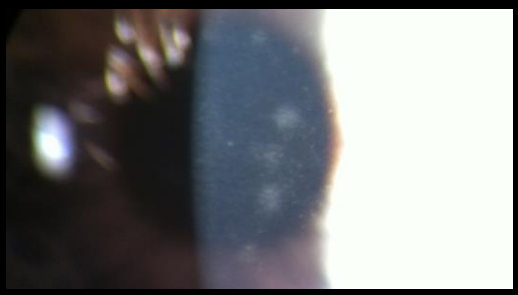
49 Year Old Male with the Ickies

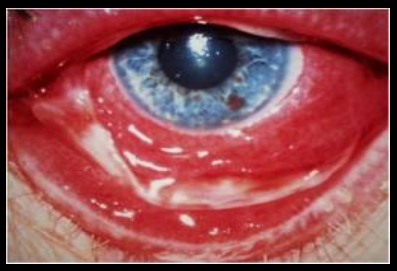
- RFV/CC: "Last Monday morning my eyes got an infection" Patient had been to the ED on the Wednesday after the infection---started on Polytrim
- HPI: + redness, + crusting in am, + watering constantly, + pain, but it fluctuates
- + photophobia, - VA changes, - CL wear, - recent illness
- Feels like the drops do not help and that the eye has remained the same.

49 Year Old Male

- Physical Exam:
  - VA: OD 20-, OS 20/70 pH 20/50
  - Swollen upper eyelid OS>OD
  - Grade 3+ diffuse injection
  - Infiltrates OS, with a diffuse corneal haze OU
  - Pseudomembrane upper lid OD, lower lid OU
  - Pre-auricular (PA) nodes left side, not right
  - No cells and flare
  - IOPs 21 OD, OS with NCT







49 Year Old Male

- Impressions and Management
  - EKC OU, OS>OD
    - Stripped membranes with proparacain, cotton tip applicator and forcepts—pt tolerated it well
    - Started Tobradex one drop every hour X 1 day, then QID OU until f/u visit
    - Strong education on hygiene, washing linens, contact with others
    - RTC 3 days

49 Year Old Male

- RVF/CC: "Back for my eye infection"
- HPI: + redness, improving, + crusting, improving, - watering, - photophobia, - itch, - pain, - VA changes
- Patient stated that he is feeling much better, but it is still "a little red"

EKC

- Physical Exam:
  - VA: OD 20/20-, OS 20/70 pH 20/50
  - Slight swelling of upper lids OU, improved
  - Nasal grade 2+ injection, every where else grade 1 OU
  - Infiltrates OS, mild corneal haze still remains OU
  - Pseudomembranes in lower lid OU, not as thick as prior visit
  - PA still present on left side
  - No cell and flare
  - IOPs 19/15 also by NCT

EKC

- Impressions and Management
  - EKC OU, improving
    - Psuedomembranes were removed with proparacain, cotton tip and forcepts. Pt tolerated the procedure well
    - Pt told to continue taking Tobradex QID OU
    - Pt re-educated on hygiene, washing linens, contact with others
    - RTC 7 days

EKC

- Membranes need to be peeled; usually numb the eye and use a cotton swab. The membranes can bleed.
- Palliative care
  - Artificial tears, cold compresses
- Steroids
  - Pred Forte 1% generic 5 mL = $21.00—usually q 2 hours, depending on severity
- Combination drops
  - Tobradex 2.5 mL = $40.00—usually q 2 hours, depending on severity
  - Tobradex 5.0 mL = $71.00—usually q 2 hours, depending on severity
  - Zylet 5.0 mL = $170.00—Dosage depends on severity
- Betadine treatment
  - Proparacaine the eye, use betadine ophthalmic solution and cotton tip….do not expose to the eye for more than 2 minutes….rinse with saline thoroughly….then put the patient on a steroid drop
  - WARNING with Betadine treatment
- EDUCATION, EDUCATION, EDUCATION!!!!

EKC follow up

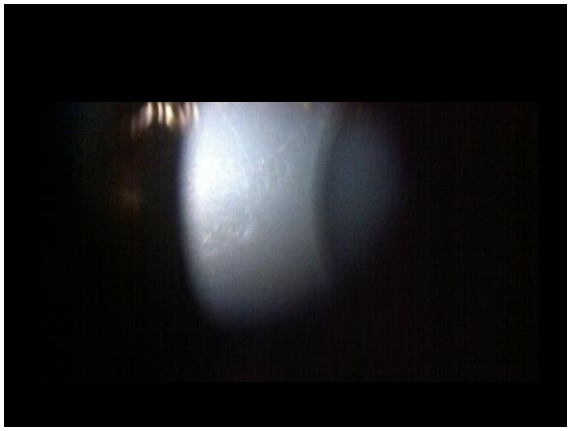
- Palliative care:
  - See them back in at least one week, sooner if a membrane was peeled
- Steroids and Combination drops
  - Patient needs to be seen back in one week to check pressures and to adjust taper
  - Re-educate patient on hygiene, staying out of lenses, taking drops, ect
  - See patient back usually in one week
- Betadine treatment
  - Usually see patient back in one day to check cornea
  - If patient doing well at day one, see them back in 6 days, if not see patient back in a couple of days to make sure the cornea is healing

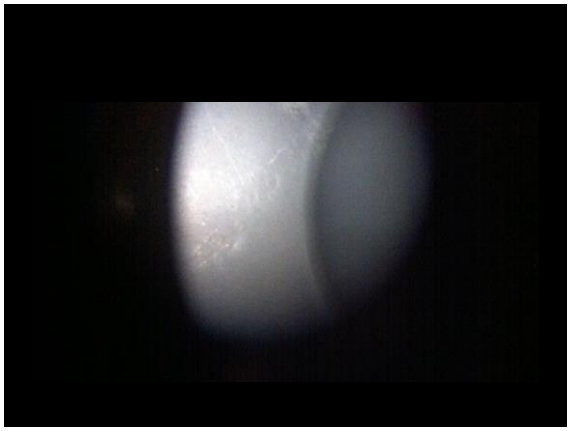
12 year old male

- RVF/CC: “Need to get glasses”
- HPI: + blur in distance OU, since beginning of school, - N blur OU, + floaters OU, stable, - flashes, - diplopia, - HA
- In middle school. Having trouble in the classroom

12 year old male

- Physical Exam:
  - VA: OD 20/50, OS 20/70
  - Refraction: OD: -5.00-0.75X045 20/25+, OS: -5.00-1.00X135 20/25+
  - Entrance testing normal
  - Patient had mild papillae in inferior papebral conjunctiva
  - Long, cigar shaped “scar” in superior cornea OS
  - Internal ocular health was fairly normal.





