

Course # 141

SECO2026
THE EDUCATION DESTINATION™

Boat Anchors, Devices or Toys? Pathways to Dry Eye Success

Jeff Michaels, OD, MBA, FAAO

Please Silence All Mobile Devices.
attendseco.com

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Disclosure statements:
CSI Dry Eye Software: Speaker's Bureau | Lumenis: Speaker's Bureau


All relevant relationships have been mitigated.

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Financial Disclosures

Jeff Michaels, OD, MBA, FAAO

CSI Dry Eye Software	Consultant
Lumenis Vision	Speaker, Consultant
Optometry 360	Advisory Panel

All have been removed or mitigated ◆ Provide me feedback if you feel otherwise
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What's Up?

- 01 DEWS III (& DEWS II)
- 02 Boat Anchors?
- 03 Devices.
- 04 Toys!

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Today's Concept

- ◆ ◆ ◆  **—Boat Anchors**
Financial outlays that go nowhere in our office
- ◆ ◆ ◆  **—Devices**
The stuff we cannot live without
- ◆ ◆ ◆  **—Toys**
Now we are just having fun

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Where are we going today?



Diagnostics



Light Devices



Muscle Stim



Meibum Melt



Massaging



Lid Hygiene


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If money was no object...

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My Anchor

Diopsys



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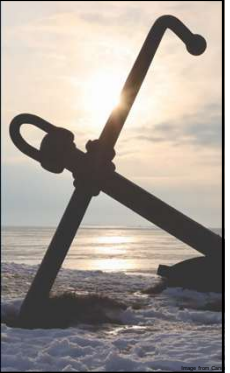
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“I hope it becomes an anchor” says nobody


Doctor Paradigm
You aren't using the right artificial tear...
In your heart of hearts...

Process
Systems, consents, patient flow, reimbursement, consumables
Can you start using it on Monday morning?

Ongoing Staff Training
Sally is the only one trained how to do that...
...and she left 6 months ago



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ROI

QOL
Patient need
Eventually they leave

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Ask...



What Anchors are Holding YOU Back?

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**How do we treat
wet Macular Degeneration?**
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 ◊ ◊
 ◊ ◊

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**How do we treat
Dry Eye Disease?**
 ◊ ◊
 ◊ ◊
 ◊ ◊

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 ◊ ◊
 ◊ ◊
Dry Eye Disease Treatments
 ◊ ◊
**Still missing large population-based
prospective, double masked
treatment outcome,
randomized clinical trials**
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Out with the Old

<p>DEWS II</p> <p>Aqueous Deficient v Evaporative Mixed</p> <p>Accompanied by symptoms AND Specific diagnostic tests</p> <p>Step-wise approach to treatment One size fits all</p>	<p>DEWS III</p> <p>Truly multifactorial</p> <p>Symptoms AND Specific diagnostic tests</p> <p>Drivers that get to the root cause Multi-treatment approach</p>
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TFOS DEWS III
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“Dry eye is a multifactorial, *symptomatic disease* characterized by a loss of homeostasis of the *tear film and/or ocular surface*, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities are etiological factors”

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TFOS DEWS III
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Treatment requires a personalized, multifaceted approach that considers the underlying causes and patient-specific factors...

...growing evidence supports the importance of optimizing meibomian gland function...

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TFOS DEWS III

Multiple treatments used together are the likely, and most appropriate management strategy, considering that DED has multiple pathogenic drivers

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TFOS DEWS III

MGD is typically treated with warm compresses and a wide variety of in-office treatments, including device-driven technologies to warm the eyelids, IPL, LLLT, and other new and emerging technologies

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TFOS DEWS II

~~Based on Signs & Symptoms~~

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Standardized

Screening
Best testing protocols

Diagnosis
Identify the underlying factors

Based on Signs & Symptoms

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Symptoms plus Tear Film Instability and/or Ocular Surface Staining

Symptoms
Ocular Surface Disease Index 6 (OSDI-6) ≥ 4

Tear Breakup Time
Non-invasive <10 seconds
Traditional fluorescein TBUT < 5 seconds

Osmolarity
≥ 308 mOsm/L or >8 mOsm/L difference between eyes

Cornea, Conjunctiva, Lid Staining
> 5 punctate stains on cornea (fluorescein)
> 9 punctate stains on conj (lissamine)
≥ 2mm stain and ≥ 25% eye lid width (lissamine)

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OSDI-6

	Constantly	Mostly	Often	Sometimes	Never
Have you experienced any of the following during a typical day within the last month?					
1. Eyes that are sensitive to light?	4	3	2	1	0
2. Vision blurring between blinks (with your refractive correction if needed)?	4	3	2	1	0
Symptoms and visual disturbance subscale ⇨					
Have problems with your eyes limited you in performing any of the following during a typical day within the last month?					
3. Driving or being driven at night?	4	3	2	1	0
4. Watching TV, or a similar task?	4	3	2	1	0
Visual function / tasks subscale ⇨					
Have your eyes felt uncomfortable in any of the following situations during a typical day within the last month?					
5. Windy conditions?	4	3	2	1	0
6. Places or areas with low humidity?	4	3	2	1	0
Environmental subscale ⇨					

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OSDI-6

	Commonly	Often	Sometimes	Never	
Have you experienced any of the following during a typical day within the last month?					
1. Eyes that are sensitive to light?	4	3	2	1	0
2. Vision blurring between blinks (with your refractive correction if needed)?	4	3	2	1	0
Symptoms and visual disturbance subscale ⇨					
Have problems with your eyes limited you in performing any of the following during a typical day within the last month?					
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Have your eyes felt uncomfortable in any of the following situations during a typical day within the last month?					
5. Windy conditions?	4	3	2	1	0
6. Places or areas with low humidity?	4	3	2	1	0
Environmental subscale ⇨					

Indexed

0-3: Normal
4-8: DED
>8 Severe DED

Easy for kids?

