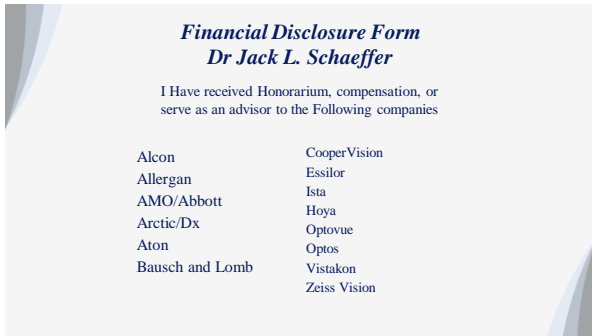


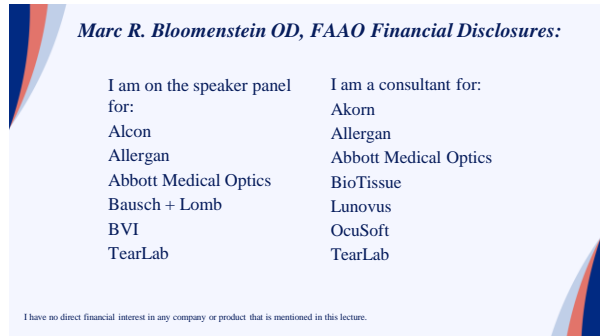
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4



5



6

*Dry eye is not just a disease,  
it's a complex, multi-  
factorial disorder.*

Citation

7

## *DEWS*

Dry eye is a **multifactorial disease** of the tears and ocular surface that results in symptoms of **discomfort, visual disturbance, and tear film instability** with potential damage to the ocular surface. It is accompanied by **increased osmolarity** of the tear film and **inflammation** of the ocular surface.

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Dry Eye is a **multifactorial** disease of the ocular surface characterized by a loss of **homeostasis** of the tear film, and accompanied by ocular **symptoms**, in which **tear film instability** and **hyperosmolarity**, ocular surface **inflammation and damage**, and **neurosensory** abnormalities play etiologic roles.

—The Definition and Classification of Dry Eye Disease, DEWS II, TFOS 2017

9

## *Dry Eye /Ocular Surface Disease*

- Medical Ocular condition or disease
- Ocular manifestation of a systemic problem
- Ocular complication from a medical Treatment

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## *Dry Eye /Ocular Surface Disease*

- Diabetes
- Thyroid Disease
- Autoimmune disease
- Hormonal changes
- Botox and Filler procedures
- Facial plastic procedures
- Graft VS Host disease ( cancer Tx complications)

11

## *Dry Eye /Ocular Surface Disease*

- Endocrinology
- Dermatology
- Facial Plastics
- Rheumatologist

12

### Oxidative Stress and Targets

omegas, antioxidants  
Trehalose  
FF-A2P  
reproslap

Nutrition  
RASP-inhibitors

**PLOS ONE**

**Selenium Compound Protects Corneal Epithelium against Oxidative Stress**

**SCIENTIFIC REPORTS**

**Vitamin D Supplementation for Patients with Dry Eye Syndrome: Retrospective to Conventional Treatment**

**Non-enzymatic & Enzymatic Formation of ROS**

**Cellular Damage**

Chen Y, Malin G, Vasilov V. Antioxidant defenses in the ocular surface. *Drug Saf*. 2007;30(1):174-185.  
Larkin D, Kozlowski K. Trehalose for Ocular Surface Health. *Biomedicine*. 2023;10(1):1-10.  
Clark DL, Sheppard J, Brady JC. A randomized double-masked phase 2a trial to evaluate safety and efficacy of topical ocular aging-inhibitor, a novel RASP inhibitor, in dry eye disease. *Acta Ophthalmol*. 2023; May; 101(5): 103-109.

13

### Innate and Adaptive Immunity

**Normal ocular immune response: regulated adaptive**

**Injury, insult, loss of homeostasis**

**Healthy Lymphoid Function (LDF) / Ocular Immunosuppression**

**Regulatory T cells (Treg)**

**T helper 1 (Th1)**

**T helper 2 (Th2)**

**T helper 17 (Th17)**

**Macrophages and Antigen Presenting Cells (APC)**

**Dendritic cells**

**Adaptive**

Robinson LM, Parry VL, Sabin D, Liu MC. Next-Generation Biological Treatments for Dry Eye Disease and Current Regulated Immune Options. *J Ocul Pharmacol Ther*. 2020 Apr; 36(2):137-146.

14

### Inflammatory Markers and Interventions

**Initiation**

**Amplification**

**Damage and self-perpetuation**

**Recruitment**

Adapted from Prabakaran, Laxmi M, et al. "The Immunological Basis of Dry Eye Disease and Current Topical Treatment Options." *Journal of Ocular Pharmacology and Therapeutics* 34(3):200-177-146.