12 year old male

- Patient and his dad were questioned on history of trauma and type of pregnancy and delivery.

12 year old male

- Impression and Management
  - Rupture of Descemet's membrane, possibly secondary to birth trauma. Patient to be monitored every year.
  - Myopia and Astigmatism---new Spec Rx written

18-year-old female Contact lens nightmare

- RFV/CC: "My eye started bothering me Friday [three days]."
- Pain 4/5
- Wears Air Optix Night/Day
- HPI: Went to the pediatrician and got Vigamox; used three drops on Saturday; 1 drop Sunday, then lost the bottle.
- Has worn the same pair for three months, 24/7.

Note: I said to patient, "Thank you for coming in to enrich my professional life."

18-year-old female

- Physical exam:
  - VAs: 20/20; 20/30
  - Lid swelling due to excessive tearing
  - High grade injection
  - Marginal ulcer
  - Edema encroaching visual axis (Note to self: how is she seeing that well?)
  - Grade III cells/grade II flare
  - Undilated funduscopy unremarkable (patient was dilated in CL clinic less than a year before)
  - IOPs OD 12/OS 9

18-year-old female

- Physical exam
  - "Uninvolved eye" shows signs of mild acute and moderate to severe chronic over-wear
    - SEIs
    - Neovascularization

18-year-old female

- Impressions and Management:
  - Marginal ulcer (and I don't like contacts)
  - Anterior uveitis
  - D/C contact lens OU until further notice (patient has no glasses)
  - Vigamox 1 drop every five minutes X 2 hrs.; then 1 drop an hour X24 hours (I got even)
  - Homatropine 5% 1 drop, 3X/day
  - RTC 1 day
  - Patient education regarding contact lens wearing habits (I didn't yell)

18-year-old female
1 day F/U

Note: Patient phoned from the pharmacy. Insurance didn't accept Vigamox. Changed to Ciloxan.

HPI: Pain is a "tad" better; "3.8/5;" less photosensitive.

18-year-old female
1 day F/U

- Physical exam:
  - 20/20; 20/20-
  - Lid still swollen; unchanged
  - Injection reduced by 50%
  - Grade II cells/trace flare
  - Ring edema (great!)
  - Fellow eye clearing with no treatment except D/C CL

18-year-old female
1 day F/U

- Impressions and Management:
  - Marginal ulcer
  - Fungal?
    - But anterior chamber improving and VA better
  - Continue with Ciloxan, maintain every hour again during waking hours; add Tobrex ointment bedtime.
  - Reduce Homatropine to B.I.D.
  - RTC 1 day

18-year-old female
Day 3 F/U

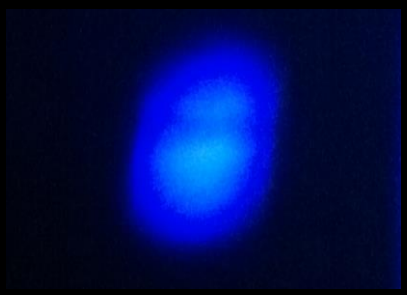
Patient phoned. Insurance doesn't pay for Tobrex. Switch to Bacitracin/Polymyxin-B Rescheduled for following day.

HPI: Feels comfortable and not sensitive to light anymore.

Compliant with drops, but hasn't filled ointment Rx yet.

18-year-old female
F/U Day 3

- Physical exam:
  - VAs 20/20 OD, OS
  - Lid swelling resolved, symmetrical
  - Grade I+ cells; no flare
  - No ring edema
  - Mild pooling on the ulcerative area
  - New focal staining adjacent to area of edema
    - Question touch of the tip of a bottle



18-year-old female
F/U Day 3

- Impressions and Management:
  - Healing ulcer
  - Fungal or Pseudomonas not a primary concern at this point
  - Observed and reviewed drop instillation technique
  - Reduce Ciloxan to every 4 hours; AK-Poly-Bac UNG bedtime
  - Add Lotemax
  - RTC 2 days

18-year-old female
F/U Day 7

Note: Patient rescheduled; mentioned she hasn't yet filled Lotemax Rx. Will do so in a day or so. Patient seen by Dr. Peabody.

•HPI: Now taking all the other meds as Rx'd

•Feels back to normal

18-year-old female
F/U Day 7

- Physical exam:
  - Focal defect resolved
  - Marginal ulcer inactive; scar
  - Grade I cells, no flare
  - Med-induced SPK

18-year-old female
F/U Day 7

- Impressions and Management:
  - Continue all meds at lower doses
  - Artificial tears PRN
  - RTC 4 days

18-year-old female
F/U Day 11

Note: During the weekend prior to F/U, patient called doctor on call, who called me. Patient reported severe pain on Sunday after playing softball on Saturday. I advised increase Ciloxan and Homatropine.

- HPI: Feels better today (Monday) and has been compliant with meds. Claims no contact lens wear when asked how she could see the ball during the game.

18-year-old female
F/U Day 11

- Physical exam:
  - VAs 20/20; 20/40
  - Moderate conjunctival injection, lid swelling
  - The center of the original ulcer stains slightly-pooling; the small secondary focal area indicates subtle but definite epithelial defect with edema.
  - A/C clear

18-year-old female
F/U Day 11

- Impressions and Management:
  - Marginal ulcer reactivation
  - RTC 1 day

18-year-old female F/U Day 12

- HPI: Extreme pain, much worse than yesterday.
- Does anyone have a length of rope?

