

*Adventures of
the Anterior Segment*
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Disclosures

- ▶ Walter O. Whitley, OD, MBA, FFAO has received consulting fees, honorarium or research funding from:
 - Alcon
 - Allergan
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 - Biotissue
 - Beaver-Visitec
 - Ocusoft
 - Science Based Health
 - Shire
 - Sun Pharma Ceuticals
 - TearLab Corporation
 - Tearscience
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- Review of Optometry – Contributing Editor

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Case Study

- ▶ 62 yo female presents for recent onset redness, discharge, swelling, and irritation. OU for the last 3 days
- ▶ Current Drops:
 - Restasis BID OU
 - Genteal PRN OU
- ▶ Ocular History
 - Cataract Extraction with PCIOL Dec 2012 OU
 - Blepharospasm treated with Botox injections
- ▶ Health - unremarkable
- ▶ Teaches 1st Grade

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Examination




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Assessment and Plan

- ▶ Acute Conjunctivitis
- ▶ Considerations
 - Associated symptoms?
 - Are they contagious?
 - Impact on treatment?
 - Any other testing considerations?

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Acute Conjunctivitis

- ▶ Common condition – affects approximately 2% of the population annually¹
- ▶ Can be caused by virus, bacteria, allergy, or other less frequent causes
- ▶ 1-2% of all office visits²
- ▶ 20-70% of acute conjunctivitis is viral³
- ▶ 65-90% caused by Adenovirus⁴



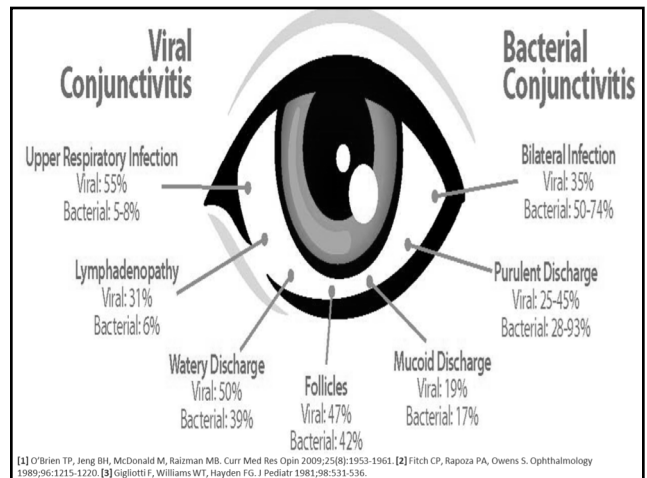
[1] Thomson Reuters Medstat Market Research. 2005. [2] Shields T, Sloane PD. Fam Med. 1991 Sep-Oct;23(7):544-6. [3] Marangon FB, Miller D, Alfonso E. Eye Careman 2007; 70:189-194. [4] Infectious Disease Surveillance Report. 1995;16:97-98.

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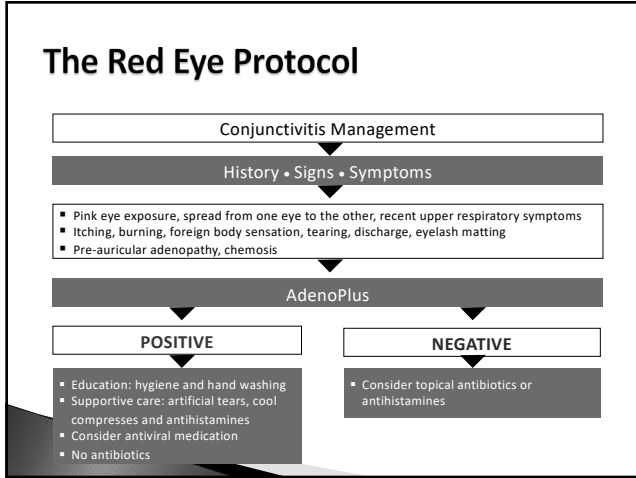
Viral or Bacterial??



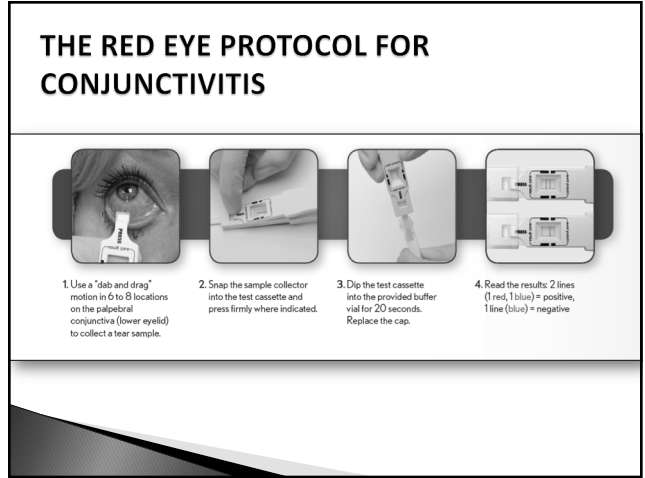
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Off-Label Treatments for EKC

NO ANTIBIOTICS REQUIRED!

