IPL Illuminated: Exploring the Mechanisms of Intense Pulsed Light for Dry Eye

Cory Lappin, OD, MS, FAAO

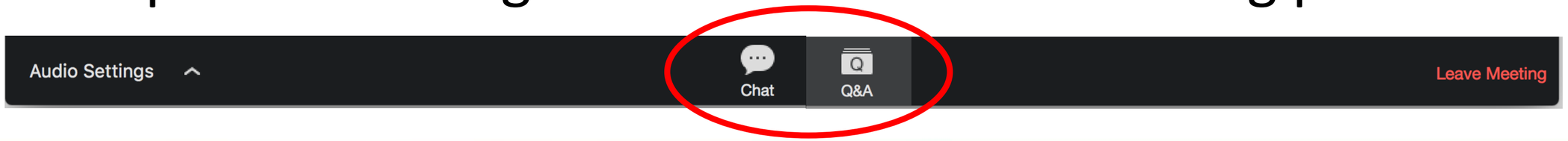
WOO UNIVERSITY

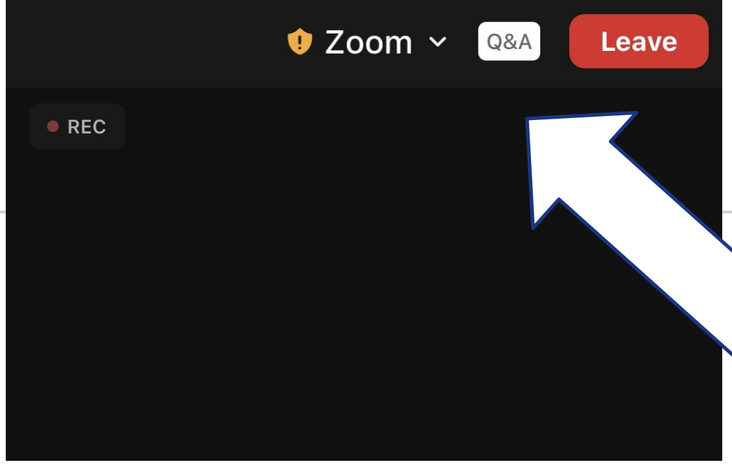
WELCOME!

Host: Dr. Jennifer Stewart

Thank you to Lumenis for exhibiting at this event.

- For each hour of CE units, attendees ***must be online for a minimum of 50 minutes***
- For a COPE certificate, please fill out the survey link in the chat. Also, the survey link will appear when the webinar ends.
- CE certificates will be delivered by email and sent to ARBO with OE tracker numbers
- We will also display a QR code at the end of the event if you have the OE tracker app on your phone.
- ***<u>CE certificates will be emailed within 4 weeks</u>***
- Ask questions using the zoom on-screen floating panel





Opportunity to Partner

Optometrists are at the frontline to recommend treatment for cataract and glaucoma patients.

Established relationships with patients

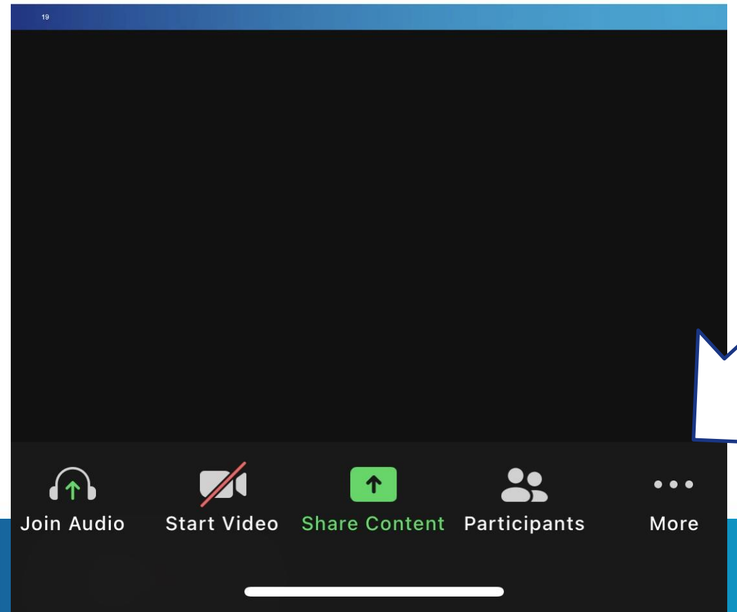
- Ability to inform patients of the best technologies available
- Needs, wants, expectations, and lifestyle

Reduce patient and physician burden

- Cost/pharmacy visits and prior authorizations
- Ocular surface disease and potential effects on visual acuity

Ability to impact patients' post-operative lifestyle

- ONE TIME opportunity during cataract surgery to address a patient's cataract, refractive needs (astigmatism and presbyopia) as well as their glaucoma



Speaker Bio –

Dr. Lappin received his Doctor of Optometry degree from The Ohio State University College of Optometry, where he concurrently earned his Master of Science degree in Vision Science and served as Class President.

He then continued his training by completing a residency in Ocular Disease at the renowned Cincinnati Eye Institute in Cincinnati, Ohio.