15

### Medications: new appreciation for old friends

**Lifitegrast<sup>1</sup>**

- 100 pre-operative cataract patients with confirmed dry eye, 28 days of LiG BID
- Improvements in:
  - Accuracy
  - HOA
  - SPEED

**Cyclosporine 0.05%<sup>2</sup>**

- 42 eyes, pre-op LASIK with confirmed dry eye, cyclosporine 0.05% emulsion BID, 1 month pre and 3 months post surgery
- Improvements in:
  - Accuracy
  - Refractive predictability

**Cyclosporine 0.09%<sup>3</sup>**

- 75 eyes, pre-op cataract with DED treated with CEQUA<sup>TM</sup> for 28 days BID
- Improvements in:
  - Accuracy, HOA, staining, 'TBUT'
  - SPEED

1. Robinson J, Epperson A, Davenport M, Holladay JT. The Effect of Lifitegrast on Refractive Accuracy and Symptom in Dry Eye Patients Undergoing Cataract Surgery. *Clin Ophthalmol*. 2020;14:2596-2598. Published 2020 Sep 16.  
2. Gellera CA, McKeown MB, Scola M. Safety and efficacy of cyclosporine 0.05% drops in preoperative dry eye patients being treated with laser-assisted cataract surgery. *IOVS*. 2006;47:1251-1254.  
3. Robinson JA, Brady JC, Epperson A, Holladay JT. Effect of cyclosporine 0.09% treatment on accuracy of preoperative refractive and higher order aberrations in dry eye patients undergoing cataract surgery. *Clin Ophthalmol*. 2021; 13:1675-1680.

16

**Initiation**

Cyclosporine  
Lifitegrast  
Steroids  
IPL

**Amplification**

Cyclosporine  
Lifitegrast  
Steroids  
IPL

**Damage & Self-Perpetuation**

Cyclosporine  
Lifitegrast  
Steroids  
IPL

**Recruitment**

Cyclosporine  
Lifitegrast  
Steroids  
IPL

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### Address Each Driver

**Desiccation Stress**

**Tissue Damage**

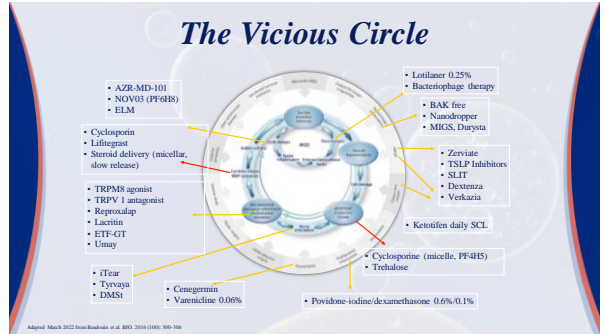
**Inflammation**

**OCULAR SURFACE**

18

- Restasis
- Xiidra
- Cequa
- Verkazia
- Autologous serum
- Platelet rich plasma, PRP
- Regener-eyes / biologics ( amniotic enhanced)
- Neurostimulation
- iTear100
- Salagen
- Evoxac
- Tyrveya
- Lotemax
- Eysuvis
- Steroids
- Nutraceuticals
- Bruder Mask
- Expression devices
- IPL
- LLT
- Night goggles
- Doxycycline

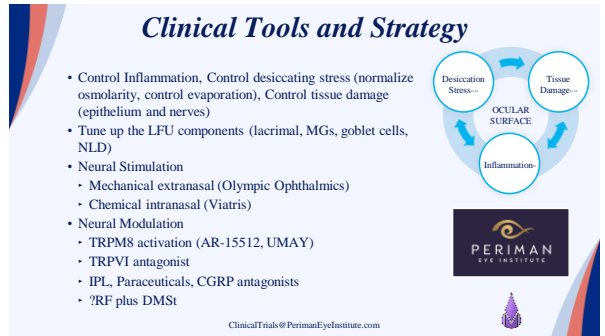
19



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- ### Lacrimal Functional Unit (LFU)
- Tear film
  - Lacrimal glands
  - Corneal and conjunctival epithelia
  - Meibomian glands
  - Homeostasis controlled by nerve connections and systemic hormones
- Batolino S et al. Prog Retin Eye Res. May 2012

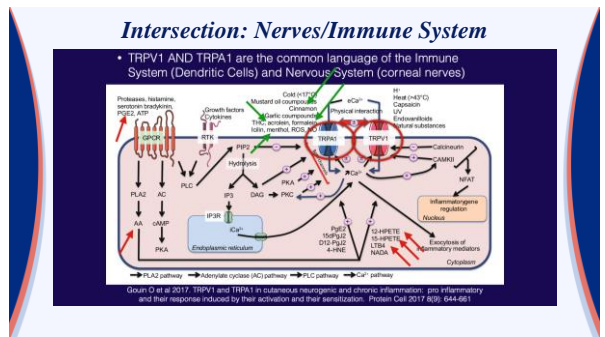
21



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- ### Neural MODULATORS
- Immunomodulators
    - steroids, CsA, LiG
    - Delivery systems
  - Neuralmodulators
    - Mechanical (iTear)
    - Chemical (Varenicline)
    - Growth factors (Cenegermin, Enriched Tear Function Gene Therapy-ETF-GT, mesenchymal secretosomes—KPI-012)
  - Neuroinflammatory modulators
    - TRPV1 antagonist
    - TRPM8 agonist
    - CGRP antagonist

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# Clinical Cases

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## IPL OPT then RF +DMSt

Morbihan's Rosacea

DryEye and MGD, lagophthalmos after quad blepharoplasty

Immediately after ZEST, OPT IPL

LM Periman MD

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## RF +DMSt

DryEye and MGD, lagophthalmos after quad blepharoplasty

Before and after TriLift #1

7.6

9.4

LM Periman MD

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## Neurocutaneous Inflammation