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Subclass the Underlying Cause

Tear Film Deficiency

Lipid, Aqueous, Mucin/Glycocalyx

Eyelid Anomalies

Blink, Lid Seal/Closure
Lid/Lash Health, Anterior Bleph, Demodex
MGD, Blofilm

Ocular Surface Abnormalities

Anatomical misalignment
Conjunctivalchhalasis
Pinguecula and Pterygium
Neural Dysfunction

Cellular damage
Lid Wiper
Inflammation/Oxidative Stress
Bulbar redness
Inflammation Mediators In Blood & Serum

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Not to Mention

- ◆ Systemic Diseases
- ◆ Hormones
- ◆ Sex
- ◆ Lifestyle
- ◆ Environmental
- ◆ Iatrogenic

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DEWS II⁺ Staged Management of Treatment for DED

1. Educate about disease
Lifestyle / Environment / systemic meds modification
Artificial tears
Essential fatty acids
Lid hygiene / Warm compresses
2. Intense pulsed light
In-office heat & expression
NPAT
Tea tree oil for Demodex
Plugs / moisture chamber
Topical Rx's: antibiotics, steroids, immunomodulators, LFA-1 antagonists
Oral tetracycline
3. Autologous serum drops
Oral secretagogues
Therapeutic contact lenses
4. Long-term topical steroids
Amniotic membranes
Surgical occlusion
Other surgeries: tarsorrhaphy

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DEWS III "Test Drivers"

Tear Film Deficiency	Eyelid Anomalies	Ocular Surface Abnormalities
ETIOLOGIC DRIVER TESTS	ETIOLOGIC DRIVER TESTS	ETIOLOGIC DRIVER TESTS
Lipid	Blinking / lid closure	Anatomical misalignment
Tear film lipid layer thickness / interferometry	Incomplete blinking	Biomicroscopy e.g. pterygium, LIPCOF / conjunctivochhalasis, ectropion / entropion, lagophthalmos
Meibomian gland expressibility	Anterior blepharitis	Pharmacological tear stimulation / restoration
Meibum quality	Eyelid biomicroscopy - greasy (seborrhoeic) or flaky (staphylococcal)	Device tear stimulation / restoration
Aqueous	Eyelash base - cylindrical dandruff - Demodex	Blink therapies
Tear meniscus height	Meibomian gland dysfunction	Topical lid hygiene
Meniscometry / Schirmer / phenol red thread test	Putting, missing, displaced gland orifices	Oral nutrition (Omega 3)
Mucin / glycocalyx	Meibomian gland expressibility	Tear supplementation / stabilization
Lissamine green / rose bengal staining	Meibography - truncated, dilated glands, 'drop out'	Tear conservation devices
Conjunctival impression cytology	Telangiectasia	Pharmacological / device tear stimulation / restoration
	Lid margin keratinization	Oral anti-inflammatories
		Device tear stimulation / restoration
		Topical anti-inflammatories
		Device tear stimulation (neurostimulation)
		Surgical options
		Topical lid hygiene
		Oral nutrition (omega 3)
		Tear supplementation / stabilization (HP guar)
		Topical anti-inflammatories
		Pharmacological tear stimulation
		Device tear stimulation (neurostimulation)

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DEWS III Treatment Algorithm

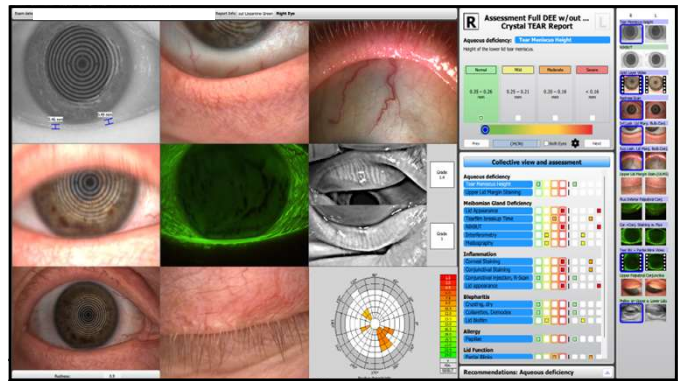
Tear Film Deficiency	Eyelid Anomalies	Ocular Surface Abnorm/Inflamm
EVIDENCE-BASED INTERVENTIONS	EVIDENCE-BASED INTERVENTIONS	EVIDENCE-BASED INTERVENTIONS
Lipid	Blinking / lid closure	Anatomical misalignment
Tear supplementation / stabilization (lipid mimetics)	Blink exercises	Surgical options
Tear conservation devices (moisture retaining spectacles)	Anterior blepharitis	Topical lid hygiene
Pharmacological tear stimulation / restoration	Topical lid hygiene	Tear supplementation / stabilization
Device tear stimulation / restoration	Oral antibiotics	Surgical options (punctal occlusion)
Blink therapies	Meibomian gland dysfunction	Cellular damage / disruption
Topical lid hygiene	Oral nutrition (vitamin D3)	Oral nutrition (vitamin D3)
Oral nutrition (Omega 3)	Tear supplementation / stabilization (lipid based, androgen)	Tear supplementation / stabilization
Tear supplementation / stabilization	Pharmacological tear stimulation / restoration (topical acetylmethylc, selenium sulfide)	Device tear stimulation / restoration
Tear conservation devices	Device tear stimulation / restoration (intra and external lid heating, IPL, LLLT, QMIR, radio-frequency)	Ocular surface regenerators
Pharmacological / device tear stimulation / restoration	Lid margin debridement for significant keratinization	Topical anti-inflammatories
Topical anti-inflammatories	Oral antibiotics	Surgical options (punctal occlusion)
Device tear stimulation / restoration		Topical anti-inflammatories
Oral anti-inflammatories		Device tear stimulation / restoration (IPL)
Pharmacological tear stimulation		Topical lid margin hygiene / debridement
Device tear stimulation (neurostimulation)		Topical anti-inflammatories
		Ocular surface regenerators (keratinocyte membrane)
		Surgical options (external occlusion)

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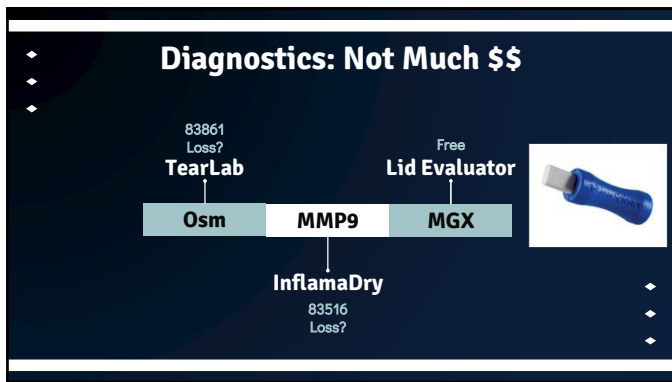
DEWS III "Test Drivers"