Dr. Lappin practices at Phoenix Eye Care and the Dry Eye Center of Arizona in Phoenix, Arizona, where he treats a wide variety of ocular diseases, with a particular interest in dry eye and ocular surface disease.

He is a Fellow of the American Academy of Optometry, a member of the American Optometric Association, and serves on the Board of Directors for the Arizona Optometric Association. He is also a member of the editorial board for the online eye care publication Eyes On Eyecare.

Dr. Lappin received the American Academy of Optometry Foundation Practice Excellence Award and was named the 2023 Young Optometrist of the Year by the Arizona Optometric Association.

Financial Disclosures for Dr. Lappin

- Bausch + Lomb: Speaker
- Lumenis: Speaker, Consultant
- Myze: Consultant
- NuLids: Consultant
- PRN Vision Group: Speaker, Consultant
- Tarsus: Speaker, Consultant

All financial relationships have been mitigated.

What is IPL?

- Intense Pulsed Light (IPL)
  - Non-laser high-intensity, polychromatic light source (xenon flash lamp)
  - Produces light output of wavelengths from 400 to 1200 nm
  - Controlled pulses of intense light (few milliseconds duration)

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History of IPL

- Dermatology
  - Hemangiomas
  - Telangiectasia
  - Rosacea
- Aesthetics
  - Hair removal
  - Photofacials

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History of IPL

- Benefits for dry eye found by accident
- Discovered ~20 years ago by Rolando Toyos, MD
- Treating dermatological conditions (rosacea)
  - Patients with concomitant dry eye noted improvements after IPL treatment

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How Does IPL Work?

Blackbox

“any device that produces a particular result but its internal functions or mechanisms are mysterious or unknown”

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How Does IPL Work?

- Understanding the mechanism of action of any treatment is key
  - Patient education and questions
  - Determining potential candidates
  - Knowing when to implement
  - Troubleshooting

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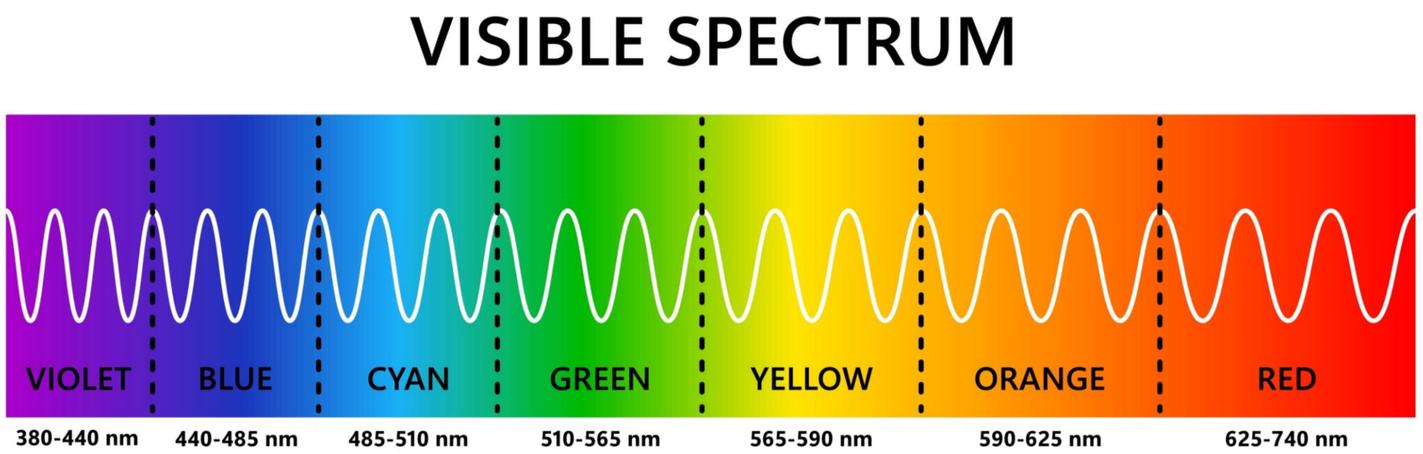
How Does IPL Work?



- Energy delivery in the form of light
  - Direct and indirect energy delivery
  - Light energy absorbed by pigment/chromophores in target tissues