- IPL with OPT
- Dermaceutical grade skincare
- Skin microbiome
- Tacrolimus
- Paraceutical skincare that blocks C-nociceptors in the skin

Eczema exacerbation with swelling and severe itching. Itch score 80

Immediately following Poriman Protocol Itch score 30

LM Periman MD

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## Paraceuticals in management of cutaneous neurovascular inflammation

Chemical Irritants

www.noonaesthetics.com

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## CGRP: migraine, rosacea, neuropathic pain

- Dysregulation of inflammatory, vascular and neuronal systems
- C-nociceptors (target for paraceuticals)
- In office lines
- CGRP reducing strategies:
  - IPL, steroids, neurotoxins, CGRP antagonists

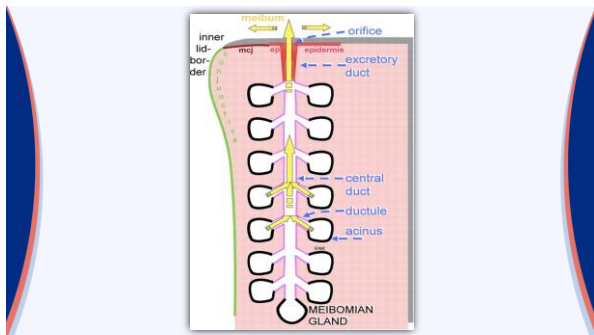
5 min after NOON SOS on one ear

Staschhoff M et al. Clinical, Cellular, and Molecular Aspects in the Pathophysiology of Rosacea. Journal of Investigative Dermatology Symposium Proceedings, 15(1), 2011.  
 Jongjaru S, Ouyang SB, Sillman KW. The role of calcitonin gene-related peptide in peripheral and central pain mechanisms including migraine. Pain. 2017 Apr;158(4):543-559. doi: 10.1093/pain/pnw00000000081. PMID: 28301400. PMCID: PMC5319794.

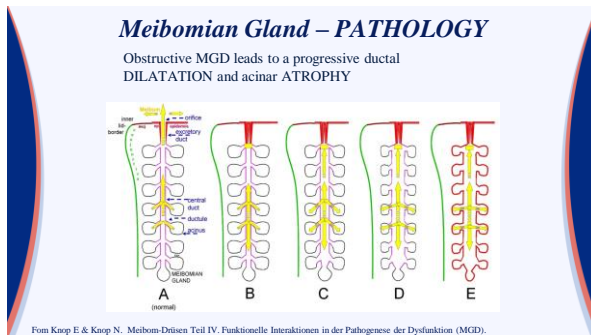
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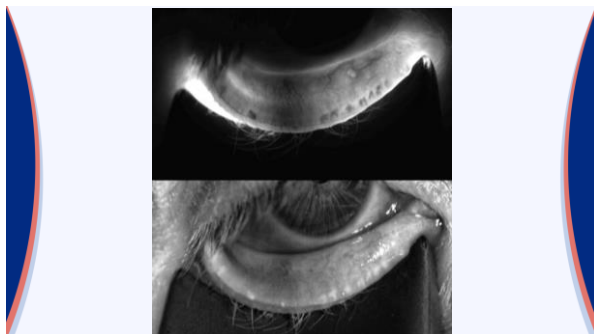




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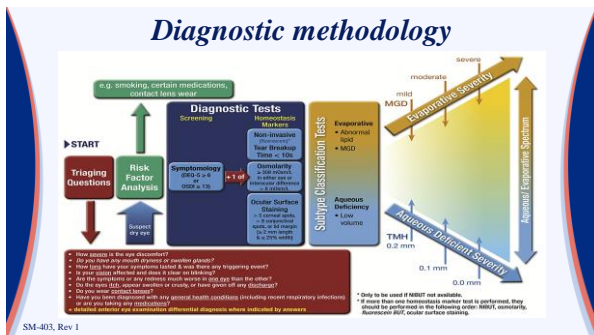
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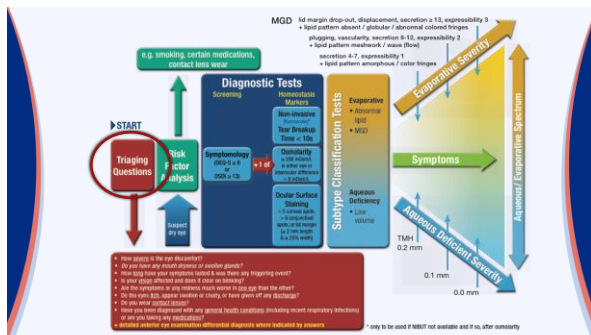
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48



### 5 Triaging Questions from OD Summit

- Do your eyes ever feel irritated, dry or burn?
- Are your eyes red?
- Do you experience blurred vision especially fluctuating vision?
- Do you use or have the urge to use artificial tears?
- How much time do you spend on digital devices per day?