Tear Film Deficiency	Eyelid Anomalies	Ocular Surface Abnormalities
ETIOLOGIC DRIVER TESTS Lipid Tear film lipid layer thickness / Interferometry Meibomian gland expressibility Meibum quality Aqueous Tear meniscus height Meniscometry / Schirmer / phenol red thread test Mucin / glycoalyx Lissamine green / rose bengal staining Conjunctival impression cytology	ETIOLOGIC DRIVER TESTS Blinking / lid closure Incomplete blinking Anterior blepharitis Eyelid biomicroscopy - greasy (seborrheic) or flaky (staphylococcal) Eyelash base - cylindrical dandruff - Demodex Meibomian gland dysfunction Pouting, missing, displaced gland orifices Meibomian gland expressibility Meibography - truncated, dilated glands, 'drop out' Telangiectasia Lid margin keratinization	ETIOLOGIC DRIVER TESTS Anatomical misalignment Biomicroscopy e.g. pterygium, LPCOF / conjunctivochalasis, ectropion / entropion, lagophthalmos Neural dysfunction Corneal sensation In vivo confocal microscopy Cellular damage / disruption Cornea (fluorescein) Bulbar Conjunctiva (lissamine green) Lid wiper epitheliopathy (lissamine green) Inflammation / oxidative stress Bulbar conjunctival hyperemia Inflammatory markers

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Besides slit lamp, what diagnostic alters your clinical decisions?

A grid of 12 eye images showing various diagnostic test results, including interferometry, meibography, and clinical observations of the eye surface.

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DEWS III Test Drivers & Treatments

ETIOLOGIC DRIVER TESTS	CATEGORIES	SECTION	EXAMPLES	LIPIDS	AQUEOUS	MUCIN / GLYCOCALYX
Tear film lipid layer thickness / Interferometry	Corneal Aberrations	2	Polystyrene risk factors	None	None	None
Meibomian gland expressibility	Orbitals	9	Omega 3, Vitamins	None	Omega 3	None
Meibum quality	Tear	3.1	Artificial tears, Substitutes	Artificial tears	Artificial tears	None
Tear meniscus height	Tear	3.2	Punctal plugs, Moisture enhancing ophthalmics, Contact lens systems	None	None	None
Schirmer / phenol red thread test	Pharmacological	3.3	Neurostimulation	None	None	None
Mucin / glycoalyx	Device and	3.3	Medial and lateral canaliculi therapy, Low level light therapy	None	None	None
Lissamine green / rose bengal staining	Weak	4.3	Risk factors	None	None	None
Conjunctival impression cytology	Treatment	4.2	Moxifloxacin, Azithromycin, Rifampin, Cyclosporin A	None	None	None
	Topical	5	Artificial tears, Contact lens systems	None	None	None
	Systemic	7.1	Systemic immunomodulators	None	None	None
	Ocular Surface	8.1	Systemic immunomodulators	None	None	None

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DEWS III Test Drivers & Treatments

Eyelid Anomalies

ETIOLOGIC DRIVER TESTS	CATEGORIES	EVIDENCE	HARMFUL	BLINKING / LID CLOSURE	ANTERIOR BLEPHARITIS	POSTERIOR LID MARGIN DYSFUNCTION
Blinking / lid closure	420	207	247			
Incomplete blinking						
Anterior blepharitis						
Eyelid biomicroscopy - greasy (staphylococcal)						
Eyelash base - cylindrical dandruff - Demodex						
Meibomian gland dysfunction						
Routing, missing, displaced gland orifices						
Meibomian gland expressibility						
Meibography - truncated, dilated glands, "drop out"						
Telangiectasia						
Lid margin keratinization						

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DEWS III Test Drivers & Treatments

Ocular Surface Abnormalities

ETIOLOGIC DRIVER TESTS	CATEGORIES	EVIDENCE	HARMFUL	BLINKING / LID CLOSURE	ANTERIOR BLEPHARITIS	POSTERIOR LID MARGIN DYSFUNCTION
Anterior misalignment						
Biomicroscopy e.g. pingueculi, LIPOF, Folliculocystitis, ectopic keratinization, telangiectasia						
In vivo confocal microscopy						
Cornea (fluorescein)						
Bulbar conjunctiva (issamine green)						
Lid wiper epitheliopathy (issamine green)						
Inflammation / ocular surface stress						
Bulbar conjunctival hyperemia						
Inflammatory markers						

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Need Decision-Making Help?

CSI Dry Eye Software
It's own EHR

Evidence-based Management
DEWS II & III

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Light Devices

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I see the light!

Intense Pulsed Light
FDA approval, off label uses

Low-Level Light Therapy
FDA approval, off label uses

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IPL Basics

- Applies heat in the form of light
- Selectively targets specific skin layers
- Disperses heat to adjacent areas
- Destroys inflammatory cells
- Targets melanin and abnormal vessels

Lumenis OptiLight IPL is the only FDA approved device for MGD

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Off-Label IPL and Combo Devices

EyeLight MDElite Rhorer EEye IRPL Cynosure Clarion

MANY MORE

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Thank Jeff Bezos...

Rosacea treatment device for at home, clinic or salon treatments, best results, best customer reviews

1999

25% OFF (Expires in 24 hours)

Amazon Prime Rewards Visa Card

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How IPL Works?

Photo-Biomodulation	Broad wavelength lamp emission	Heat absorbed by chromophores	Filters control penetration depth
Photothermolysis Stimulates Heat Shock Proteins (HSPs)*	400-1200nm Visible: 380-700nm Infrared 700-1400nm	Melanin 400-750nm Hemoglobin 578nm	

*Type II, et al. (2022) IPL improves signs and symptoms of DED due to MGD. PLoS ONE 17(6)

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IPL Filters – How to Control Depth!