18-year-old female F/U Day 12

- Physical exam:
  - The center of the focal lesion seems to form a "crater." Infectious ulcer.
  - A smaller ring infiltrate has returned surrounding the lesion

18-year-old female F/U Day 12

- Impressions and Management:
  - Continue with meds
  - Consultation with corneal specialist
  - Referred to specialist
  - No change in meds until seen
  - Appointment made same day

18-year-old female Specialist's report

- Agrees with original diagnosis of CL over-wear, marginal ulcer.
- Adds "soft epithelium" with "immune ring" responsible for continued reactivation
- The tearing may be diluting drops, which can affect therapy
- Continue with Lotemax, but switch to Polysporin ointment every 2 hours while awake
- No CL wear
- RTC to me 2 weeks

Long story short (too late)

- Patient has been compliant. Feels fine. Got new contact lenses, and seems to have learned a lesson.
- VAs 20/20 each eye
- Scars present of the original ulcer
- The focal lesion cleared completely

Ocular TRUST (The Ocular Tracking Resistance in U.S. Today)

- **CONCLUSIONS:**
  - The fluoroquinolones were consistently active in MSSA, *S. pneumoniae*, and *H. influenzae*. After more than a decade of intensive ciprofloxacin and levofloxacin use as systemic therapy, 100% of ocular *S. pneumoniae* isolates were susceptible to gatifloxacin, levofloxacin, and moxifloxacin; nonsusceptibility to ciprofloxacin was less than 15%. High-level in vitro MRSA resistance suggests the need to consider alternative therapy to fluoroquinolones when MRSA is a likely pathogen.
    - Am J Ophthalmol. 2008 Jun;145(6):951-958. Epub 2008 Mar 28

Antibiotic Resistance Monitoring in Ocular Microorganisms (ARMOR)

- Haas W et al. – Resistance to 1 or more antibiotics is prevalent among ocular bacterial pathogens. Current resistance trends should be considered before initiating empiric treatment of common eye infections.
- Journal of American Ophthalmology 06/08/2011

Read more:
http://www.mdlinx.com/ophthalmology/news-article.cfm/3635438/eye#ixzz20X2Rs426

63 y/o male

- RFV/CC: Bump on right upper lid, started Monday; has gotten worse from there.
- HPI: + pain, +swelling right upper lid, + crust in a.m., + white head popped day before, + much worse today than day before
- Patient seen by primary care and put on bacitracin ung, warm compresses QID OD

63 y/o male

- Physical exam:
  - VAs: OD 20/25, OS 20/20-
  - Pupils ERRL –MG, EOM full, smooth
  - SLEx: right upper lid, swollen, S shaped, tender to touch, white dot on upper lid margin, on lid flip 3 internal hordeola in granulomatous sac, gr 1+ diffuse injection, - stain in cornea
  - Left eye anterior segment normal

63 y/o male

- Impressions and Management:
  - 1 Preseptal Cellulitis
  - 2 Internal hordeola
  - Patient to start 500 mg Keflex TID po X 7 days, warm compresses QID OD and Vigamox TID OD for coverage. Pt to RTC 2 days for f/u.

63 y/o male

- What were the other options?
  - Augmentin—especially good for kids
  - Ceclor
  - I like Bactrim for patients with allergy to PCN
- What about coverage of the conjunctiva?
- Warm compresses even at this stage?
- What about ung?
- What about Doxycycline?
- What about Omega 3?
- What about diet?

25-year-old Female

Note: This case is an amalgamation of two identical cases in physical presentation and symptomatology. Concentration on the above case.

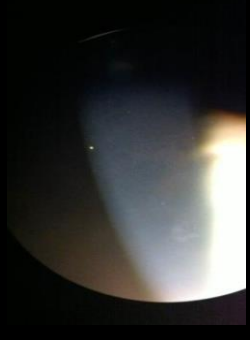
•RFV and CC: "My eye hurts and has been watering."

•HPI: Has happened before; current episode started about a week ago; getting better; eyes take turn; no history of trauma; wears contacts except when this happens; a conscientious contact lens wearer, even cleans the case

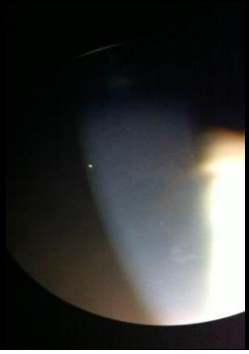
25-year-old Female

- Physical exam:
  - VAs: 20/20, 20/20-
  - Mild watery discharge OD
  - A/C clear and quiet OU

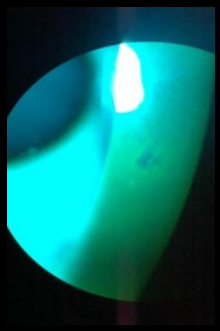
25-year-old Female



25-year-old Female

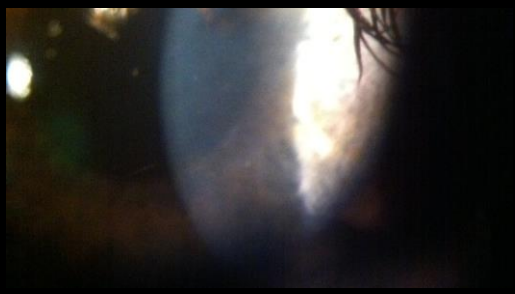


25-year-old Female



25-year-old Female

Picture from 28-year-old Female



Picture from 28-year-old Female

Matrix metalloproteinase (MMP)

- Zinc-based proteinase
  - Found in excess in RCE
  - Dissolves the basement membrane and the fibrils of the hemidesmosomes
  - Doxycycline can reduce MMP activity

25-year-old Female

- Impressions and Management:
  - RCE (patient has been seen since for repeated erosions)
  - Placed on doxycycline in addition to Muro 128 5% saline solution and lubricating tears
  - Previous experience with doxycycline has been mostly positive
  - If no improvement, consider anterior stromal suture or phototherapeutic keratectomy (PTK)