Optometry Dry Eye Summit, Denver 2014

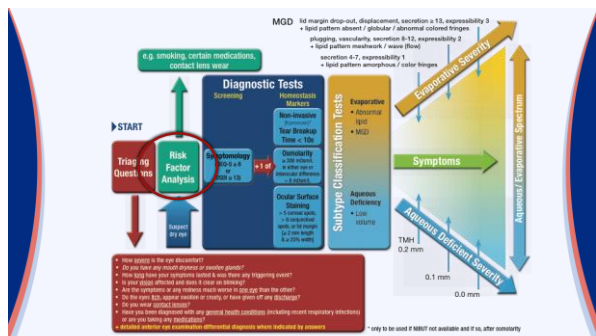
49

### 4 Triaging Questions from OD Summit

- Do your eyes ever feel irritated, dry or burn?
- Are your eyes red?
- Do you experience blurred vision especially fluctuating vision?
- Do you use or have the urge to use artificial tears?

Optometry Dry Eye Summit, Denver 2014

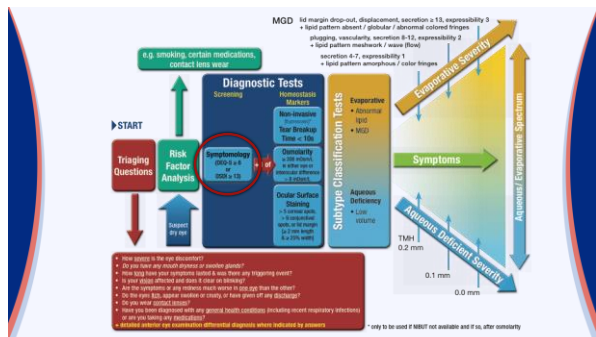
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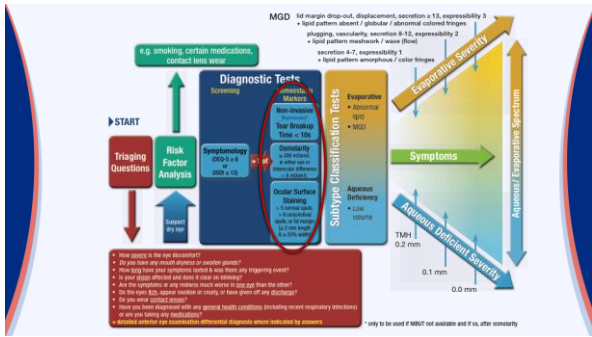
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53



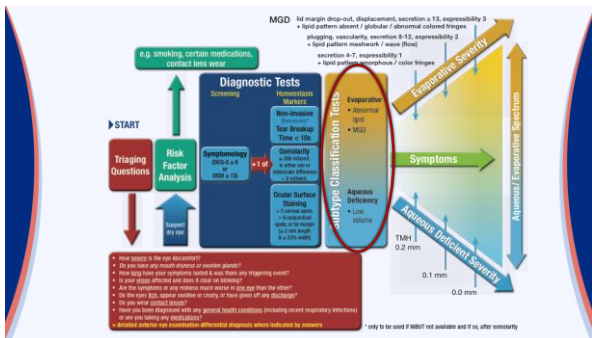
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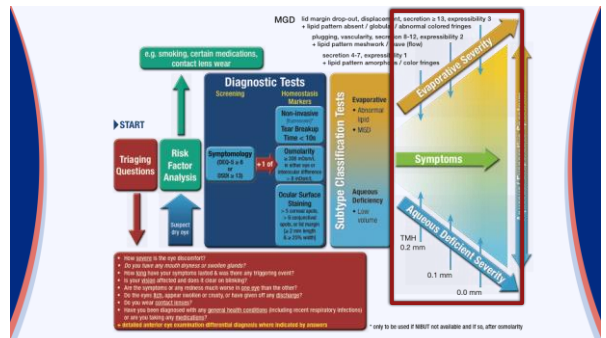
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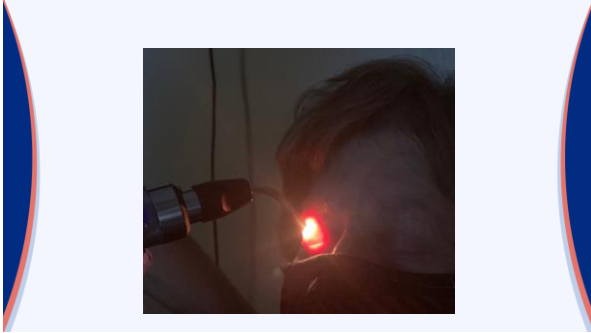
58

- In Chronological Order**
- Symptoms (most significant and when)
  - Eyelid assessment with MG expression
  - Ocular surface staining with NAFL (#15 yellow Wratten filter)
    - Corneal stain
    - Conjunctival stain
    - TFBUT
    - Tear meniscus height

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## *Perfluorohexyloctane*

### **Indication**

perfluorohexyloctane ophthalmic solution is a semifluorinated alkane indicated for treatment of the signs and symptoms of dry eye disease.