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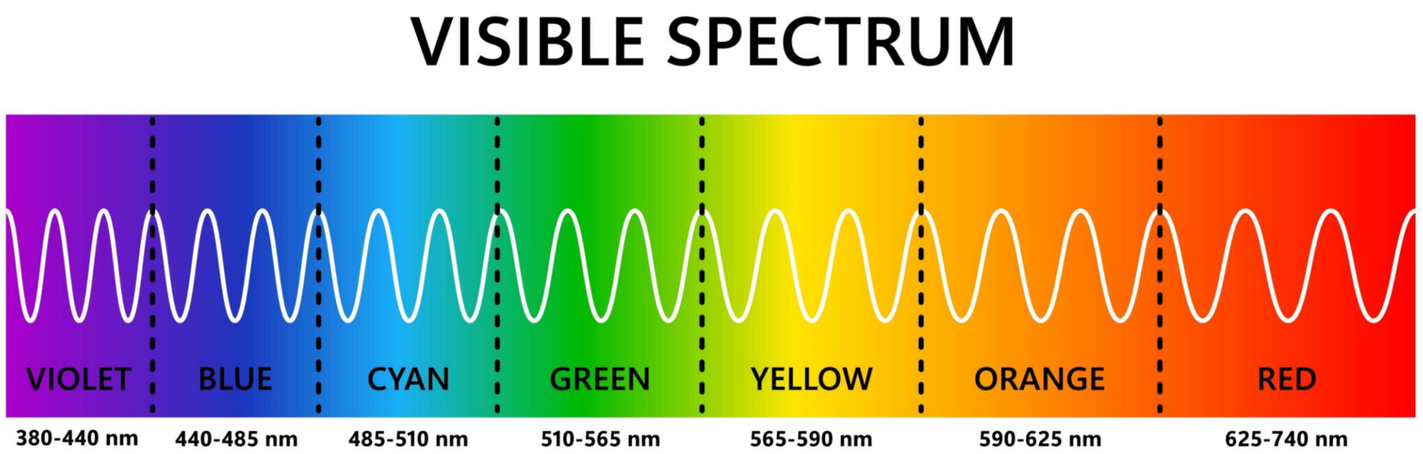
How Does IPL Work?



- Wavelengths of light produced determined by cutoff filters
  - 590 nm filter
    - Standard filter used for dry eye treatment
    - Produces wavelengths ranging from 590-1200 nm
    - Corresponds to yellow, orange, and red visible light and near-infrared light

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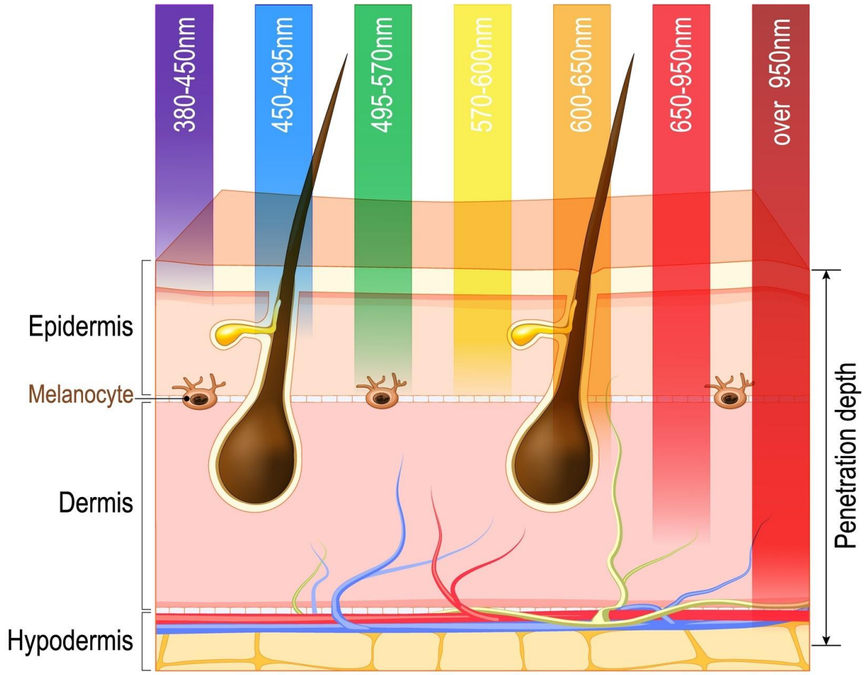
Biophysics

- Wavelength of light determines penetration depth and target tissue
  - Shorter wavelength: higher energy but less penetration
  - Longer wavelength: lower energy but deeper penetration
- IPL has different effects based on:
  - Wavelength
  - Pigmentation
  - Target tissue



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Biophysics – Photobiomodulation

Photobiomodulation

- Delivery of energy to a target tissue in the form of light
- Stimulates intracellular biological processes at gene and protein levels
  - Can trigger regenerative and anti-inflammatory processes

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Biophysics – Photobiomodulation

Mechanism: Increased ATP production via stimulation of cytochrome c oxidase (COX)

- COX - Enzyme contained in mitochondria
  - Part of electron transport chain (ETC)
- Chromophore (pigment) contained in COX absorbs light energy produced by IPL
- Photoexcitation of COX increases adenosine triphosphate (ATP) production
- ATP enhances function of intra- and extracellular pumps and transporters
- Increases levels of free intracellular Ca^{2+}

Alternative/Complimentary Mechanism: Entrainment

- Light energy causes physical vibrations of cellular calcium channels
- Vibration increases permeability of channels
- Increases levels of free intracellular Ca^{2+}

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Biophysics – Photobiomodulation

Mechanism (continued):

- Ca^{2+} is a key intracellular signaling molecule
  - Alters function of fibroblasts, keratinocytes, T cells, and macrophages
    - Fibroblasts – **increases cell proliferation and collagen synthesis**
    - Keratinocytes – **enhances epithelial wound healing**
    - T cells – **decreases inflammatory response**
    - Macrophages – **clears dead cells, proinflammatory debris**
  - Enhances blood flow
    - Elevates nitric oxide
      - Increases activity of nitrite reductase vs dissociation of nitric oxide from COX via photoexcitation
  - Increases antioxidant levels
- Result
  - Decreased inflammation
  - Enhanced tissue repair and regeneration

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Dry Eye & IPL

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 etiological roles.