Note on diabetics

- Be aware of RCE in diabetics
- Well-known poor healers
- If oral medications interfere with control (case-based):
  - Excimer PTK may move up on the ladder
- Sugar control is key

60 y/o female

- RFV/CC: + Blur first thing in the morning, distance and near
- HPI: - burn, - water, - itch, - red, + CRT work 7-10 hours/day, + use Patanol (only uses "as needed"), h/o EBMD OU
- Systemic issues: + thyroid disorder

60 y/o female

- Physical exam:
  - VAs: OD 20/30+ NIPH, OS 20/20+
  - PERRLA –MG, EOM full and smooth
  - SLEx: + stasis OU, + pinguecula OU, + EBMD OU, + arcus OU, mild cataracts
  - IOPs normal
  - Internal ocular health was normal

60 y/o female

- Additional testing:
  - TBUT = 3 sec
    - Patient states she is using AT about 7 times/day at this point
  - What other types of testing could have been done?
    - Phenol red, Shirmer's test, osmolarity testing, ect.

60 y/o female

- Impressions and Management
  - Refractive
  - EBMD OU
  - Dry Eye
  - New specs written
  - Ed patient on Restatsis, uses, advantages and disadvantages. Patient decided to cont. using AT at least 8-10x/day and a gel at night. Will RTC if cannot maintain AT usage or if it becomes cumbersome.

60 y/o female

60 y/o female

60 y/o female—1 year later

- RFV/CC: "Blurry vision in the morning" OU
- HPI: blur at distance and near, - pain, - burn, - redness, - discomfort, + CRT use 10 hours/day, + compliance with AT 8-10 times/day, + gel use at night, + warm compresses at night
- Systemic: + thyroid problem

60 y/o female

- Physical exam:
  - VA: OD 20/30+, OS 20/25+ NIPH OU
  - PERRLA –MG, EOM full and smooth
  - SLEx: + stasis OU, + pinguecula OU, + EBMD OU, + arcus OU, grade 1+ NS OU
  - TBUT = 4 sec OU
  - Internal ocular health good OU

60 y/o female, part 2

- Impressions and Management
  - Dry Eye
  - EBMD OU
  - Refractive
  - Patient ed—patient to start Restasis BID OU, also start Lotemax BID OU X 1 month, then QD X 1 month and then d/c Lotemax. Ed pt about separating drops by 5 minutes. Stressed the importance of being diligent about taking Restasis. Told patient it takes 12-16 weeks for drops to become fully effective. Ed pt to cont using AT at least QID OU for maintenance. Pt to RTC 3 months for f/u.

60 y/o female, part two

- Restasis: more than one way to skin a cat…
  - Some only do steroid for one month
  - Some use PredMild
  - Some don't use a steroid at all

60 y/o female

- RFV/CC: Dry Eye f/u
- HPI: less blur in the morning, although still some, - pain, - redness, - burn, + compliance with Restasis and Lotemax. Pt had d/c Lotemax X 1 week. Still using gel at night and AT a couple times/day

60 y/o female

- Physical exam:
  - VA: OD 20/20-, OS 20/20-
  - PERRLA –MG, EOM full and smooth OU
  - SLEx: + stasis OU, + EBMD OU, + pinguecula OU, + arcus OU, gr 1+ NS OU
  - TBUT = 6 sec OU

60 y/o female

- Impressions and Management
  - Dry Eye
  - EBMD OU
  - Ed patient---cont. Restasis BID OU and AT when needed. Pt also encouraged to cont. WC at least QD if not BID OU. RTC 1 year for full exam.

Dry Eye

- Other options?
  - LipiFlow Thermal Pulsation unit
  - Clearing out glands with small gauged needle and BSS
  - Testosterone
    - Used with Sjorgen's patient
    - 3% gel
    - Compounded by pharmacist
  - Autologous serum eye drops

Dry Eye Newsflash

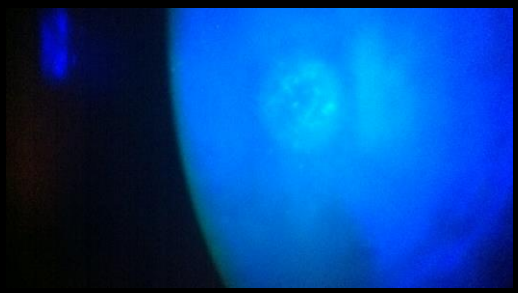
- On July 12, 2016, FDA approved Lifitegrast (*Xiidra*).
  - First lymphocyte function-associated antigen 1 agonist approved for this purpose by FDA
  - Only prescription eyedrop indicated for the treatment of both signs and symptoms of dry eye
  - Every 12-hours
  - Large sample randomized study results encouraging; perhaps faster-acting than Restasis (relief in as early as two weeks).

41-year-old female

- Referred to our clinic. Patient seen initially by Dr. Kohne.
- RFV/CC: "My vision feels worse in the right eye over the past month."
- HPI: History of HZO for the past five years. Has dull pain around the eye, especially when tired. Comes and goes. Has been on Viroptic, scopolamine. Feels the same as previous episodes.
- Patient denies systemic involvement and reports no systemic testing

41-year-old female

- Physical exam:
  - VAs 20/25-; 20/20; worse through PH
  - Negative Hutchinson sign
  - Two large stromal scars noted OD.
  - Stains positively with FLNa+
  - Anterior chamber clear
  - IOPs normal; fundus clear



41-year-old female

- Impressions and Management:
  - HZO
  - Acyclovir 800 mg 5X/day PO for 10 days
    - Large glass of water
  - Artificial tears
  - RTC 2 days
  - Consider topical if worsening

41-year-old female
2-day F/U

- HPI: Patient has a "heavy" feel and vision is about the same.
- Compliant with medication

41-year-old female
2-day F/U

- Physical exam:
  - VA: 20/25-; 20/20
  - IOPs unchanged
  - Anterior chamber clear
  - Staining reduced over the scar, but new staining inferiorly (not visible in the photo)