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Most Common Filters for DED

Dry Eye Filter ✓ 590nm	<p>420 515 560 590 615 640 695 800</p> <p>Acne Vascular Pigment Vascular Pigment Darker skin Hair Skin tightening</p>
Rosacea Filter ✓ 560nm ✓ More "aggressive" ✓ Energy more superficial ✓ Off-label for DED	

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Fitzpatrick Skin Type Scale:

Type I Light, Pale White	Type II White, Fair	Type III Medium White to Olive	Type IV Olive Tone	Type V Light Brown	Type VI Dark Brown
Always burns, never tans	Usually burns, tans with difficulty	Sometimes mild burn, gradually tans to olive	Rarely burns, tans with ease to moderate brown	Very rarely burns, tans very easily	Never burns, tans very easily, deeply pigmented

Image from SKLabs.com

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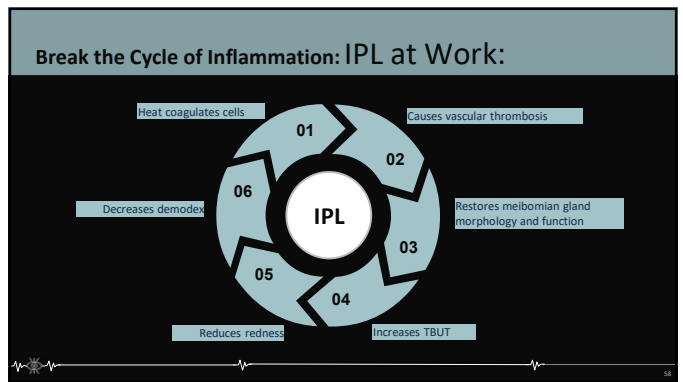
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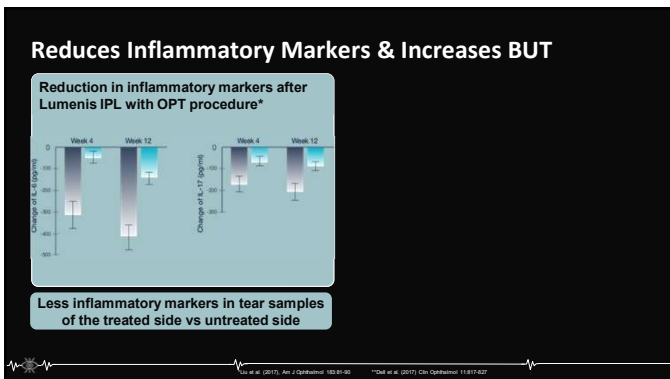
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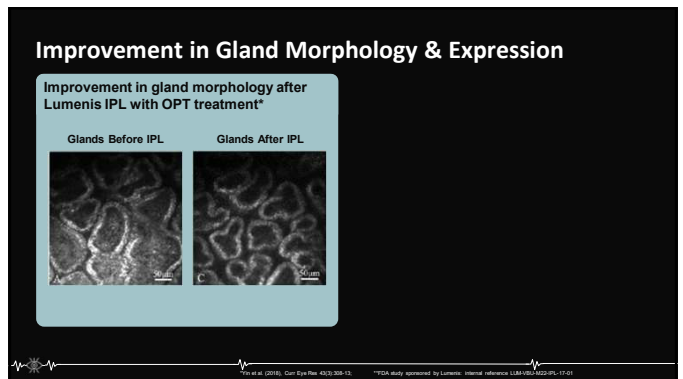
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Dry Eye Protocol


FDA Protocol

- ✓ 4 Treatments
- ✓ Every 2-4 weeks

*Maintenance treatments can be structured many ways



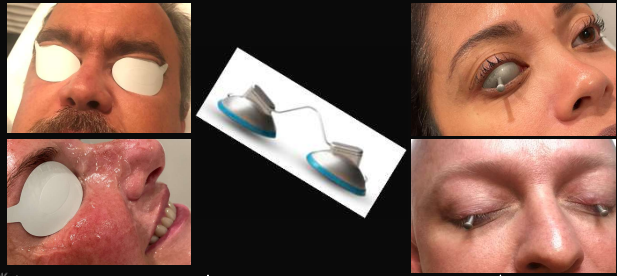
- Large IPL handpiece
- Wider areas with higher energy levels



- Smaller hand-piece
- Fits contours around the eyes

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FDA Requirement – Patient Protection



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Chalazion Off-Label Treatment


Periman Protocol

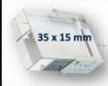
Step 1 Large light guide: deliver full face rosacea treatment (Fitzpatrick skin type presets)

Step 2: Toyos settings double pass in V2 distribution 590 nm filter, triple pulse, double pass, 14 J/cm²


Step 3: Switch to small light guide. Same Toyos settings to upper lids and lower lids, double pass, 14 J/cm²

Step 4: Stack three extra Toyos pulses on top of the chalazion





35 x 15 mm



15 x 8 mm

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Chalazion B/A




Pico Stitch

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Off-Label Applications for IPL

Rosacea	3ms/25ms, triple pulse, 560nm filter, ~18J/cm ²
Facial telangiectasia	3.5ms/25ms, double pulse, 560nm filter, ~16J/cm ²
Hemangiomas	4ms/20ms, double pulse, 560nm filter, ~17J/cm ²
Lentigines	4ms, single pulse, 560nm filter, ~ 13J/cm ²

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Off-label

Use in your office
Legal

Advertise to the public
Not legal
- Social Media, website, etc

U.S. Code § 331 - Prohibited

S. Code Notes Authorities (CFR)

The following acts and the causing thereof are prohibited:

(a) The introduction or delivery for introduction into interstate commerce of any food, drug, device, tobacco product, or cosmetic that is adulterated or misbranded.

(b) The adulteration or misbranding of any food, drug, device, or cosmetic in interstate commerce.

(c) The receipt in interstate commerce of any food, drug, device, or cosmetic that is adulterated or misbranded, and the delivery of such food, drug, device, or cosmetic for pay or otherwise.

(d) The introduction or delivery for introduction into interstate commerce of any food, drug, device, or cosmetic in violation of section 344, 350d, 355, 360bbb-3, or 364c of this title.

(e) The refusal to permit access to or copying of any record or information maintained by or for the United States, or the failure to establish or maintain any record, or make any record available for copying.