- TFOS DEWS II Definition & Classification Subcommittee Report

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Dry Eye & IPL

Major benefit of IPL

IPL addresses several contributory conditions of dry eye in a single treatment modality

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Dry Eye & IPL

- Benefits of IPL for Dry Eye
  - Improves meibomian gland structure, function, quality of meibum, and tear breakup time (TBUT)
  - Reduces inflammatory factors found in the tear film and on the ocular surface
  - Destroys proinflammatory telangiectatic blood vessels, which are often associated with ocular rosacea
  - Decreases Demodex and bacterial populations on the lids and lashes
  - May improve blinking mechanics
    - Increases tone of lid skin and improves lid margin notching and scarring through stimulation of collagen synthesis

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Dry Eye & IPL

So how does IPL specifically provide these benefits and address these problems?

Several proposed mechanisms of action are occurring at once

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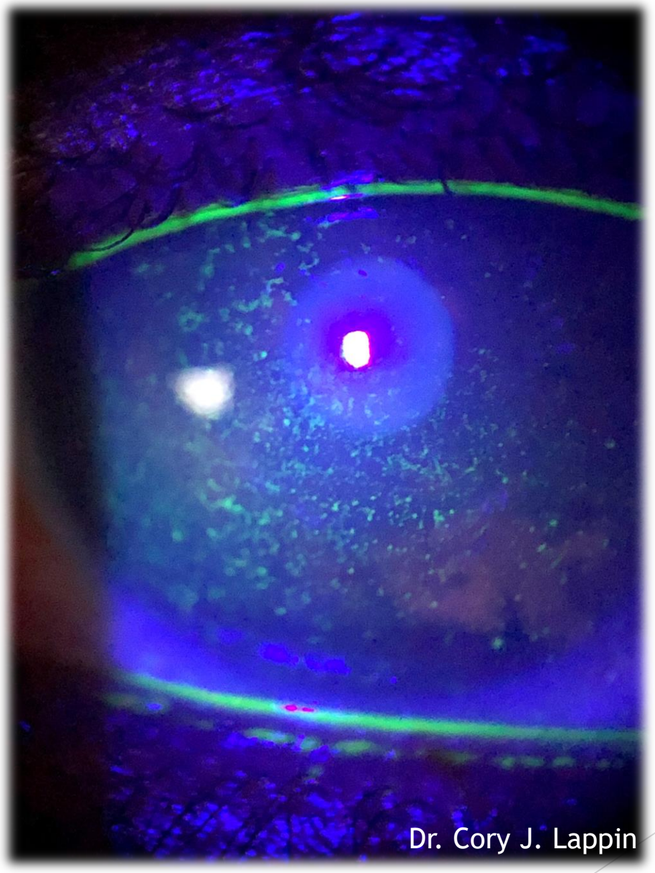
Inflammation

- Levels of proinflammatory factors are elevated in tear film of dry eye patients
  - Pain, tear film instability, ocular surface disruption, goblet cell dysfunction, Sjogren's Syndrome (aqueous deficiency)



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Inflammation & IPL

- Reduces inflammation through multiple mechanisms:
  - Photobiomodulation
  - Improvement in MGD
  - Destruction of proinflammatory telangiectatic blood vessels
  - Decrease in bacterial and Demodex burden on lids and lashes
- Alters inflammatory factors:
  - Increases IL-10 – decreases cytokine production by T cells
  - Decreases IL-6,TNF-α, and MMPs – proinflammatory factors
  - Biphasic effect on TGF-β
    - Can be pro- or anti-inflammatory – regulates T proliferation
    - Low energy levels – decreases TGF-β
    - High energy levels – increases TGF-β

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Inflammation & IPL

- Reactive Oxygen Species (ROS)
  - Free radicals elevated in dry eye patients (oxidative stress)
  - Reduced by IPL
- Paradoxical Effect of IPL
  - IPL enhances activity of ETC via photobiomodulation
    - Byproduct of ETC is free radical production
    - Would therefore expect free radicals to increase with IPL
  - Arndt-Schultz Curve
    - Biphasic dose response
      - Low energy levels – increase ROS formation
      - High energy levels – decrease ROS formation
      - Both potentially beneficial