41-year-old female
2-day F/U

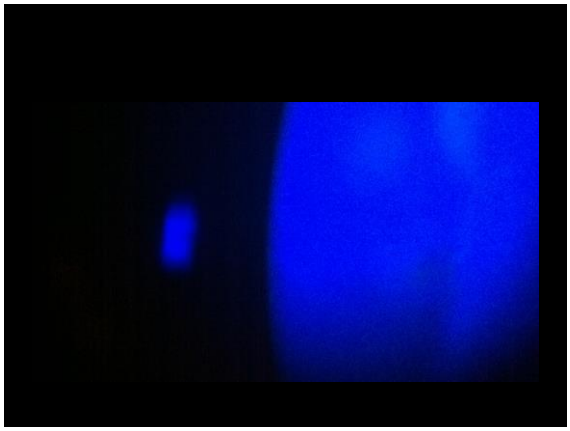
- Impressions and Management:
  - Slowly resolving reactive zoster
  - Continue with oral
  - Add Lotemax 1 drop, 4X/day
  - RTC 1 week

41-year-old female
Day 9

- HPI: Vision feels worse and there is more pain
- Patient compliant with meds, but states expensive; wonders if she can halve the dosage to make it last longer.
- Further questioning regarding any systemic involvement, including any immune compromising disorders
  - None reported

41-year-old female
Day 9

- Physical exam:
  - Refraction:
    - OD –4.25 –1.25 X 075
    - OS –4.75 –0.25 X 105
  - VAs unchanged
  - IOPs unchanged
  - No staining on the scars
  - An elevated area (negatively stains) overlapping the scar
  - Trace anterior chamber reaction
  - (Photo poor quality)



41-year-old female
Day 9

- Impressions and Management:
  - Anterior uveitis indicates another reactivation
    - The patient had been having mild symptoms originally for a month before seen
  - Maintain Lotemax as Rx'd; maintain oral as Rx'd
  - RTC 2 days

41-year-old female
Day 11

- HPI: Patient reports pain is better. But is concerned about the "heavy" feeling.
- Compliant with meds

41-year-old female
Day 11

- Physical exam:
  - VAs unchanged
  - IOPs unchanged
  - No staining; the uneven epithelial area seems to have resolved (epithelium even), no negative staining.
  - Scars unchanged

41-year-old female
Day 11

- Impressions and Management
  - Continue with Lotemax with a slow taper scheduled
  - Reduce acyclovir to 400 mg PO 5X/day
  - Recommended reading Rx/bifocal and AT
  - RTC 2 months; but patient to report in via phone call in three weeks for an update

41-year-old female
6 weeks later

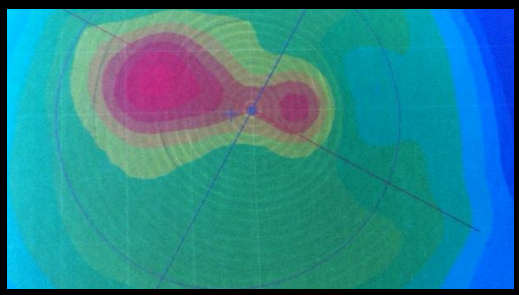
Note: Patient called as instructed three weeks after last visit; no changes reported by patient and reports compliance with meds

- HPI:
  - Patient reports everything is worse, including pain and vision
  - Did not fill the reading Rx yet
  - Patient indicates pain is worse with computer work
  - Mood and Affect of the patient: More anxious about the pain and the fact vision continues to be worse in the right eye

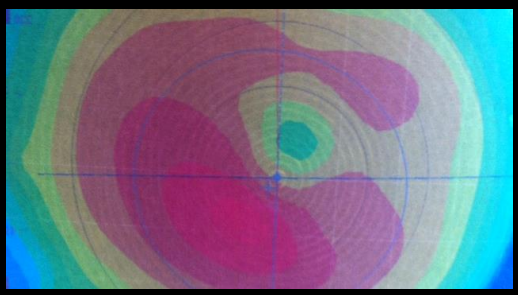
41-year-old female
6 weeks later

- Physical exam
  - No changes noted of any kind. VAs and IOPs unchanged; no staining; area of epithelial heaping remains smooth
  - Scars, as expected, are unchanged
  - Due to patient anxiety another dilated fundus exam showed no changes—unremarkable

Topography OD



Topography OS



41-year-old female
6 weeks later

- Impressions and Management
  - Emphasized RRx and AT
  - D/C Lotemax
  - Continue with oral
  - RTC 6 months for F/U and full exam

41-year-old female
6 months later

- Patient is still worried about the heavy feeling, but otherwise no changes; compliant with acyclovir and AT

41-year-old female 6 months later

- Physical exam:
  - VAs: 20/30; 20/20-1
  - No changes in the appearance of the cornea/scars
  - No staining
  - IOPs 14/11
  - Refraction yielded:
    - OD: -4.00 –1.50 X 075 20/20-1 at far and near
    - OS: -5.00 DS 20/20
      - +1.25 Add

41-year-old female 6 months later (Happy Ending)

- Impressions and Management
  - Due to multiple recurrence maintain 400 mg acyclovir 3X/day for one month; then D/C
  - New spectacle Rx
  - Heavy feeling abated after consistent use of reading Rx (bifocal)
  - RTC 1 year or as needed

19-year-old Female

- RFV/CC: "My eyes burn and my vision is blurry."
- HPI
  - About a week; has been getting worse; feels like "sand in the eyes;"
- No previous of history of any eye problems
- No history of current or previous contact lenses or spectacles
- Usual seasonal allergies
- No recent illness; no pertinent systemic involvement; no medications of any kind, including birth control pills and OTC
- Denies discharge except "tearing" when the eyes burn
- Denies swimming