Hypochlorous Acid??

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Off-Label Adenoviral Treatments

Ganciclovir .15% Gel vs Preservative Free Tears (N=18)

	Ganciclovir .15% gel N=9	Preservative free tears N=9
Recovery time [mean (range)]	7.7 (7-12) days	18.5 (7-30) days
SEIs	2 patients	7 patients

[1] Collin J. Ganciclovir ophthalmic gel: a valuable tool for treating ocular herpes. Clin Ophthalmol. 2007;1:441-53.

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Problems with Steroid Treatment

Although it may make the patient feel better...

- Risk of HSV (~3-21% of pink eye)^{1,2}
- Increase infectivity and viral replication of Adenovirus³⁻⁶
- Prolongation of Adenoviral positive cultures³⁻⁶
- Result: increase potential spread of Adenovirus³⁻⁶
- Medical-legal issues

[1] Manganaro M, et al. American Journal of Ophthalmology. 2004; 137(1): 453-458. [2] Probst M, Semczuk K. KlinOczna. 2005; 107(7-9): 418-420. [3] Gaynor RD, Chidambaram DV, et al. Br J Ophthalmol. 2005 Sep;89(9):1097-9. [4] Ihara N, Suzuki T, Kawamura Y, et al. Diagn Microbiol Infect Dis. 2006 Nov;38(1):297-303. [5] Uchino T, et al. Jpn J Ophthalmol. 2005; 49(1): 1-5. [6] Ich N, et al. Br Ophthalmol. 2000 Sep; 84(9):968-72. [6] Silverman M, Bressman B. Conjunctivitis. Available at: <http://www.emedicine.com/ophnmg/topic1000.htm>

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Bacterial Conjunctivitis Treatment

- ▶ Fluoroquinolones
 - Besifloxacin
 - Levofloxacin
 - Moxifloxacin
 - Gatifloxacin
 - Ciprofloxacin
- ▶ Macrolides
 - Azithromycin



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Graded Pharmacotherapy

Stepwise Treatment Strategies for Allergic Conjunctivitis

Stepwise Treatment Strategies for Allergic Conjunctivitis	
Mild	Avoidance, cold compresses, tears, over-the-counter medications Topical antihistamines/mast cell stabilizers Oral antiallergics (allergists may already have patients on orals; may exacerbate the ocular condition while improving the nasal condition) Montelukast
Moderate	+ Mast cell stabilizers (treats allergy before mediator is released) + Combination antihistamine/mast cell stabilizers + Topical corticosteroids (most beneficial for severe outbreaks)
Severe	Topical corticosteroids (short course; fluorometholone/dexamethasone/loteprednol/prednisolone) Topical immunomodulating agents (tacrolimus, cyclosporine) Oral steroids

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12 Patient Allergy Tips

- ▶ Never rub your eyes
- ▶ Wash your hands
- ▶ Use allergy free pillows
- ▶ Stay indoors
- ▶ Use drops for eyes, sprays for nose
- ▶ Avoid "get the red" out vasoconstrictors
- ▶ Chill your drops
- ▶ Use cool compresses
- ▶ Apply allergy drops proactively
- ▶ Pets out of the house or bedroom
- ▶ Know and avoid your personal antigens
- ▶ Try Montelukast: no sedation, no drying

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Case Study

- ▶ 2/13 ROV: 52 YO Asian Female / Follow up 4 month dry eye check. Intermittent foreign body sensation and fogged vision over 1 year
- ▶ Ocular Hx: DES, LASIK 12.08.11
 - Ocular Medications: Restasis BID OU
- ▶ Medical Hx: Allergies, Borderline Diabetes, Acid Reflux
 - Systemic Medications: Multivitamin, Iron

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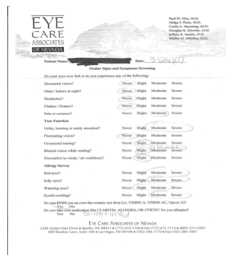
Slit Lamp Examination

- ▶ BCVA
 - OD 20/25-
 - OS 20/20-
- ▶ MR
 - OD pl – 0.75 x 005
 - OS -0.50 DS
- ▶ External: normal OU
- ▶ Conjunctiva: 2+ injection
- ▶ Cornea: 1+ Diffuse SPK OU
- ▶ Tear Eval:
 - 4 sec NIBUT
 - Schirmer 8/9
- ▶ Iris: flat OU
- ▶ A/C: deep & quiet OU
- ▶ Lens: clear OU