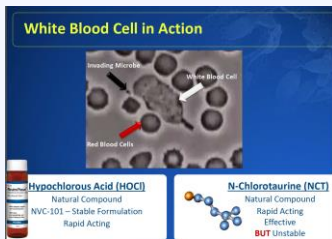
### **Important Safety Information**

- Should not be administered while wearing contact lenses. Contact lenses should be removed before use and for at least 30 minutes after administration
- Instruct patients to instill one drop of PFHO into each eye four times daily
- The safety and efficacy in pediatric patients below the age of 18 have not been established
- The most common ocular adverse reaction was blurred vision (1% to 3% of patients reported blurred vision and conjunctival redness)

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## *Eyelid Debridement*

64



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## *IPL and LLLT*

- Intense Pulsed Light Therapy and Low Level Light Therapy
- Clear association between DED and lid margin inflammatory disease
- Widely accepted as a treatment for dermatological rosacea
- More than 80% of patients with rosacea have MGD
- 20% have ocular signs first

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### Treatment: Demodex

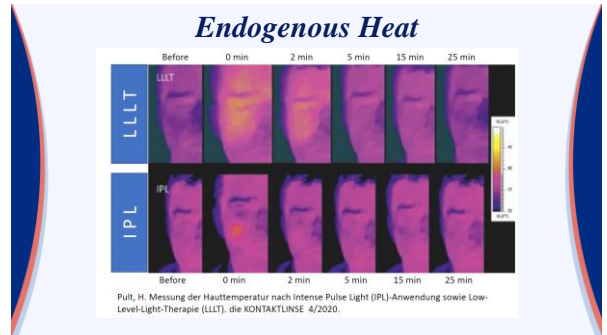


**Consists of a PHASE 1**  
(With a specific blue light mask)  
And a PHASE 2  
(With the standard supplied Red Light Mask)

**PHASE 1 – BLUE MASK**  
Blue light stimulates porphyrins and creates an anti-bacterial action.

**PHASE 2 – RED MASK**  
Red light stimulates ATP by increasing and improving cellular activity, it reduces inflammation and oedema and works on Meibomian glands.

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68

### Omega fatty acids and Dry Eye

- LA / GLA (ω-6)
- Increase "good" PG (PGE-1)
  - Against ocular surface inflammation
  - Increase tear production
- Positive action on lipid layer (Graham RH. There's nothing fishy about omega-3 fatty acids for Dry Eye Syndrome. [www.medscape.com/viewarticle/707984](http://www.medscape.com/viewarticle/707984). Sep 3, 2010.)
- Positive action on tear volume (Roncone M, Bartlett H, Eperjesi F. Essential fatty acids for dry eye: A review. *Cont Lens Anterior Eye* 2010; 33(2):49–54.)
- Help to maintain MG function (Macasai, 2008)



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### Supplemental GLA for Dry Eye:

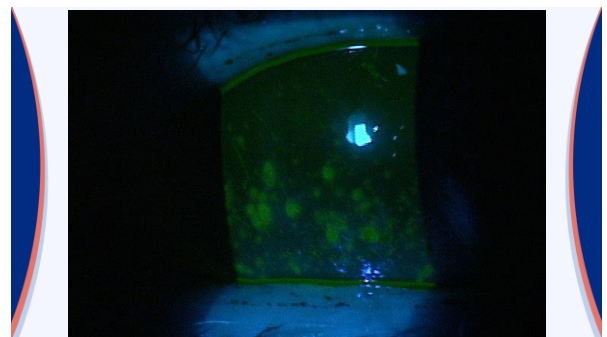
7 Controlled Clinical Trials

- Aqueous-deficient (Barabino S et al. *Cornea* 22:97–101, 2003.)
- PRK (Macri A et al. *Graefes Arch Clin Exp Ophthalmol* 241:561-6, 2003.)
- Sjögren's (Aragona P, et al. *Ophthalmol Vis Sci* 46:4474-9, 2005.)
- Contact lens (Kokke KH et al. *Contact Lens Ant. Eye* 31:141-6, 2008.)
- MGD (Pinnia et al. *Cornea* 26:260-264, 2007.)
- Mild-moderate DE (Brignole-Baudouin et al. *Acta Ophthalmologica* 89:e591-7, 2007.)
- Post-menopausal women (HydroEye) (Sheppard JD, Pflugfelder SC, et al. *Cornea* 32:1297-1304, 2013.)

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### Aqueous Deficient Dry Eye Disease Management

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### Artificial Tears

#### Aqueous Supplementation

- Viscosity enhancing agents
- Carboxymethyl Cellulose (CMC)
- Hydroxypropyl Cellulose (HPMC)
- Hyaluronic Acid (HA)
- Combined CMC and HA
- Hydroxypropyl Cellulose
- Hydroxypropyl-Guar (HP-Guar)
- HP-Guar + HA
- Osmotic agents
- Osmoprotectants
- Antioxidants
- Preservatives/inactive ingredients/electrolytes

#### Lipid Supplementation

- Emulsions:
  - Macro
  - Nano
  - Micro



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### Artificial Tears

#### Biological Tear Substitutes

- Autologous tear substitutes
- Adult allogenic serum
- Umbilical cord serum
- Platelet preparations