19-year-old Female

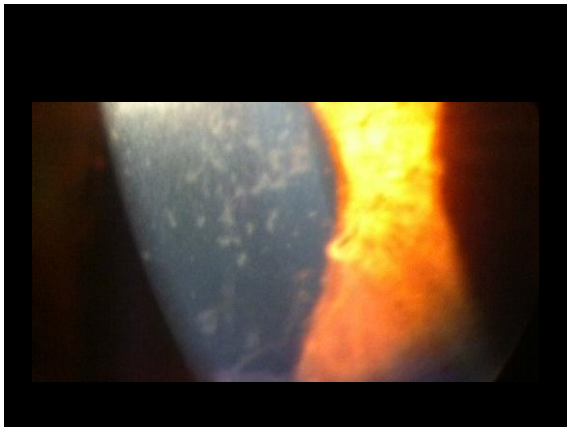
- SHx
  - Freshman, taking summer courses at IU
  - Somewhat "outdoorsy, if the weather not too hot"
  - Makeup only for special occasions
  - No recent trips out of the country or out of state
  - Denies tanning

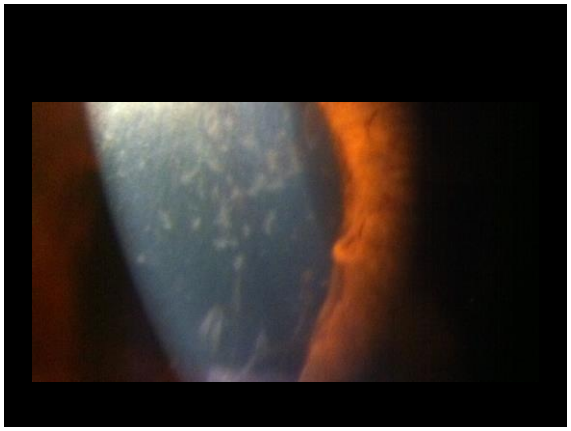
19-year-old Female

- Physical exam:
  - VAs 20/25 OD, OS
  - PH and refraction no impact on VA
  - Anterior chamber is clear and quiet OU
  - Conjunctiva trace injection OU
  - Few follicles and no papillae on palpebral conjunctiva; no foreign bodies detected
  - No lymph adenopathy
  - IOPs normal

19-year-old Female

- Cornea
  - "Breadcrumb" SPK that stained with FLNa+, but not with lissamine green
  - No mucous strands discovered
  - No pseudomembranes





19-year-old Female

- Impressions and Management
  - Even considered filamentary keratitis, but no mucous "tadpoles"
  - Treated as Thygeson though somewhat atypical in appearance
  - Loteprednol suspension 1 drop 3X/day OU
  - Non-preserved AT
  - RTC 1 week/PRN

Thygeson Superficial Punctate Keratitis (TSPK)

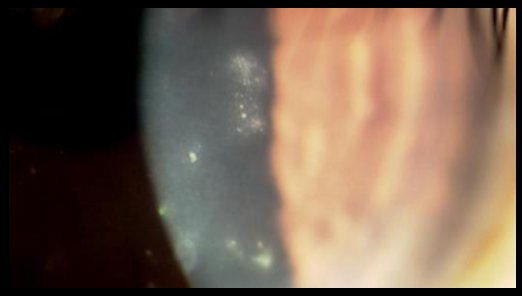
- Exact etiology unknown
- Exact epidemiology unknown
  - Lasting years to even decades
  - No predilection for gender
  - Race predilection unknown
- Episodic, may have a genetic component
  - HLA-DR3
    - Associated with various autoimmune disorders
- May have a viral component
- First presentation as early as first decade of life

TSPK

- Course and presentation
  - Remission and exacerbation
  - Small or coalesced, white, raised during active presentation
  - Can disappear completely or become flatter, less noticeable during periods of remission

TSPK

- Treatments
  - AT
  - Steroids
    - One source mentioned this might elongate to overall course of the disease
    - Another source said it is the mainstay of therapy
  - Bandage lens
  - Cyclosporin (Restasis)

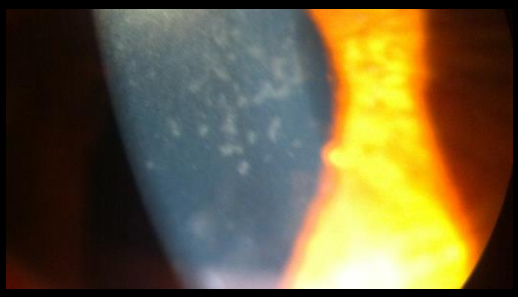


19-year-old Female
Day 8

- Patient states no to mild improvement
  - Drops help momentarily, but she feels like she wants to put the drops in "all the time"
- Compliant with instructions
- No new symptoms
- No new information (confirmed some of the information gathered during original interview—no changes)

19-year-old Female
Day 8

- Physical exam
  - VAs 20/25+ NIPH
  - No mucous
  - Conjunctivae white
  - IOPs unchanged



19-year-old Female
Day 8

- Impressions and Management
  - No change in management
  - Patient told to return in five days

  Note: The above case was an example of approximately 8 patients seen in Primary Care during the period of early May through September in 2010. All cases shared a great deal in common with few variations. We have had more similar cases in 2011 and 2012.
- Hypothesis: Bloomington population drops due to graduation and mass exodus in May. Water tables remain relatively unused. Could it be in the water?

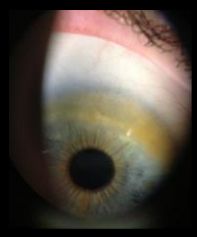
Terrien's Marginal Dystrophy

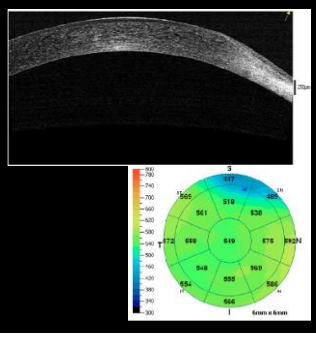
- 45-year-old Asian female
  - Presented for annual exam with mild irritation "from time to time."
  - VAs 20/20 in each eye
  - Refraction moderate myopia and low astigmatism

Physical Exam

- SLEx:
  - Central cornea normal
  - Arcus
  - Limbal cornea thinned
    - "Guttering" of the limbal conjunctiva