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Diagnostic Testing

- ▶ Clinical history
- ▶ Symptom questionnaire
- ▶ Tear film break up time
- ▶ Ocular surface staining
 - Nafi / Lissamine Green
- ▶ Schirmer / Red Thread Test
- ▶ Lid and meibomian morphology
- ▶ MG Expression
- ▶ Tear meniscus
- ▶ Tear film osmolarity



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Superior Limbic Keratitis

- ▶ Definition
 - Uncommon chronic disease
 - Superior bulbar and tarsal conjunctiva and limbus
 - Bilateral
 - Middle aged women
 - Abnormal thyroid function
 - Symptoms worse than signs
 - Remission occurs spontaneously
- ▶ Pathogenesis
 - Blink-related trauma
 - Tear film insufficiency
 - Excess of lax conjunctival tissue
 - Inflammatory process
 - Self-perpetuating cycle

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SLK and Treatment

- ▶ Lubrication
- ▶ Acetylcysteine
- ▶ Mast cell stabilizers
- ▶ Steroids
- ▶ Cyclosporine A
- ▶ Soft contact lens
- ▶ Silver nitrate
- ▶ Autologous serum
- ▶ Botulinum toxin
- ▶ Supratarsal steroid injection
- ▶ Resection
- ▶ Conjunctival ablation
- ▶ Consider thyroid evaluation

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Eyelid / Conjunctival Cultures

- ▶ Eyelid
 - Moisten swab, rub along the lid margins
- ▶ Conjunctiva
 - Inferior palpebral conjunctiva
- ▶ Inoculate solid media plates
- ▶ Culture
 - Calcium alginate swab
 - Cotton-tipped applicator
 - Transport medium



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Example of Culture Report

- ▶ Hold for:
 - Bacteria 1 week
 - Viral 2 weeks
 - Fungal 1 month
- ▶ Test for all sensitivities



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Treatments for MRSA

- ▶ 100% to vancomycin¹
- ▶ 97.7% to sulfisoxazole¹
- ▶ 95% to Polytrim²
- ▶ 93.2% were sensitive to tetracycline¹
- ▶ 63.6% were sensitive to bacitracin¹
- ▶ 14.8% of MRSA isolates were sensitive to ciprofloxacin and erythromycin¹
- ▶ Besifloxacin has been reported to be effective

1. Freidlin J, Acharya N, Linn S, et al. Spectrum of eye disease caused by methicillin-resistant staphylococcus aureus. Am J Ophthalmol. 2007 Aug;144(2):313-5
 2. Asbell PA, Colby KA, Deng S, et al. Ocular methicillin-resistant staphylococcus aureus: in vivo and in vitro antimicrobial susceptibility patterns in ocular isolates. Am J Ophthalmol. 2008 Jun;145(6):951-5.

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 2. Ishii Y, Aoyagi Y, Kobayashi T, et al. Worldwide antimicrobial susceptibility patterns in ocular isolates. Am J Ophthalmol. 2008 Jun;145(6):951-

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Case Study

- ▶ 54 Year Old Female
- ▶ 2 year hx of Severe Dry Eye Syndrome
- ▶ Med Hx
 - History of Pernicious Anemia
 - Hypo Thyroid (Synthroid)
 - HRT
- ▶ Meds
 - B-12
 - Prozac
- ▶ Full Scope Treatment of OSD
 - Progressing over 4 years in therapy
 - Various Artificial Tears – Currently with HA
 - Restasis
 - Lotemax
 - AzaSite

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“Vision Starts at the Tear Layer”

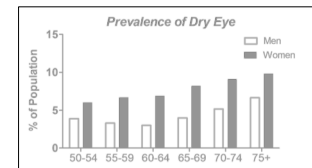
- ▶ Tear - corneal epithelium complex provides 65% of refractive power
- ▶ Pre-corneal tear film: hydrophilic gel
- ▶ Eyes open 92% of time, ~ 15 blinks per minute
- ▶ Cornea most exposed mucosal membrane in the body

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Dry Eye Disease

- ▶ Prevalence 2%-14.4% worldwide
- ▶ Age greatest risk factor
- ▶ ~ 29 million USA
- ▶ F>M at every age group

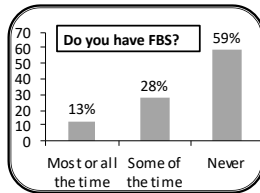


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Testing only when Patients Complain of Dryness is Insufficient

- > 40% of people with objective evidence of dry eye are asymptomatic¹
- Cataract surgery patients often complain of fluctuating vision rather than dryness or FBS²



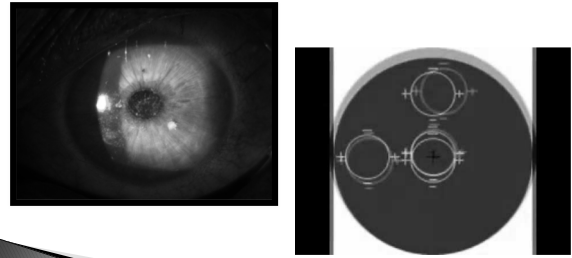
Despite a lack of discomfort, dryness or FBS, >60% of subjects had significant signs of OSD²

1. Bran AJ, Tomlinson A, Foulks GN, et al. Ocular Surface 2014; In press.
2. Trotter W, Reilly C, Goldberg D, et al. Preoperative Assessment of Cataract Patients Ocular Surface Study. Poster, ASCRS 2011.