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IPL Contraindications

- Only Aqueous Deficient DED
- Zero meibomian glands remaining in eyelids
- Fitzpatrick Skin Type V & VI
- Active skin lesions: herpes, acne, Lupus, other
- Eye surgery < 6 months
 - Intraocular or eyelid
- History of migraines, seizures or epilepsy
- Neuro-paralysis < 6 months
- Recently tanned (3 weeks)
 - Superficial pigment cells over vascular layer of skin
- Sun sensitive medication or herbs
 - Tetracycline, Doxy, Isotretinoin, St John's Wort
 - Off meds x 2 weeks
 - Off Accutane x 6 months
- Fillers/Botox
- Pre-cancerous lesions
- Immunocompromised
- Recent chemotherapy or planned chemotherapy
- Recent radiation or planned radiation of head/neck
- Pregnant / Nursing

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Consumables for IPL

- Ultrasound/Coupling Gel
 - \$50 for 5 liters
- Patient Eye Protection (stickers)
 - \$1.44 per OU treatment
- Disposable headbands
- Popsicle sticks/Tongue Depressor
- Alcohol pads or wipes
- Latex gloves?
- Gentle Make Up Wipes
- Protex ultra disinfection wipes (for equipment)
- Kleenex
- Gauze
- For Chalazion:
 - Celluvisc
 - Anesthetic drops
 - Reusable corneal shield

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DEWS III Discussing IPL

” ...Safe and effective way to treat MGD & DED...”

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DEWS III Discussing IPL

“...the exact mechanism of action in treating DED remains largely unknown...”

...[because of the] differences between instruments and algorithms used...there is still a need for independent, large, randomized, controlled, long-term studies to define the most efficacious treatment regimen...”

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2025 Device Meta Analysis

- IPL
- Triple effect on MGD: anatomical, functional and anti-inflammatory
- Tear Care?

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LLLT Basics: Red Light

- Improves cellular metabolism
- Absorbed in the cellular mitochondria: Cytochrome C Oxidase
- Stimulates ATP production
- Increases collagen and elastin & cellular repair
- Anti-inflammatory: reduces oxidative stress

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Low Level Light Therapy

- Red** Increase fibroblast activity & ATP
- Green** Reduce melanin stimulation
- Yellow** Inhibits VEGF, Increase lymphatics
- Blue** Reduce inflammatory cytokines & sebum production
- Pink** Eliminates acne breakout bacteria & anti-inflammatory
- Infrared** Reduces telangiectasia
- Red, IR, Orange** Dry AMD

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Valeda by Alcon

Dry AMD

20/32 - 20/70
3 medium drusen, 1 large drusen, non-central GA

3 applications per week for 3 weeks (9 total)
Twice per year for 2 years +

0936T ??
Use ABN
~\$150 per application
**Click fee ~\$30-35 like DSLT



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Red LLLT Improvement for Dry Eye

NIBUT	OSDI	Tear Meniscus
K stain	Conj stain	Schirmer

FDA: Inflammation

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Fitzpatrick Skin Type Scale:



Type I Light, Pale White Always burns, never tans	Type II White, Fair Usually burns, tans with difficulty	Type III Light to medium brown Some sun, mild burn, gradually tans to olive	Type IV Medium brown Rarely burns, tans with ease to moderate brown	Type V Light Brown Very rarely burns, tans very easily	Type VI Dark Brown Never burns, tans very easily, deeply pigmented
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IPL & LLLT

IPL & LLLT x 3

Improvements in: OSDI, TBUT*
Meibo score**
Lipid layer thickness***

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DEWS III

Discussing LLLT

” More research is needed to fully understand the long-term efficacy and optimal treatment protocols, and it is often considered most effective when combined with other treatments for DED ...”

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ZPL
FDA Q1 2026?

LLLT
15 minutes
\$ 13 per mask

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Zogniq's Polarized Light Therapy (ZPL)

1. REDUCED SCATTER & REFLECTION

STANDARD LIGHT: HIGH SCATTER

POLARIZED LLLT: MORE LIGHT THROUGH TISSUE

- Allows increased transmission through eyelids & skin barriers.

2. DEEPER TISSUE PENETRATION

EPIDERMIS

DERMIS

SUBCUTANEOUS FAT/MUSCLE

SHALLOW DEPTH

DEEPER DEPTH

- Increases tissue penetration to boost therapeutic effects.

3. EFFICIENT CELLULAR ACTIVATION

STANDARD: INEFFICIENT ACTIVATION

POLARIZED: OPTIMIZED ABSORPTION & ATP PROCT

- Improved clinical effectiveness at the molecular level.
- Requires less power, minimizing unwanted side effects.

OVERALL RESULT: MAXIMIZED THERAPEUTIC OUTCOMES WITH GREATER PRECISION & SAFETY.

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Muscle Stimulation

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I paid zero attention...

Lower Lid Distraction Test

Snap Back Test

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Korb-Blackie Light Test

- Grade: 0-3
 - 0: No compromise
 - 3: Severe Compromise
- Lid Seal Compromise Study*
- Normal eye lids and NO visible signs of lagophthalmos
- Moderate to Severe compromise:
 - 61% in symptomatic patients
 - 14% in asymptomatic patients

Image from: Karpinski P. Review of Oculin. Nov 2020. Pearl of the week. Wink G. et al (2017) JOMS


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3-5% muscle mass loss each decade after age 30

- Laxity and descent of the orbital rim
- Laxity and descent of the infra-orbital rim
- Descent of the lip-cheek junction and subsiding of the orbital system
- Descent of the cheek fat pad with loss of the orbital ligament
- Laxity of the SMAS covering zygomaticus muscles and other structures of the upper lip
- Deepening of the nasolabial fold
- Jaw formation

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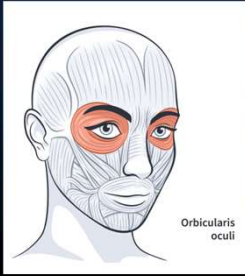
Dynamic Muscle Stimulation



- Tones muscle
- Improves blood flow
- Tightens skin
- Consumable: \$90 Medical grade glycerin

85

My experience



Orbicularis oculi


- Misery
- Eyelid Laxity
- Impaired blinking
- Nocturnal lagophthalmos

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Dynamic Muscle Stimulation

Improvements in:


- Lower Lid Distraction Test
- Lower Lid Laxity
- Tear Break Up Time
- Modified Meibomian Gland Score (Expression Quality)
- OSDI Scores
- Eyelid Appearance
- Blink Quality
- Blink Rate
- Eyelid Seal



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Dynamic Muscle Stimulation



Video courtesy of Dr. Steven S. Goldstein, MD

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◆ DEWS III ◆

◆ Discussing Muscle Stimulation ◆

◆

It's not mentioned

“...Individual with incomplete blinking have higher OSDI scores, more significant MG dropout, more MGD signs, poorer tear film Lipid layer thickness, and a shorter NIBUT...”