Terrien's Marginal Dystrophy



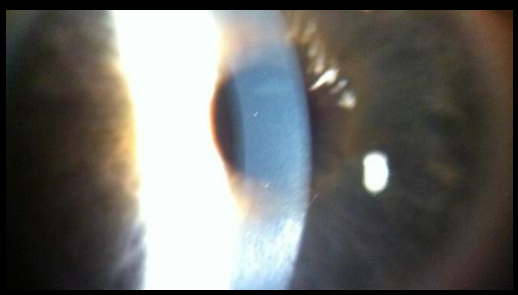


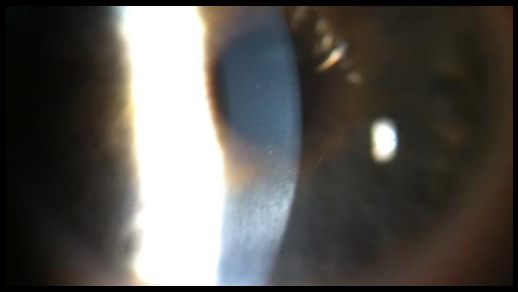
23-year-old male

- RFV/CC: "I woke up and my eye was bothering me."
- HPI: First occurrence ten days ago; on and off; as soon as thinks it's better, it gets bad again. Today, it wasn't very bad, but decided to come in anyway. No history of glasses or contacts. General health described as "excellent." Some allergies, uses OTC
- SHx: Grad student in linguistics; lots of reading and computer work
  - Recently came back from a vacation

23-year-old male

- Physical Exam:
  - VAs 20/20 each eye, far and near
  - Refraction reveals low hyperopia
  - Cornea
    - Patchy area of "scarring;" patient has no recollection of any trauma, recent or otherwise
    - Area does stain with FLNa+
      - Patchy staining
      - A "hairy" insect leg found in the cul-de-sac
  - Anterior chamber clear and quiet





23 year-old male

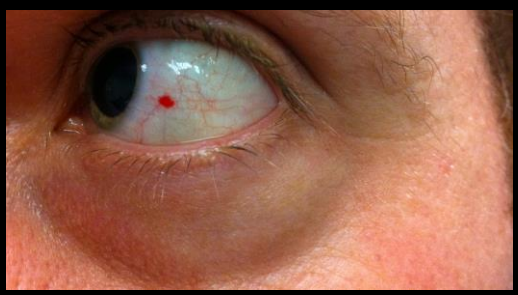
- Impressions and Management
  - Insect bite or possible "abrasion"
  - The start of the symptoms coincident with hotel stay during vacation
  - Reactivation possibly due to venom of unknown insect (I couldn't identify the leg, and we lost it before I could take a picture!)
  - A rinse was performed in office
  - Zylet ophthalmic suspension
    - Low dose for 5-7 days
  - RTC 5 days

23-year-old male
Day 5

- HPI: Feels much better; no FB sensation, no symptoms.
- The "scar" is unchanged, but no staining
- Patient dismissed from care

23-year-old male
Return visit

- The patient returned a month later with *another* bug in the eye, this time while playing softball.
- Presentation was more conjunctival and a "missile" effect.
- Treatment regimen was more supportive. Patient was dilated because he felt the "missile" hit strongly enough to "knock my head back."
  - Questioned if it could be debris (rocks or sand), but eyewitnesses confirmed a large insect, possibly a bee.
  - Dilation revealed no internal damage
- To the best of my knowledge, there have been no further entomological incidents.



48-year-old Female

- Reason for visit and CC:
  - "My eye hurts and I can't see out of it. I think I scratched it." Severity placed at 5/5 by patient. However, patient was able to sit comfortably and respond to questions. Physical exam didn't require any anesthetic instillation.
- Mood and Affect: Patient appeared calm and somewhat groggy.
- HPI: Moderately long-standing (approximately two weeks). "It's not getting better."

  Notes:
  - Presented as a walk-in
  - Patient had been seen two weeks before at an OD/MD practice and referred to specialist for corneal consult (we did not know this at the time of admission).

48-year-old Female

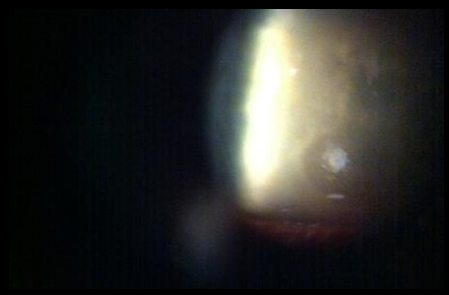
- Physical exam
  - VAs OD: 20/25; OS: 20/80 NIPH
  - Cornea is opaque and has a large area of central epithelial defect as well as multiple scars and areas of discreet abrasions.

Note: Patient questioned regarding self-mutilation, which patient denied. However, she added that she has multiple cats that sleep with her. She now added that she had been placed on Tobrex by the previous office and also mentioned she refused to travel to Indianapolis to see the corneal specialist.

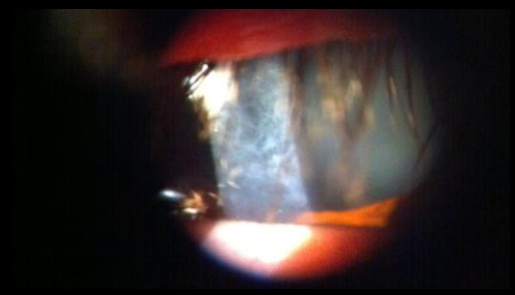
48-year-old Female

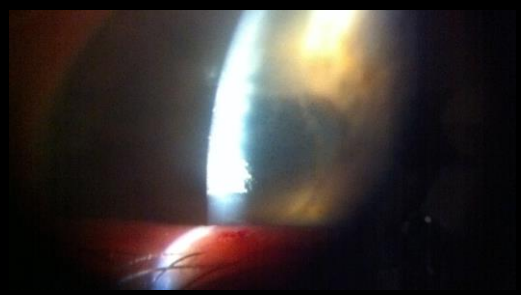
- Physical exam:
  - Difficult to assess anterior chamber
  - Estimated flare at grade 3-4
  - Pupil marginally responsive
  - Difficult to assess synechia