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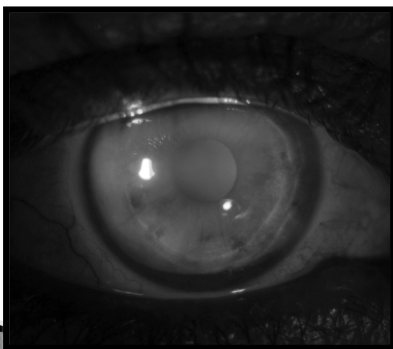
Cataract Surgery and Dry Eye

- Ocular surface must be optimized pre-operatively for accurate keratometry



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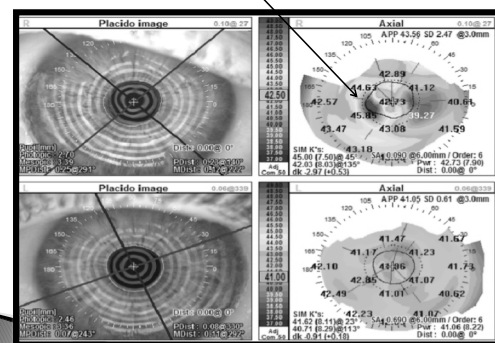
Goal of Therapy: Stabilize Interblink Tear Film



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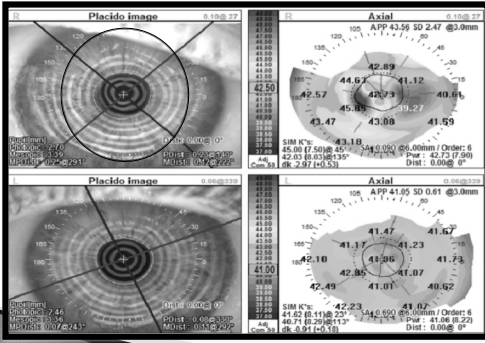
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"Hot spots" and "Flat spots" are abnormal



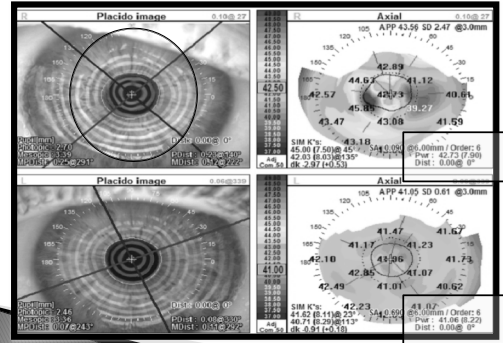
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Irregularly shaped or smudgy placido disk is abnormal!



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Take a closer look if average K values are different



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Dry Eye Preparation for Cataract Sx Measurements

1. Frequent NPAT use
2. Topical steroid course
 - Fluoromethalone, loteprednol
 - PF Dexamethasone 0.01% to 0.1%
3. Upper and/or lower punctal occlusion
4. MGD management: MiboFlo, Lipiflow
5. Prokera Self-retaining AMT
6. Address any other issues, i.e. blepharospasms, lag ophthalmos, filamentary keratitis

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Case Study

- ▶ 72 YOAAF – Referred by OD for Cataract Eval OU. Blurred VA. Occasionally uses ATs prn.
- ▶ Med Hx of allergies, acid reflux and HTN
- ▶ SLE: 3+ NS OU
- ▶ Uneventful cataract sx OU
 - OD 1/4/12 OS 2/1/12

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Case Study

- ▶ 3/27/12 Increased light sensitivity / pain OU
 - Dx: Rebound Iritis OU
 - Tx: Restart difluprednate and nepafenac TID OU

- ▶ 5/14/12 F/u chronic iritis OU, FBS OS
 - Dx: Improved Chronic Iritis OU, Dry eye disease OS>OD
 - Tx: Decrease steroid and NSAID to BID OU, ATs BID OU

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Case Study

- ▶ 9/7/12 – F/u chronic iritis, FBS OS>OD, Tearing
 - Dx: Resolved iritis OU, Dry eye disease OU
 - Tx: Start on cyclosporine 0.05% OU, F/u 4-6 mos

- ▶ 2/25/13 – F/U dry eye disease OU, OS always has a FBS, Chronic tearing
 - Dx: DED OU / See photo
 - TearLab: 298 / 301