◆ ◆ ◆

89

◆ ◆ ◆

Meibum Melting Devices

◆ ◆ ◆

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Meibum Melters

Radio Frequency

Tear Care

Tixel

iLux

LipiFlow

91

What temperature melts meibum?

92

What at-home Warm Compress method is the most consistent for that temperature?

93

How Does RF Generate Heat?

RF Targets Water

Water is the key tissue electrolyte in the ECM

RF causes the water molecules vibrate

Vibration causes increased temperature within the ECM

Temp increase results in collagenesis and lipolysis

The ECM is made up of proteins (collagen) and carbohydrates (adipose tissue)

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Radio Frequency (RF)

On -Label

- Skin tightening/wrinkle reduction
- Local circulation / heating
- Fat lipolysis
- Musculoskeletal pain

Off -Label for OSD/MGD Treatment

- Heating meibum
- Breaks obstructions
- Improves expression

Can be done on any skin type ("Color-Blind")

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Radio Frequency (RF)

Thermal Energy Treatment used for

- Skin tightening 40-42 °C (104-107 °F)
- Lipolysis 42-44 °C
- Apoptosis 45 °C
- Melting Fat 43-45 °C (109-113 °F)

Target 41°C for 6-7 minutes each side of face

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The Three Main Types of Radiofrequency Systems

Monopolar **Bipolar** **Multipolar**

Monopolar: Requires a Grounding Pad: \$22-25 per pad
RF Lotion: \$90 bottle

97

RF for MGD

Radio Frequency vs LipiFlow at 3 months

OSDI & SPEED: Improved
MGX: Improved

Conj staining: Improved only at 1 month

Marx Line (Lid Wiper): Improved only for Radio Frequency

Journal of Dry Eye and Ocular Surface Disease

Abstract:
PURPOSE: To compare the efficacy of the Pulsed Thermal System to LipiFlow for the treatment of Dry Eye due to Meibomian Gland Dysfunction.
SUBJECTS: 30 patients with Meibomian Gland Dysfunction (MGD).
RESULTS: OSDI & SPEED: Improved. MGX: Improved. Conj staining: Improved only at 1 month. Marx Line (Lid Wiper): Improved only for Radio Frequency.

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IPL & RF

Combined Treatment Yields Better Outcomes

OSDI: 1.5x improvement
NIKIBUT: 2.9x improvement
Expressible Glands: 1.5x lower
2.1x upper
Meibum Quality: 1.6x lower
2.9x upper

Journal of Cutaneous Medicine and Surgery

Abstract:
PURPOSE: To evaluate the efficacy of combined IPL and RF for the treatment of Meibomian Gland Dysfunction (MGD).
SUBJECTS: 30 patients with MGD.
RESULTS: Combined treatment yields better outcomes compared to IPL or RF alone. OSDI: 1.5x improvement. NIKIBUT: 2.9x improvement. Expressible Glands: 1.5x lower, 2.1x upper. Meibum Quality: 1.6x lower, 2.9x upper.

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DEWS III

Discussing Radio Frequency

"... there is no strong evidence that supports the use of RF for DED and more studies, especially RCTs are needed...."

100

In-Office Heat & Massage

LipiFlow
MGX is included
FDA: localized heat and pressure therapy in adults ...with chronic... conditions... including MGD

TearCare
Requires manual MGX
FDA: localized heat and pressure therapy in adults ...with chronic... conditions... including MGD when used with manual MGX


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In-Office Heat & Massage

LipiFlow	TearCare
12 minutes	15 minutes
Effect in 6-8 weeks	Effect in 1 week
42.5°C (44°C max inner lid)	41-45°C
Disposable Activator: \$290 per OU	Disposable Smart Lids: \$500 per OU
	CPT: 0563T

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Systane iLux



- 38-44°C
- 8 minutes
- FDA: localized heat and pressure therapy in adults with chronic diseases of the eyelids, including MGD
- Disposable Smart Tip: \$175

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DEWS III

Comparing TearCare, iLux and LipiFlow ???


There is no direct comparison study

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Six of one, half dozen of the other?



iLux



TearCare



LipiFlow

iLux is non-inferior to LipiFlow³
 TearCare is non-inferior to LipiFlow²
 LipiFlow is no better than warm compresses¹

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Cochrane Library Review

Purpose: to provide high-quality, independent, evidence-based information to help people make informed healthcare decisions, acting as the gold standard for synthesizing medical research

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Cochrane Review 2024


“LipiFlow performs similarly to other commonly used DED treatments with regard to DED signs and symptoms.”

The best available evidence was deemed to have a high level of bias, leading to low or very low certainty evidence.

Additional research with adequate masking, a standardized testing methodology...is therefore needed”

107


Tixel i: Thermo-mechanical fractional skin treatment



- 400°C
- Tissue coagulation: 60-80 °C
- Self-disinfects!
- Short pulses of heat with controlled pressure
- Skin contact: ~8m sec
- Protrusion into skin 300-400um
- Dermis: 48°C , MG ~ 40°C
- (melts meibum)

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Tixel i




- 2 minutes
- Upregulates ATP
- Downregulates MMP9
- Disposable: anesthetic gel?
- No eye shields, no doctor shields

Image from: Haraoka, et al. Update on Tixel (2022). Cornea Refract Surg Today.

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Tixel i




- Apply light pressure: 22kPa (Inserting CL: ~100kPa)
- Refractive and K cyl changes?*
- Caution leading into cataract surgery?

Image from: Sakli, et al. J Cataract Refract Surg 2022.

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Tixel C vs LipiFlow (FDA Study)



FDA Clearance: localized heat and pressure therapy in adults with evaporative dry eye due to MGD

Non-inferior to LipiFlow

Image from: Haraoka.