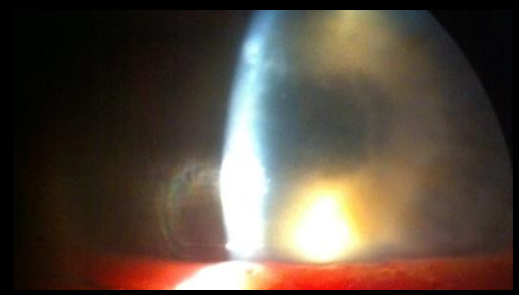
RE (20/25)



LE (20/80)







48-year-old Female

- Impressions and Management
  - Patient asked about drug use. She admits to a history of cocaine and amphetamine use "years ago." However, she has been "clean for years."
  - Dx: Abrasion induced (likely) pseudomonas infection
  - Importance of visit with corneal specialist was stressed
  - Fortified Vigamox 1 drop ever five minutes X 2 hours; then, 1 drop/hour X 24 hours. RTC 1 day

48-year-old Female Day 6

- Patient no-showed for 24-hour visit
- Unable to contact patient
- She presented as walk-in on Day 6
  - Pain is worse
  - Vision is "same"
  - Did not fill the Vigamox Rx
  - Continued with the original regiment of Tobrex 1 drop 4X/day

48-year-old Female Day 6

- Physical Exam (Anesthetic drops needed to be instilled at this time)
- VAs OD: 20/25; OS: Hand-motion at 5 feet
- The central "divot" had filled in; however, the immune ring/infiltrate totally obscuring iris detail
- As expected, anterior chamber impossible to assess

48-year-old Female Day 6

- Impressions and Management:
  - We immediately called corneal specialist
  - Patient promised she would visit the specialist
  - We had the patient write a note to that effect
  - Appointment made with the corneal specialist on the day
  - Followed up with specialist's office a few hours later to ascertain patient showed up

  Note: Corneal specialist remembered the patient from when the OD/MD practice made the referral

48-year-old Female

- Specialist's report:
  - Pseudomonas confirmed
  - Treatment with Polymyxin-B and Tobrex
  - Patient to return in 48 hours to specialist

48-year-old Female Day 13

- Patient presents as a walk-in
- Did not keep appointment with specialist
- Vision no better, but patient seems in less discomfort
- Continued use of the Tobrex, but did not fill the Polymyxin-B Rx.

48-year-old Female Day 13

- Physical exam:
  - VA continues to be hand motion
  - Conjunctiva is quieter, less injected
  - Leukomatous scar
  - Patient seems to have forgotten about the trip to specialist. Confirmed with the specialist regarding plan for follow-up

48-year-old Female Day 13

- Impressions and Management
  - Emphasized the importance of visit with the specialist
  - Emphasized the importance of following orders of the specialist
  - Patient has been lost to follow-up to date

References

- ^ Ramamurthi S, Rahman M, Dutton G, Ramaesh K (2006). "Pathogenesis, clinical features and management of recurrent corneal erosions.". *Eye* **20** (6): 635–44. DOI:10.1038/sj.eye.6702005. PMID 16021185.
- Baryla J, Pan YI, Hodge WG (2006). "Long-term efficacy of phototherapeutic keratectomy on recurrent corneal erosion syndrome.". *Cornea* **25** (10): 1150–1152. DOI:10.1097/01.ico.0000240093.65617.80. PMID 17172888.
- http://www.revoptom.com/content/d/cornea/c/33146/
- Thygeson P. Superficial punctate keratitis. *J Am Med Assoc.* Dec 30 1950;1. 144(18):1544-9
- Tabbara KF, Ostler HB, Dawson C, Oh J. Thygeson's superficial punctate keratitis. *Ophthalmology*. Jan
- 1981;88(1):75-7
- Seo KY, Lee JB, Jun RM, Kim EK. Recurrence of Thygeson's superficial punctate keratitis after
- photorefractive keratectomy. *Cornea*. Oct 2002;21(7):736-7; author reply 737
- Hasanreisoglu M, Avisar R. Long-term topical cyclosporin A therapy in Thygeson's superficial punctate
- Thygeson Superficial Punctate Keratitis Follow-up http://emedicine.medscape.com/article/1107535-followup

References

- Resnick, S. "LipiFlow thermal Pulsation System: Targeted Therapy for MGD Patients. (2012)" *Refractive Eyecare* **16** (6): 7-9.
- Asbell, PA, Colby, KA, Deng S, McDonnell, P, Meisler, DM, Raizman, MB, Sheppard, Jr, JD, Sahm, DF. "Ocular TRUST: Nationwide Antimicrobial Susceptibility Patterns in Ocular Isolates." *American Journal of Ophthalmology* 2008;145:951-958. DOI:10.1016/j.ajo.2008.01.025.
- Haas, W, Pillar, CM, Torres, M, Morris, TW, Sahm, DF. "Monitoring Antibiotic Resistance in Ocular Microorganisms: Results From the Antibiotic Resistance Monitoring in Ocular MicRorganisms (ARMOR) 2009 Surveillance Study." *American Journal of Ophthal*mology 2011;152:567-574. DOI:10.1016/j.ajo.2011.03010.
- *Review of Optometry*. Digital ed. March 15, 2012. http://www.revoptom.com/content/d/cl/c/31/2/
- *Review of Optometry*. Digital ed. February 7, 2011. http://www.revoptom.com/content/d/dry_eye_report/i/1378/c/26521/
- http://www.nature.com/eye/journal/v20/n8/full/6702052a.html
- Rhee, DJ, Pyfer, MF. *The Wills Eye Manual: Office and Emergency Room Diagnosis and Treatment of Eye Disease, 3rd ed.* Philadelphia, PA: Williams and Wilkins, 1999.
- Melton, R and Thomas, R. *Review of Optometry Clinical Guide to Ophthalmic Drugs*. May 2012.
- *telemedicine.orbis.org*
- *Healthline.com*

Synechia-Rubeosis