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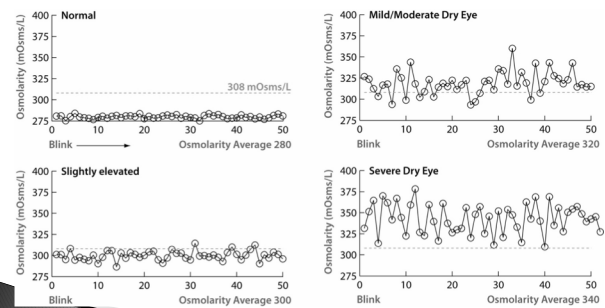
Understanding Tear Film Instability in Dry Eye

- ▶ Normal subjects exhibit low and stable osmolarity
 - Normal tear osmolarity = 280 - 300 mOsm/L
 - Equivalent to blood osmolarity = 285-300 mOsm/L
 - Indicative of the tears being held in proper homeostasis
- ▶ Dry Eye subjects exhibit elevated and unstable osmolarity
 - Osmolarity changes between eyes and over time
 - Variability is the hallmark of DED (> 8 mOsm/L between eyes)
- ▶ Osmolarity was found to be the least variable of all common signs¹
 - Osmolarity: 8.7%
 - Corneal Staining: 12.2%
 - Conjunctival Staining: 14.8%
 - Meibomian Grading: 14.3%
 - TBUT: 11.7%
 - Schirmer's Test: 10.7%

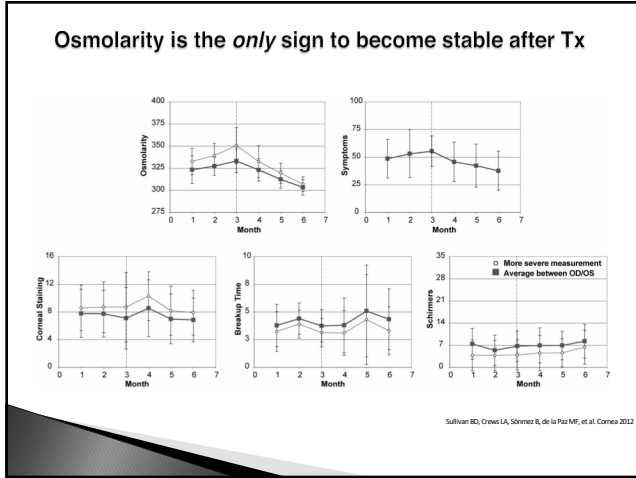
¹Sullivan BD, Crews LA, Sörnmez B, de la Paz MF, et al. Cornea 2012

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Osmolarity & Tear Film Instability in DED



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Leading the Future of Diagnostics

- ▶ **TearLab DISCOVERY™ Platform:**
 - Quantitative
 - Rapid testing (< 2 minutes)
 - Multiplexed biomarkers
 - EHR Integration
- ▶ **First test card to include:**
 - Osmolality
 - Two Inflammation markers:
 - MMP-9
 - IL1-Ra

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InflammaDry

85% Sensitivity² **94% Specificity²**

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Advanced Tear Diagnostics Tearscan

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Referred to Conjunctival Resection

- ▶ Dx: Conjunctivalchhalasis OS>OD
- ▶ Tx: Schedule for conjunctivoplasty OS
 - Disc R/B/A to surgery including 50% chance that symptoms will not improve even after a successful operation.
 - Pt elected to proceed with conjunctivoplasty OS only, as that is the more symptomatic eye.

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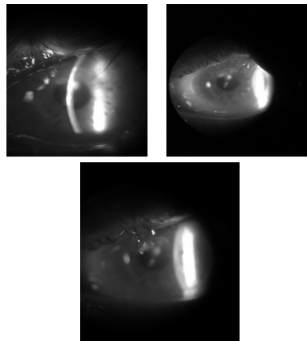
Culture Club

- ▶ 51 y/o Caucasian male referred for corneal ulcer
- ▶ Patient complains of blurry and foggy vision, discomfort, and redness OS
- ▶ H/o soft contact lens wear
- ▶ Drops: OTC anti-histamine

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Ulcer Case

- ▶ VA: 20/200
- ▶ Conjunctiva: 2+ injection
- ▶ Cornea: central ulcer with multiple (8) infiltrates, 3mm x 1.4 mm epithelial defect
- ▶ Cultures obtained including blood, chocolate and fungal



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Bacterial Keratitis: Risk Factors

- ▶ Contact lens wear - #1
- ▶ Nonsurgical trauma
- ▶ Surgical trauma
- ▶ Lid dysfunction
- ▶ Ocular surface disease
- ▶ Corneal epithelial abnormalities
- ▶ Systemic diseases
- ▶ Topical medications