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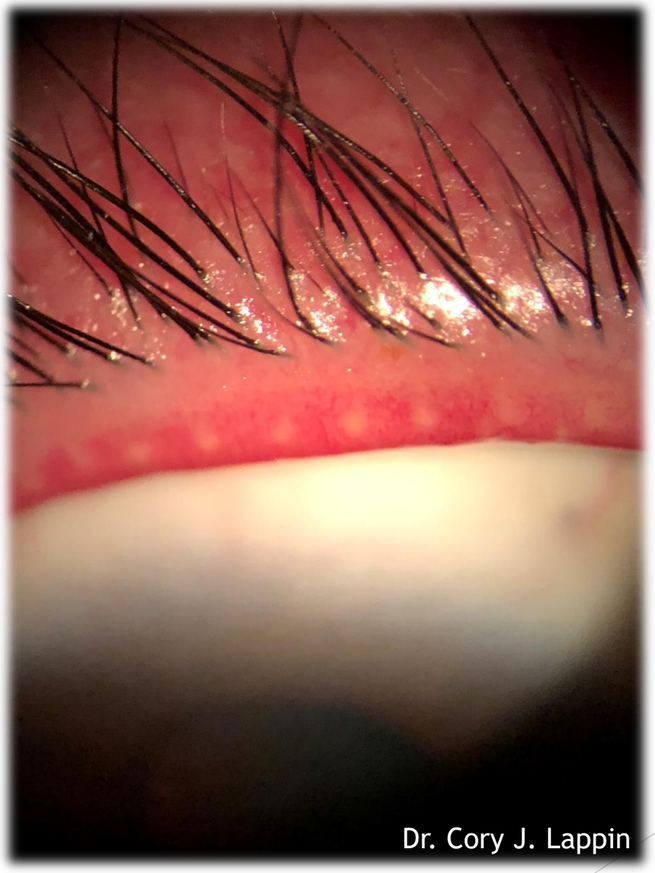
MGD

- Major contributory factor to dry eye
- Multifactorial
  - Lifestyle
    - Diet
    - Screentime
  - Blinking Mechanics
  - Blepharitis, Demodex, Ocular Rosacea
- Enlarged, inflamed glands
  - Inspissated/clogged ducts
  - Toothpaste-like secretions
- Tear film instability
  - Reduced TBUT



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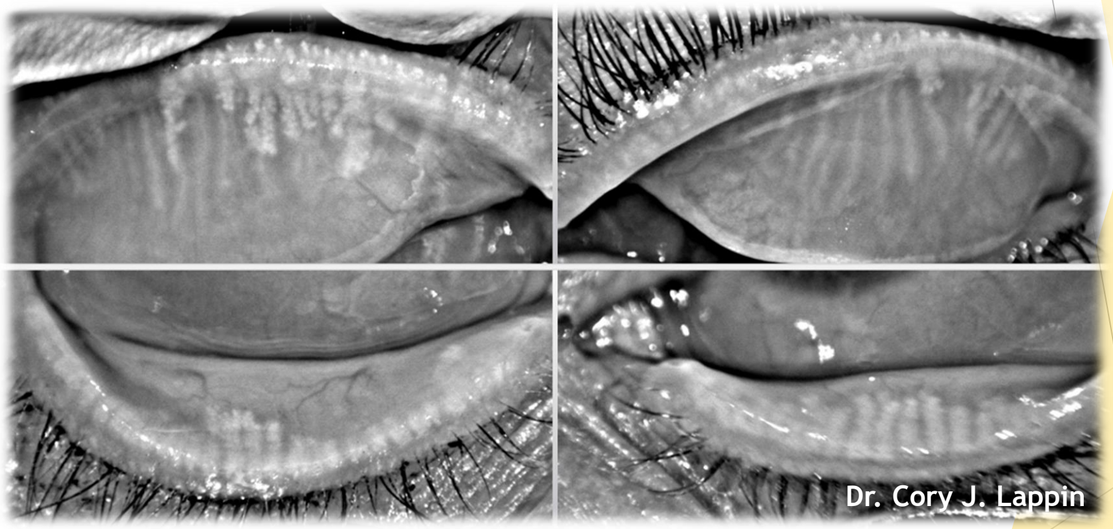
MGD & IPL

- Improves meibum quality
  - Liquefies stagnant meibum
    - Photochemical vs thermal change
  - Increased meibocyte proliferation
    - Photobiomodulation
- Improves gland structure
  - Macrostructure – decreased gland dropout
  - Microstructure - increased acinar cell activity
- Improved meibum secretion
  - Improved blinking mechanics
    - Improved lid rigidity and elasticity via increase in collagen synthesis



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Ocular Rosacea

- Hypersensitivity to normal environmental stimuli
- Telangiectasia
  - Eyelid proper, lid margin
  - Proinflammatory
- Flushing
  - Environmental triggers
- Chronic inflammation and erythema
- Lid margin damage
  - Lid notching
  - Lid margin thickening
- Demodex
- MGD

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Ocular Rosacea & IPL

- Destroy proinflammatory telangiectatic blood vessels
  - Light energy absorbed by hemoglobin in blood vessels
  - Temperature in blood vessels increases
  - Blood coagulates and vessels involute
  - Reduced release of inflammatory factors
- Improved lid margin health
  - Reduced abnormal epithelial cell turnover
  - Decreased proinflammatory debris (source of gland obstruction)
- Improved cosmetic appearance
  - Decreased erythema

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Bacterial Blepharitis

- Overpopulation of normal microflora
  - Staph
- Saponification
  - Production of enzymes that breakdown meibum
  - Tear film instability
- Biofilm buildup
  - Proinflammatory
  - Meibomian gland obstruction
- Lid margin changes
  - Thickening, notching/scalloping
- MGD
  - Altered meibum composition
  - Increased melting point