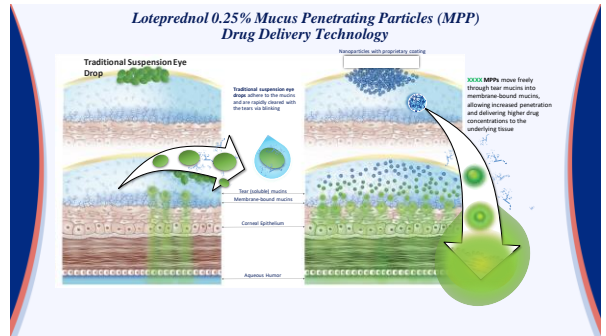
#### Other Agents

- Mucolytic agents
- TRPV1 receptor antagonist



<https://www.reviewofoptometry.com/article/how-and-why-to-make-autologous-serum>

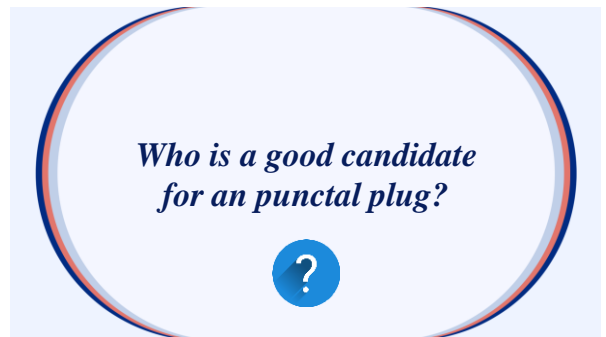
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## Aqueous Volume

- Indications:
  - Symptomatic contact lens wear
  - Dry eye related to refractive surgery
  - ADDE
  - Dry eye associated with a rapid TBUT
  - Systemic medications that reduce tear film production
  - Superior limbic keratoconjunctivitis (SLK)
  - Corneal irregularities or scarring that affect tear stability
  - Lid palsy or lid closure abnormalities
  - Toxic epitheliopathy
- Contraindications:
  - Presence of ocular surface inflammation could prolong the presence of pro-inflammatory cytokines
- A recent study showed that punctal occlusion resulted in:
  - ↓ corneal fluorescein staining
  - ↓ symptom scores
  - With no elevation of cytokine or matrix metalloproteinase (MMP)-9 levels

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## Punctal Plugs

- Complications of punctal occlusion:
  - Spontaneous plug extrusion
    - Occur in ~ 60% of cases
  - Infection
  - Canalicular migration of the plug
  - Pyogenic granuloma
  - Punctal enlargement
  - Tumors

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## Dry Heat Glass Bead Sanitizer

Suitable for all metal instruments including the Meibomian Gland Expression Instruments

Fast acting and easy to use:

- Chamber size: : 1 5/8" Diameter x 2 1/2" Deep.
- Chamber with glass beads heats to 250 °C in approximately 30 minutes
- Sanitizes in 30 seconds
- Electrical



Item #98201  
Replacement Beads.  
Contain 2 refills.

Item #98200  
Sanitizer with 1 bag of glass beads.

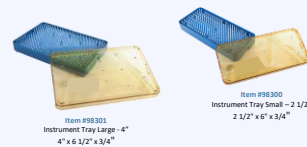
NOTE: Glass Bead Sanitizers are not FDA approved as sterilizers. Glass Bead sanitizers are a quick, easy and accurate alternative to traditional methods of disinfection and sanitizing.

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## Instrument Trays

Autoclavable instrument trays are ideal for instrument storage or transport.

Available in two convenient sizes.



Item #98302  
Instrument Tray Large - 4"  
4" x 6 1/2" x 3/4"

Item #98300  
Instrument Tray Small - 2 1/2"  
2 1/2" x 6" x 3/4"

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## Surgical Instrument Line

### Epilation Forceps

These forceps feature non-slip jaws/tips and an easy-grip, no slip handle for precise eyelash removal. German stainless.



### Punctal Plug Forceps

This instrument has a groove on the inside tip to hold the plug solidly in place during the procedure. Also if necessary the instrument can be turned 90 degrees to a flat side to push the plug into place. German stainless.



### Bandage Lens Forceps

This instrument has a narrow, but rounded tip. The application of a special coating instead of serration assures the bandage will not slip when being removed. Slide the forceps under the edge of the bandage lens and easily pick it off the eye. German stainless.



### Debrider

The instrument has a slightly curved tip with a "rip" edge on both sides. The edge is just right to remove the keratin easily by sliding the instrument, curve forward, along the eyelid in a single direction. German stainless.



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## Punctal Plugs

### Absorbable Plugs

- Temporary inserts
- Collagen-based plugs
- Absorb in 1- 16 week



### Non-Absorbable

- "Permanent" plugs
- Often silicone-based
- Types:
  - Freeman
  - Herrick
  - SmartPlug™
  - FORMFIT®



<https://kci-ophthalmics.com/dry-eye>  
<https://www.amcolabs.com/product/7134-SOFT-PLUGA®-Flow>

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## Amniotic Membrane Types

### Cryopreserved

**Pros**

- FDA Approved
- Proprietary Freezing Process
- Ease of use (fitting a contact lens)

**Cons**

- Requires refrigeration and space in office
- Has to be thawed before use
- Ring placement can be uncomfortable
- Shorter shelf-life
- Price

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## Amniotic Membrane Types

### Dehydrated

- Pros
  - Patient comfort
  - Variety of sizes
  - Reduced cost
  - Ease of use
- Requires BCL for retention or Lid Seal
- BCL can cause hypoxia
- Amniotic Membrane
  - Sizes: 8mm, 10mm, 12mm & 14mm
  - Stored at room temperature
  - Shelf life of 5 years
- Product can be placed either side down on ocular surface