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Tixel Study




OSDI 23-79 (moderate to severe)
TBUT < 10
MGS \leq 12

3 Treatments (2 week intervals)

Image from: Haraoka.

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Tixel: Continues Working AFTER



Tixel Baseline to 6 Months AFTER

TBUT: 4.0 seconds to 9.2 seconds

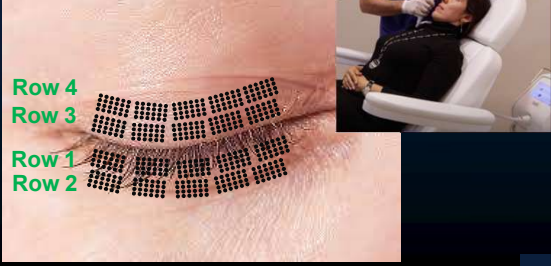
MGS: 6.6 to 24.80

Corneal FI Staining: 2.1 to 0.6

OSDI: 46.20 to 21.90

Image from: Haraoka.

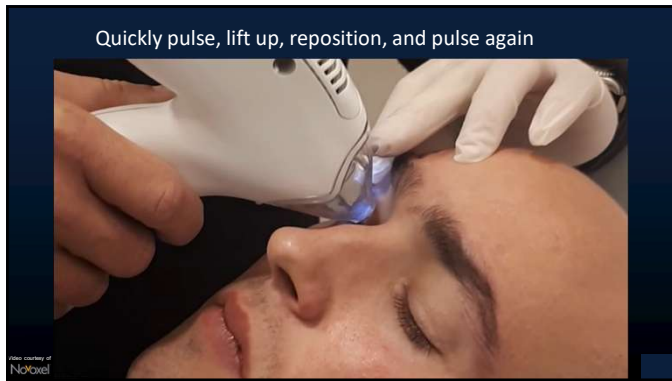
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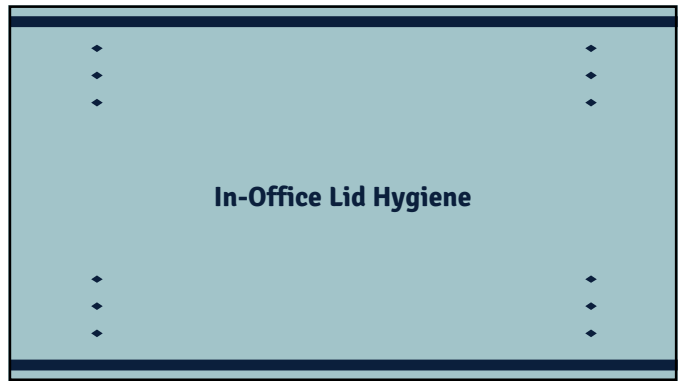
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Image from: Haraoka.

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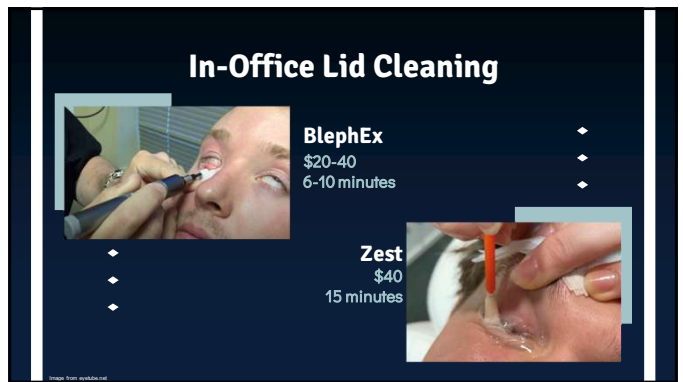
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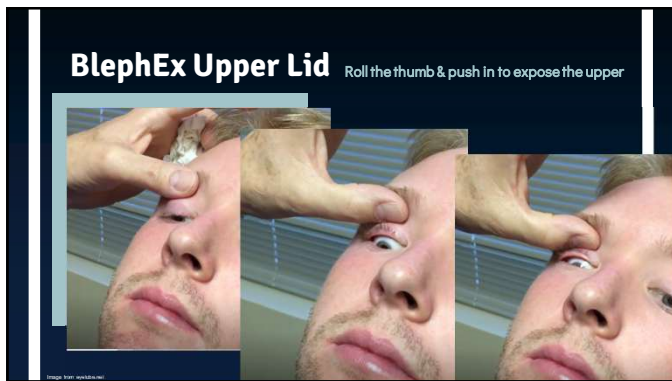
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◆ DEWS III ◆
◆ Discussing BlephEx (and MGX) ◆
◆

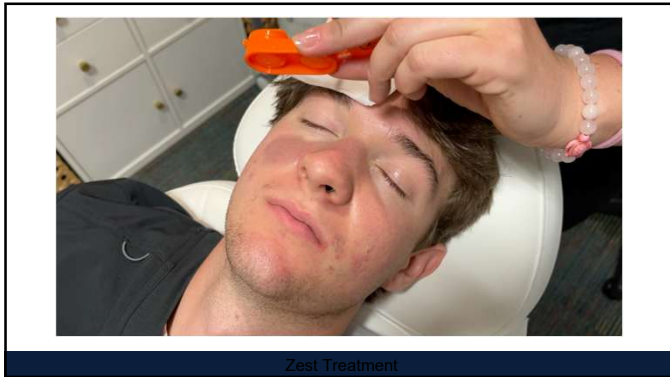
“There remains a lack of prospective studies with sham treatments and double masking”