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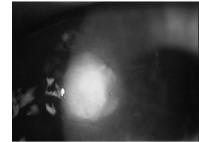
Indications for Cultures

- ▶ Hyperacute conjunctivitis
- ▶ Neonatal conjunctivitis
- ▶ Post-operative infections
- ▶ Chronic conjunctivitis
- ▶ Central corneal ulcers
- ▶ Membranous / Pseudoconjunctivitis
- ▶ Preseptal / Orbital cellulitis
- ▶ Post-traumatic infections
- ▶ Marginal infiltration / ulceration
- ▶ Atypical external disease
- ▶ Severe dry eye
- ▶ Bullous keratopathy
- ▶ Axial and severe keratitis

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Work-up

- ▶ History
- ▶ Slit lamp examination
- ▶ Photodocumentation
- ▶ Culture - Rules of 1-2-3
 - Within 1 mm of visual axis
 - Ulcers with 2 or more infiltrates
 - 3 mm or more in diameter



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Equipment

- ▶ Slit lamp
- ▶ Sterile Kimura spatula
- ▶ #15 Blade, sterile
- ▶ Calcium alginate swab
- ▶ Culture media
- ▶ Microscopy slides
- ▶ Alcohol lamp



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Procedure

- ▶ Anesthetize the cornea
 - Preservative-free tetracaine
- ▶ Scrape ulcer base / leading edge of infiltrate
- ▶ Place specimen on slide, then culture media
 - Smears – fixing organisms to be stained / observed
 - Culture – microbial growth
- ▶ Sterilize spatula over flame between slides / cultures

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Slides / Stains

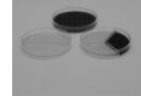
- ▶ Multiple slides
 - Bacterial
 - Fungal
 - Acanthamoeba if suspected
- ▶ Routine
 - Gram stain – bacteria, yeasts
 - Giemsa stain – cytology, bacteria, fungi, chlamydia
 - Calcofluor white – acanthamoeba, fungi
- ▶ Optional
 - Acid-fast, KOH wet mount, etc.



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Medium

- ▶ Routine
 - Blood agar – all-purpose, grows most bacteria
 - Except for Neisseria and Haemophilus
 - Chocolate agar – Haemophilus, Neisseria
 - Sabouraud's agar – fungal isolation
- ▶ Optional
 - Lowenstein-Jensen – mycobacteria, Nocardia
 - Non-nutrient agar w/E. coli overlay – acanthamoeba
 - Thayer-Martin agar – gonococcal isolation



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Example of Culture Report

- ▶ Hold for
 - Bacteria 1 week
 - Viral 2 weeks
 - Fungal 1 month
- ▶ Test for all sensitivities



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Polymerase chain reaction (PCR)

- ▶ Rapid diagnostic test
- ▶ Results within hours vs days to weeks (culture)
- ▶ Procedure
 - Obtain sample via cotton swab, metal spatula, or recently developed FTA filter paper
 - DNA of micro-organisms is extracted and amplified
 - DNA compared to DNA in literature using software

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Polymerase chain reaction (PCR)

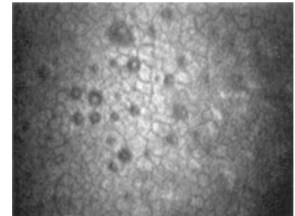
- ▶ High sensitivity
- ▶ Unacceptable specificity
 - Low specificity = high false positives
 - High amounts of unnecessary treatment
 - Increased corneal toxicity
- ▶ Ongoing studies to improve sensitivity

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Confocal Microscopy

- ▶ Historically used for endothelial cell evaluation
 - Fuch's dystrophy
 - Post-surgical bullous keratopathies
- ▶ Recently, studied for use in diagnosing infectious keratitis
 - Acanthamoeba
 - Fungal keratitis



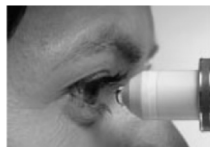
<http://dx.doi.org/10.1016/j.ophtha.2010.07.017>

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Confocal Microscopy & Fungal Keratitis

- ▶ Studies show
 - Sensitivities: 80-94%
 - Specificities: 78-93%
- ▶ Procedure
 - Thick fluid-coupling agent on cornea
 - Scans all layers



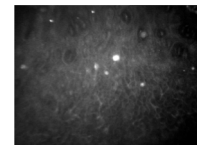
<http://www.ophthalmology.com/Products/Confocal>

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Dx: Acanthamoeba Ulcer

- ▶ Monitored daily
 - Day #2: epithelium debridement and subconj. Gentamicin injection
 - Added Bactrim DS 1 PO BID along with Polyhexamethylene Biguanide/PHMBG 9-11x/day



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Acanthamoeba

- ▶ Parasitic infection
 - *A. castellanii* and *A. polyphaga*
- ▶ Typically pain is out of proportion to findings
- ▶ Culture on dish of *E. coli* plated over non-nutrient agar