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Neurotrophin-3/Neurotrophin-4	NT-3/NT-4
Basic fibroblast growth factor	bFGF
Beta nerve growth factor	β-NGF
Epidural growth factor/Epidermal growth factor receptor	EGF/EGF-R
Glial cell line-derived neurotrophic factor	GDNF
Heparin binding growth factor	HB-EGF
Hepatocyte growth factor	HGF
Platelet-derived growth factor	PDGF-AA/PDGF-BB
Placenta growth factor	PlGF
Stem cell factor	SCF/SCF-R
Transforming Growth Factor Alpha	TGFα/TGFβ1/TGFβ3
Vascular endothelial growth factor	VEGF

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Protein	Abbreviation
Growth differentiation factor 15	GDF-15
Interleukin 1α	IL-1α
Interleukin 1 Beta	IL-1β
Interleukin 1 receptor antagonist	IL-1ra
Interleukin 12 p40	IL-12p40
Interleukin 17	IL-17
Osteoprotegerin	OPG
Interleukin 8	IL-8
Interleukin 6	IL-6
Interleukin 4	IL-4
Interleukin 5 receptor	IL-5R
Macrophage colony-stimulating factor 1 receptor	M-CSF R
B lymphocyte chemoattractant [CXCL13]	BLC
Eotaxin 2	Eotaxin-2

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## Ocular Surface Disorders

Diseases with Pre-existing Epithelial Defects to promote wound healing and reduce complications (Indications to options)	Diseases without Epithelial Defects to prevent further damage and promote regeneration (for debridement/PTK)	Diseases with Unhealthy Epithelium or Basement Membrane to promote regeneration (after debridement/PTK)
<ul style="list-style-type: none"> <li>• neurotrophic persistent corneal epithelial defect</li> <li>• post-infectious recalcitrant corneal ulcers (e.g. herpetic, venereal, and bacterial)</li> <li>• non-healing epithelial defect after PTK/PTK</li> <li>• acute chemical/thermal burns</li> <li>• acute Stevens-Johnson syndrome/toxic epidermal necrolysis</li> </ul>	<ul style="list-style-type: none"> <li>• dry eye syndrome</li> <li>• superficial (punctate) keratitis</li> <li>• filamentary keratitis</li> <li>• radiation keratitis; wheel patterns</li> <li>• indicators of limbal stem cell injury</li> <li>• exposure (Graves) keratopathy</li> </ul>	<ul style="list-style-type: none"> <li>• recurrent corneal erosions, EBMD</li> <li>• Substant's nodular degeneration</li> <li>• bulbous keratopathy during/following DSEK</li> <li>• haze after PTK</li> <li>• partial limbal stem cell deficiency</li> <li>• corneal dystrophy (e.g., Reis-Bückler)</li> </ul>

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## Action of Growth Factors in Serum

- Cellular proliferation
- Migration
- Differentiation
- Apoptosis
- Intercellular communication

### Autologous Serum Tear Substitutes

First described 1984 by Fox et al (See KCLL, more after success in eyes with persistent epithelial defects (Tsubota et al 1995))

	YEARS	SERUM
PH	7.4	7.4
Osmolality	300	300
Albumen (mg/dl)	2.4	35.00
Epil (mg/ml)	2.0	0.02
TGF-β (ng/ml)	0.02	0.02
Insulin (μg/ml)	0.1	0
Lysozyme (mg/ml)	0.02	0
High (mg/ml)	0.02	0
Fluorescein (mg/ml)	0	0.05

Prepared by Dr. SGL, Dr. L. Substantia P. (Lentemaster, Farnham Dr., GPP, other, etc.)

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## Autologous Serum Tear Substitutes

	TEARS	SERUM
pH	7.4	7.4
Osmolality	298	296
Albumin (mg/l)	54	35-55
EGF (ng/ml)	1.5	0.7
TGF- $\beta$ (ng/ml)	2-10	6-33
Vitamin A (ng/ml)	0.02	46
Lipocytase (ng/ml)	1.4	6
SIgA (ng/ml)	1190	2
Fibrinogen (ng/ml)	21	205

Hyaluronate G1, HGF, IGF-1, Substrance P, Complement, Fibronectin G1, G100, 0.1% BSA

First described 1984 by Fox et al (for KCS), more after success in eyes with persistent epithelial defects (Tsubota et al 1999)

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## National Outfit for ASED

- Present in almost every major city in the US
- Blood draw at patients home or work
- Processing
- Regular replacement
- Doctors must specify concentration
  - 20% for most patients
  - 40% for GVHD etc.

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## KOL Serum Tears Survey

### Overview

**Six Respondents**

- Victoria Chin, OD, Mann Eye Institute
- Paul Karpecki, OD, Kentucky Eye Institute
- Marjan Farid, MD, University of California, Irvine
- Pedram Hamrah, MD, New England Eye Center --Tufts
- Shachar Tauber, MD, Mery Clinic Eye Specialists
- Winston Chamberlain, MD, Casey Eye Institute

### Key Questions

- How do you **decide on starting therapy** with serum tears in a dry eye patient with unspecified symptoms or significant MGD?
- What is your **preferred starting formulation** of serum tears?
- Are there **particular types of patients** you have found **respond well to serum tears**?
- What **percentage of moderate and severe patients** do you prescribe serum?