◆ ◆
◆ ◆
◆ ◆

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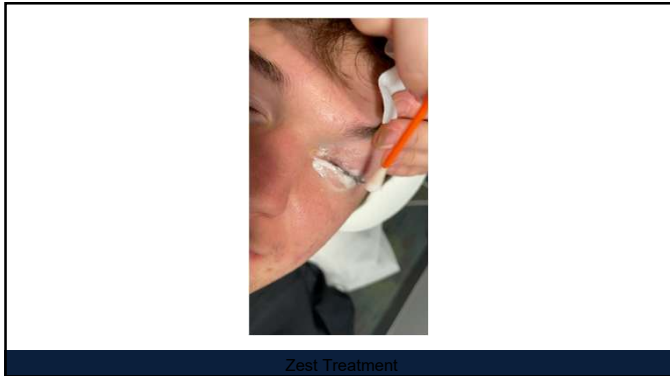
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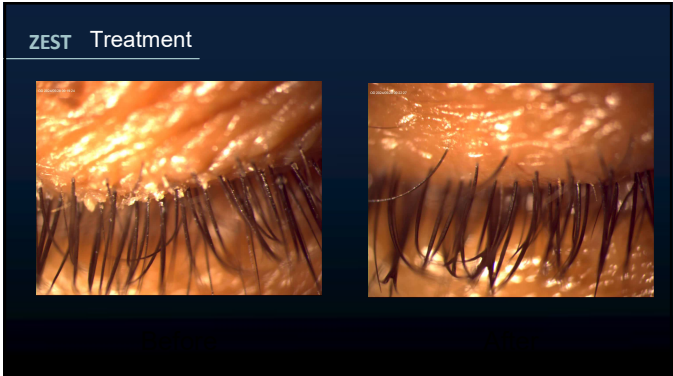
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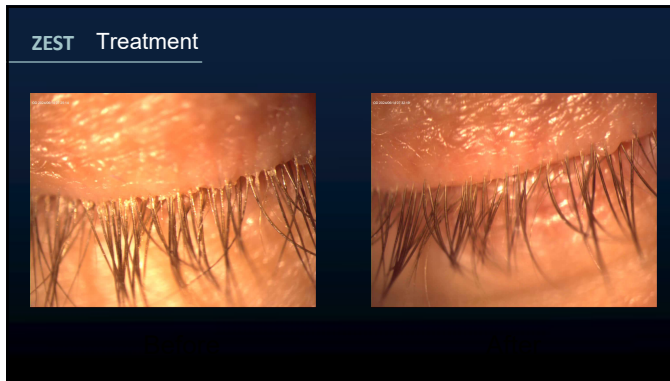
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Okra vs Tea Tree Oil (TTO)



Okra Patch vs 50% TTO Patch
Worn for 15 minutes over 3 months

Okra improves OSDI, Meibum Quality, TBUT, K staining and mite count

Not superior to 50% TTO

T4O: toxic to in-vitro human MG epithelial cells
Terpinen-4-ol: most effective component of TTO

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DEWS III

Discussing Okra-based

“More research is warranted”

129

OptiVize: Biofilm & Meibomian Gland Purification




In-office treatment:

- BlephEx treatment + Vaporization + Vibration Expression

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OptiVize: 3 Step Process



1. BlephEx: Removes surface debris
2. Vapor: Low-voltage electrical wave form breaking biofilm into polysaccharide particles
3. Vibrating & heated forceps expression

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OptiVize Goal: Normal Oily Expression



- Repeated monthly until oily expression then maintenance
- Consumable: \$195 per session

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OptiVize Study: non-published



- 10 month study, 325 patients
- End-point: oily expression
- Average: 4-6 months
- Average SPEED: Dropped 17 to 6
- Average NIKBUT: increased 6 sec
- No adverse

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NuLids



- At-home massage or in-office debridement/exfoliate
- Disposable tip: ~ \$1 per treatment
- Gel: \$0.33 per treatment

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DEWS III
Discussing Massage

“Following the application of warm compress, lid massage is required to express the meibum and to help unblock the meibomian glands”

135


DEWS III
Discussing Massage

“Requires further investigation: standarization... to the appropriate type and duration of eyelid massage”

136

LLLT Basics: Blue Light

- 410 – 430nm
- Generates Reactive Oxygen Species (ROS)
- DNA damage and apoptosis
- Bacterocidal
- Selective bacteria



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DEWS III
Discussing Blue light

“Well-controlled studies are required to optimize the appropriate clinical protocols to reduce bacterial biofilm on the lid”

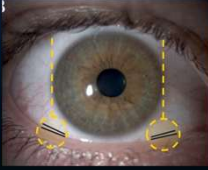
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How do you treat Conjunctivochalasis (CCH)?

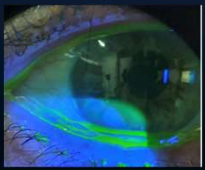
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LIPCFO vs CCH

Lid- Parallel Conjunctival Folds



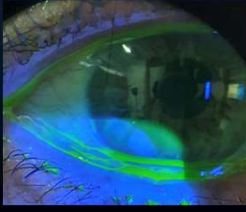
Conjunctivochalasis



Nomenclature issue?

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Treating CCH




- Artificial Tears
- Plasma Pen
- High Frequency Radio-Wave Electrosurgery (Ellman RF Cautery)
- Vectored Thermal Pulsation (TearCare)
- Microblepharoexfoliation
- Surgery: TissueTuck

Resection of

Ballentine-Saucier, A., et al 2014 Ophthalmol Ther

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Neel Desai, MD: Not localized to the conjunctiva




- Chronic inflammation
- Dissolution of Tenon's
- Prolapse of orbital fat
- Foreshortening of fornix reservoir
- TissueTuck: Tenon's dissection, amniotic assisted conj reconstruction, fat cauterization

Images: Desai N (2020). Clinical Physician Treats CCH

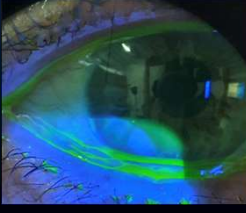
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In-Office Optometry: Plasma for CCH



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Post op Plasma



- Burns appear 3-10 days
- Antibiotic / Steroid drop and ung qhs
- Follow up 2-4 weeks
- CPT 68330 non-facility: \$612.45
- Consumable: none

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- ◆ DEWS III
- ◆ Discussing CCH Treatment
- ◆ Plasma only brief mention as a treatment but not as a surgical option
- ◆ High-Frequency Radiowave
- ◆ Electrosurgery (RF with Ellman) very brief surgical mention

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Where are we going today?



Diagnostics



Light Devices



Muscle Stim



Meibum Melt



Massaging




Lid Hygiene

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SUMMARY

Multiple treatments used together are the likely, and most appropriate management strategy, considering that DED has multiple pathogenic *drivers*



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SUMMARY

MGD is typically treated with...a wide variety of in-office treatments, including device-driven technologies... and other new and emerging technologies

More studies are needed!!

Be Aggressive, Be Be Aggressive!




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◆

◆

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