<http://eyewiki.aao.org/Acanthamoeba>
 Picture accessed from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1500467/figure/fig1/>

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Acanthamoeba

- | | |
|---|---|
| <ul style="list-style-type: none"> ▶ Decreased vision ▶ Pain ▶ Light sensitivity ▶ Redness ▶ Foreign body sensation ▶ Lid edema | <ul style="list-style-type: none"> ▶ Epithelial irregularities ▶ Epithelial or subepithelial infiltrates ▶ Satellite lesions ▶ Stromal infiltrates (ring-shaped, disciform) ▶ Anterior uveitis ▶ Scleritis ▶ Chorioretinitis |
|---|---|

Symptoms

Signs

http://eyewiki.aao.org/Acanthamoeba_Kerati
 From: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1500467/figure/fig1/>

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Differential Diagnoses of Acanthamoeba

- ▶ Herpes Simplex Virus Keratitis
- ▶ Recurrent Corneal Erosion
- ▶ Bacterial Keratitis
- ▶ Fungal Keratitis
- ▶ Contact Lens Associated Keratitis
- ▶ Dry Eye Syndrome

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Treatment and Management of Acanthamoeba

- ▶ Early stages- topical antibiotics
- ▶ Cationic antiseptics- polyhexamethylene biguanide (PHMB) and Chlorhexidine
- ▶ Combination therapy with a diamidine
- ▶ Debridement of tissue
- ▶ Penetrating keratoplasty
- ▶ Steroids?

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1500467/figure/fig1/>
 Logothetis et al., Jacob et al. "An update on Acanthamoeba keratitis: pathogenesis, diagnosis, and treatment"

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Back to Patient...

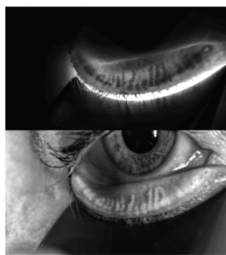
- ▶ All satellite lesions healed ~15 days following initial evaluation
- ▶ Prokera was inserted at 1 month visit
- ▶ Patient continued to improve; PHMG was tapered weekly (7x/week, 6x/week, 5x/week, 4x/week, etc.)

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Case Example – POAG / MGD

- ▶ 76YOWF – Present for follow up for Glaucoma and dry eye disease. Compliant with drops OU. Eyes have been irritating her more in the past few months
 - Previous treated with topical azithromycin
 - Current Ocular Meds: Restasis BID OU, latanoprost qhs OU
 - Numerous systemic meds including singulair, synthroid
- ▶ SPEED Score: 33
- ▶ Tear Osmolarity 308 / 315
- ▶ IOP: 14/13
- ▶ SLE: 2+ MGD OD / 3+ MGD OS / 1+ SPK OU
 - Cloud secretions OU
 - MG Structure: See images

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LipView II Page 2 of 4 TearScience

Early to Moderate Structural Changes to Meibomian Glands



LipView II Page 4 of 4 TearScience

Advanced Gland Atrophy / Dropout

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Post Treatment

SPEED II Questionnaire

Report the FREQUENCY of your symptoms using the ratings below:

Frequency	1	2	3	4
Never				
Very rarely				
Rarely				
Sometimes				
Frequently				
Very frequently				

SPEED Score = 33

- ▶ Post Tx Osmolarity
 - 300/299
- ▶ Post Lipiflow Management
 - Heat masks qhs OU
 - Hydroeye as directed
 - Restasis BID OU
 - Lipid based tear BID OU
 - F/u 3 months dry eye
 - Order tear osmolarity
 - Order inflammatory
 - SPEED Questionnaire

6 Weeks Post Treatment

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Case Example

- ▶ 67 year old white female – OS has been tearing for 3 weeks, some burning and irritation, h/o allergies
- ▶ Ocular Medications – Visine prn
- ▶ Meds: OTC Zyrtec, lisinopril
- ▶ NKDA
- ▶ Assessment: Epiphora OS

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9 Steps to Evaluating the Tearing Patient

1. History
2. Lid Exam, Palpation of Lacrimal Sac
3. Slit Lamp Exam
4. Schirmer Tear Testing
5. Dye Disappearance Test & Jones I
6. Lacrimal Irrigation, Probing, & Jones II
7. Lower Lid Taping
8. Nasal Speculum Exam
9. Radiography

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The Big Four

1. History
2. Lid Exam
3. Dye Disappearance Test
4. Lacrimal Irrigation

Not all steps are needed in every patient

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Step 1: History

- ▶ Usually will distinguish hyperlacrimation from reduced excretion:
 - Hyperlacrimation associated with discomfort
 - Blepharitis—itch, burn
 - Allergic conjunctivitis—itch
 - Corneal foreign body—pain
 - Trichiasis—irritation
 - Dry Eyes—FB sensation, burn
 - Iritis—ache, photophobia
 - Photosensitivity—photophobia