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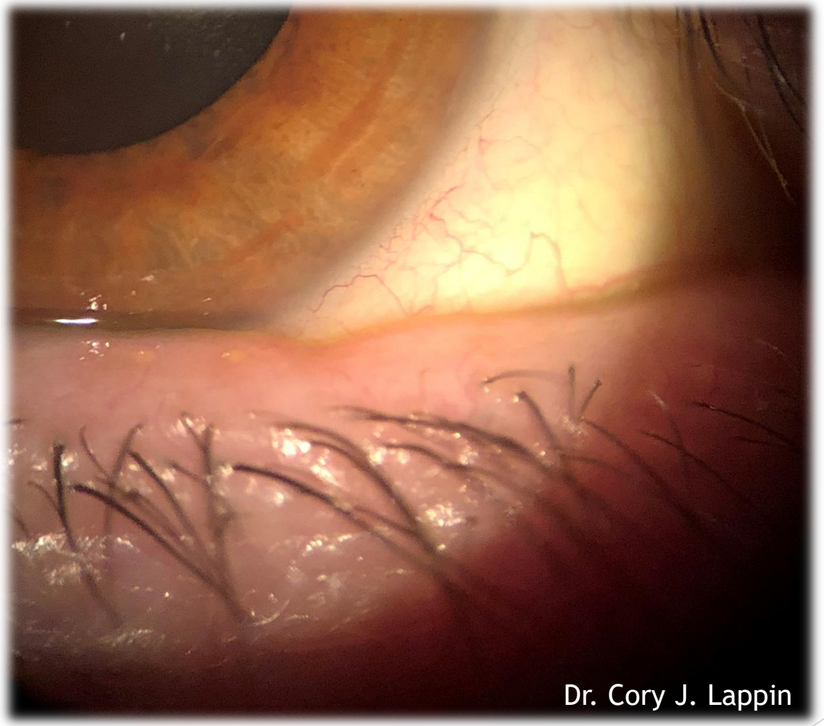
Bacterial Blepharitis & IPL

- Reduction of bacteria present on lids and lashes
  - Reduced bacterial lipases
    - Improved meibum and tear stability
  - Reduction in Demodex
    - Harbor bacteria
  - Reduced inflammation
- Improved lid margin health
  - Increased collagen synthesis



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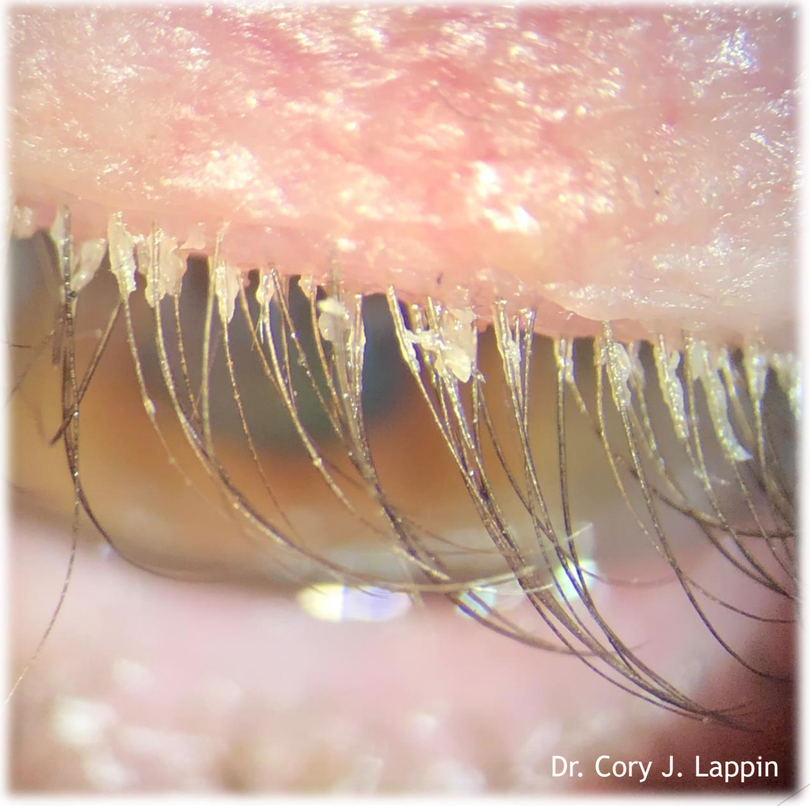
Demodex Blepharitis

- Overpopulation of Demodex mites
  - Demodex folliculorum
    - Lash follicles
  - Demodex brevis
    - Meibomian glands
- Lash collarettes
  - Proinflammatory
- Bacterial burden
  - Staph, Strep, Bacillus
- Chronic inflammation and erythema
- MGD
  - Physical obstruction of glands
  - Chalazia