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## KOL Serum Tears Survey Results

### What is the preferred starting formulation?

01	02	03	04	05	06
40%	75%	20%	40%	50%	20%
4	8	8	6	6	6
Times/D ay	Times/D ay	Times/D ay	Times/D ay	Times/D ay	Times/Day

**Take Aways**

Survey Answers Varied  
 Rx Data Average Shows:  
 • >60% Providers in 2020  
 • Began with 20% 4-8 Drops/Day

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## KOL Serum Tears Survey

### What percent of moderate and severe DED patients do you put on serum tears?

01	02	03	04	05	06
10% Moderate	50% Moderate	30-50% Moderate	20% Moderate	Those that aren't bothered by cost or inconvenience of draws may start with moderate symptoms	10-15% Moderate
50-60% Severe	90% Severe	70-80% Severe	100% Severe	70-80% Severe Would be 100% if cost wasn't a factor	90%+ Severe

**Take Aways**

- Average: 15-30% in Moderates and 60-100% in Severe

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## KOL Serum Tears Survey Results

### Who responds the best to serum tears?

01	02	03	04	05	06
Inflammatory etiology (rheumatologic, IBS, Gout, Rosacea, severe allergies).	Most patients with DED respond well	Patients with surface disease do well as long as not severe stage I NK.	Auto immune, Herpetic, Neurotrophic Pts.	GVHD, Sjogrens	GVHD, Sjogrens, NK

More severe disease, including GVHD and Sjogren's  
 YES for neuropathic pain patients, maybe for neurotrophic keratitis

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## *SCLERAL LENSES*

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## *Mucin Deficient DED*

- Stage 1: Conjunctival staining
- Stage 2: Mucin strands
- Stage 3: Filamentary keratitis

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## *Exposure Desiccation: Inadequate Lid Seal (ILS)*

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## *Morning Symptoms*



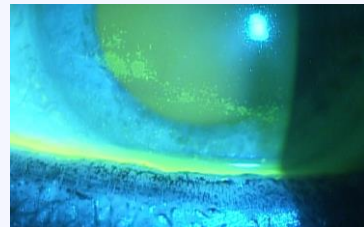
100

## *Most patients with Inadequate lid seal (ILS) simply have Morning Symptoms*

- With progression, patients may develop MGD or blepharitis
- With further progression, desiccation stress/exposure occurs and inferior corneal staining may be noted
- Patients may eventually develop immune mediated dry eye, but the vast majority don't have dry eye, they have ILS.
- When ILS is treated they typically do not need dry eye therapies

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## *Title*



Inferior Stain indicates non-lid seal (ILS)

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### ILS (Inadequate Lid Seal)

- And leads to nocturnal evaporative stress, desiccation and eventually exposure keratitis
- It is NOT lagophthalmos
- It is a major cause of dry eye
- Overnight eye seals
  - Hypoallergenic
  - Oxygen permeable
  - Latex-free
  - Adequate mild adhesive
  - Sensitive and regular



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### Title

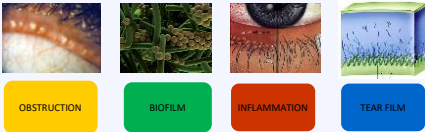
Loteprednol ointment is a new **preservative-free** steroid ointment.



Loteprednol ointment is a corticosteroid indicated for the treatment of post-operative inflammation and pain following ocular surgery.

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### The Four areas of OSD



...that should be part of a comprehensive OSD diagnosis  
Paul : take it away

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<ul style="list-style-type: none"> <li>• Blink exercises</li> <li>• Moist heat compress</li> <li>• Lid debridement</li> <li>• Thermal expression</li> <li>• LLLT/IPL</li> <li>• Lid seals</li> </ul>	<ul style="list-style-type: none"> <li>• Blepharoxfoliation</li> <li>• Hypochlorous acid</li> <li>• Manuka vs. Tea Tree</li> <li>• Surfactant cleansers</li> <li>• LLLT/IPL</li> </ul>	<ul style="list-style-type: none"> <li>• Lifitegrast</li> <li>• Cyclosporine</li> <li>• Corticosteroids</li> <li>• Omega fatty acids</li> <li>• PO Doxycycline</li> <li>• PO Azithromycin</li> <li>• Topical macrolides</li> <li>• IPL</li> </ul>	<ul style="list-style-type: none"> <li>• Artificial tears</li> <li>• Environment changes</li> <li>• Increase hydration</li> <li>• Neurostimulation</li> <li>• Brimonidine 0.25%</li> </ul>
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### Meibomian Gland Expression

- Schaeffer Eye Protocol
- OSD Evaluation
  - Includes test expression
  - All staining
- RTC expression
  - At home heat with eye medibeads
  - 2) 15-20 minutes in waiting room with Bruder's heat pack ( or rear wait)
  - 3) Expression 1 of 3
  - 4) RTC 2 weeks

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### Manual expression

Pre-treatment  
LEO  
L=Liquify  
E=Express  
O=Observe

O'Dell L. In-office manual expression. In press.

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### ***Meibomian Gland Expression***

- Fees: 99213 or 99214 OSD evaluation Pre expression
- Plus: Out of pocket expense for expression
- ABN
- Covers 2 Office visits
- Per visit fee after initial two visits