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Step 1: History

- ▶ Usually will distinguish hyperlacrimation from reduced excretion:
 - Hyperlacrimation associated with discomfort
 - Hyperlacrimation usually not monocular
 - Hyperlacrimation rarely causes frank epiphora
- ▶ Prior treatment:
 - Artificial tears, allergy drops
 - Punctal plugs, lacrimal probings

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Step 1: History

- ▶ Time course, duration
 - Severe epiphora, intermittent: lacrimal stone
 - Duration less than 6 months: may benefit from probing or intubation
 - “Slowly progressive” does not really help distinguish between PANDO and secondary (neoplasia, infiltration)
- ▶ Associated disorders
 - Previous surgery, trauma
 - Previous infections (conjunctivitis, dacryocystitis, sinusitis)
 - Facial nerve palsy

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Step 2. Lid Exam

- ▶ Facial musculature
- ▶ CNVII weakness
- ▶ Lid laxity
- ▶ Ectropion
- ▶ Entropion
- ▶ Lacrimal sac palpation

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Step 3. Slit Lamp Exam

- ▶ Canalicular punctal size, position
- ▶ Tear meniscus
- ▶ Lid motion during blink
- ▶ Conjunctivochalasis
- ▶ Ocular Surface
- ▶ Everted upper lid for papillae
- ▶ Lid margin, lashes for blepharitis

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Step 5. Dye Disappearance Test

- ▶ Functional tear drainage test, positive result could be due to:
 - Tear lake malposition
 - Poor tear pump function
 - Punctal stenosis or blockage of canaliculus, sac or NLD

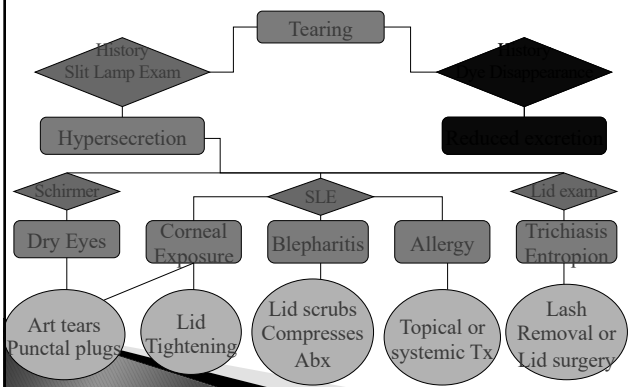
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Step 6. Lacrimal Irrigation

- ▶ So what is positive?
 - Free flow to nose—No obstruction (beyond punctum)
 - Reflux out upper punctum upon irrigating lower—obstruction beyond common canaliculus
 - Resistance to irrigation or reflux around irrigation cannula—canalicular obstruction

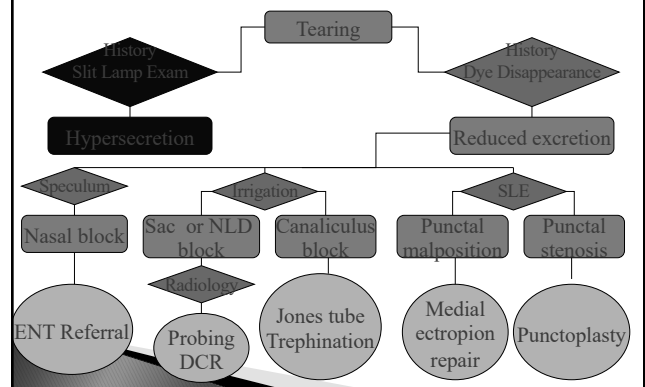
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Rational Treatment of The Tearing Patient

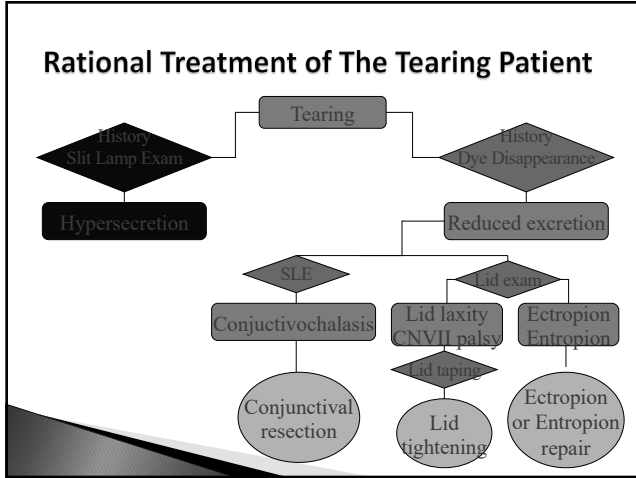


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Rational Treatment of The Tearing Patient



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