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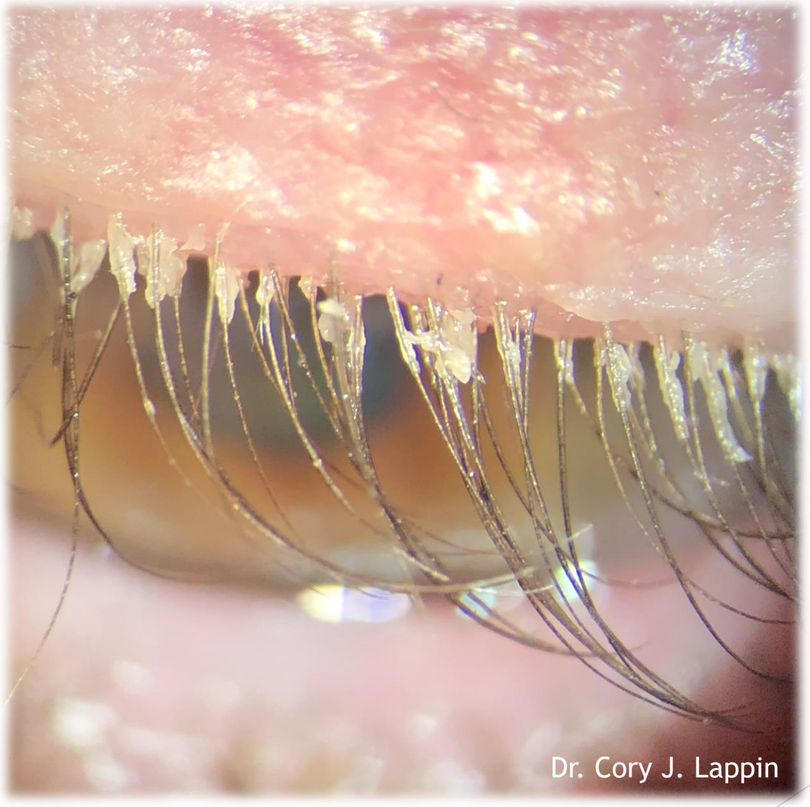
Demodex Blepharitis & IPL

- Reduced Demodex population
  - Light energy absorbed by chromophores in mites' exoskeleton
  - Rapid heating of the mites results in coagulative necrosis
- Decrease in proinflammatory collarettes
- Decrease in associated bacterial population
- Reduced likelihood of associated-chalazia
- Improved MGD
  - Less physical obstruction of glands



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Mechanical Eyelid Issues

- Incomplete lid closure
  - Laxity
    - Age
  - Lagophthalmos
    - Blepharoplasty
  - Scarring
    - Chronic inflammation
  - Poor lid seal
  - Floppy Eyelid Syndrome
- Exposure
  - Inferior and/or interpalpebral SPK

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Mechanical Eyelid Issues & IPL

- Improved blinking mechanics
  - Improved lid elasticity and rigidity
    - Photobiomodulation enhances fibroblast activity
    - Increased collagen synthesis
  - Complete blinks
    - Improved meibum secretion
    - Improved lid closure and apposition to globe
      - Decreased exposure
- Improved cosmetics
  - “Tighter” appearance to skin
  - Improved lid margin scarring

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Chalazia

- Chronic granulomatous inflammation
  - Clogged meibomian gland
- MGD
  - Gland destruction
- Demodex

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Chalazia & IPL

- Light energy breaks apart granulomatous mass
  - Decreases associated inflammation
- Medication and surgery-free alternative
  - Spares further damage of glands
- Improves root causes
  - MGD
  - Demodex

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Performing IPL

Foundational Dry Eye Treatments

Key Point: IPL is **NOT** intended for use in isolation

- Maximize benefits by using in conjunction with foundational dry eye treatments
- Should do full dry eye evaluation and ideally a CEE prior to IPL treatment

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Foundational Dry Eye Treatments

- **Omega-3 fatty acid supplementation**
  - Recommend a high quality, re-esterified, triglyceride-based supplement with 3:1 EPA to DHA ratio and at least 2 grams of combined EPA and DHA
- **Warm compresses**
  - May not be ideal for all patients, use with caution in patients with ocular rosacea
- **Blink exercises**
- **Lid hygiene**
  - Hypochlorous acid
  - Tea tree oil
  - Okra-based cleansers (Zocular)
- **Artificial tears**
  - Primarily palliative
  - Recommend preservative-free, lipid-based formulations (Refresh Mega 3) or gels (Siccaforte)
- **Immunomodulators**
  - Xiidra, Cequa, Restasis, Vevye
- **Neurostimulators**
  - Tyrvaya
  - iTear100
- **Tear film stabilizers**
  - Miebo
- **Nocturnal exposure**
  - Gels or Ointments (Siccasan, Hylo Night)
  - Moisture goggles (Eyeseals)
- **Other treatments**
  - NuLids

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When to Use IPL

- Second-stage management option
  - TFOS DEWS II
- First line treatment?

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Who is a Good Candidate for IPL?

- Mild to severe dry eye
- MGD
- Rosacea
  - Ocular Rosacea (even in isolation)
- Blepharitis
  - Bacterial
  - Demodex
- Mechanical lid issues
- Chalazia
- Failure of previous treatments
- Ocular surface sensitivity
  - Preservatives
- Desire to avoid additional drops
  - Glaucoma
  - Difficulty using drops
  - Convenience
- Fitzpatrick Skin Types I-IV

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Who is Not a Good Candidate for IPL?

Contraindications:

- Fitzpatrick Types V-VI
- Active herpetic lesion in treatment area
- Recent ocular or periocular surgery
- Actively undergoing radiation treatment of head and/or neck
- Photosensitive epilepsy

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Who is a Not a Good Candidate for IPL?

Relative Contraindications:

- Drugs that cause photosensitivity
  - Doxycycline, Tetracycline, St. John's Wort
- History of herpetic skin lesions
  - Rare, can use prophylactic course of oral anti-virals
- Melasma
- Systemic Lupus Erythematosus (SLE)

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Points of Note

- Tattoos
- Facial Hair
- Scarring
- Facial piercings
- Botox

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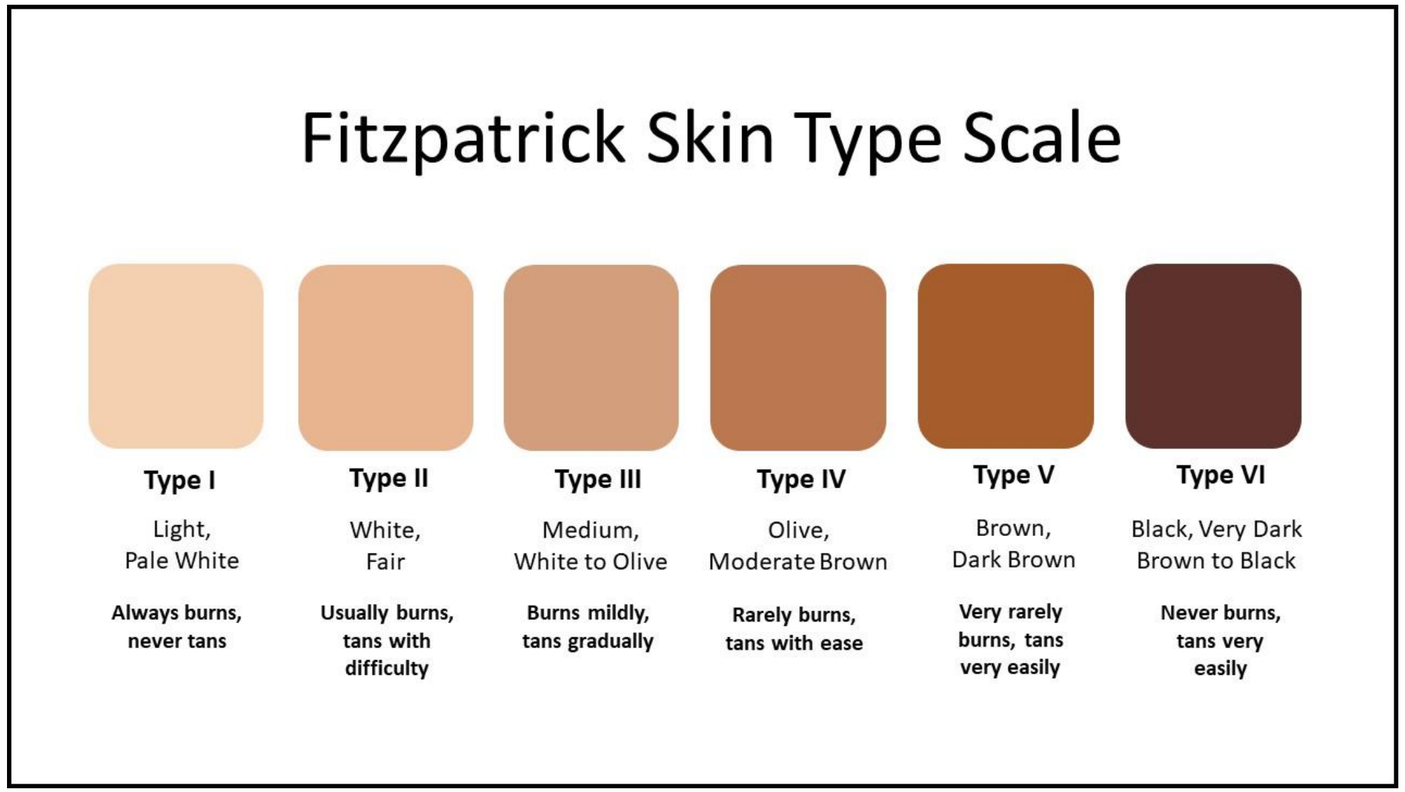
Fitzpatrick Skin Type Scale



- Based on skin's reaction to sunlight
- Ability to tan vs burn
- Scored I-VI

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Determining Fitzpatrick Score

- Questionnaire
  - Gives Fitzpatrick Score from I-VI
  - May not reflect “true” skin type
  - Must take into account other pigmentation
    - Tanning, Rosacea
- Dynamic
  - Can change over time
- What if on border between types?
  - Choose higher skin type number
  - Test shots

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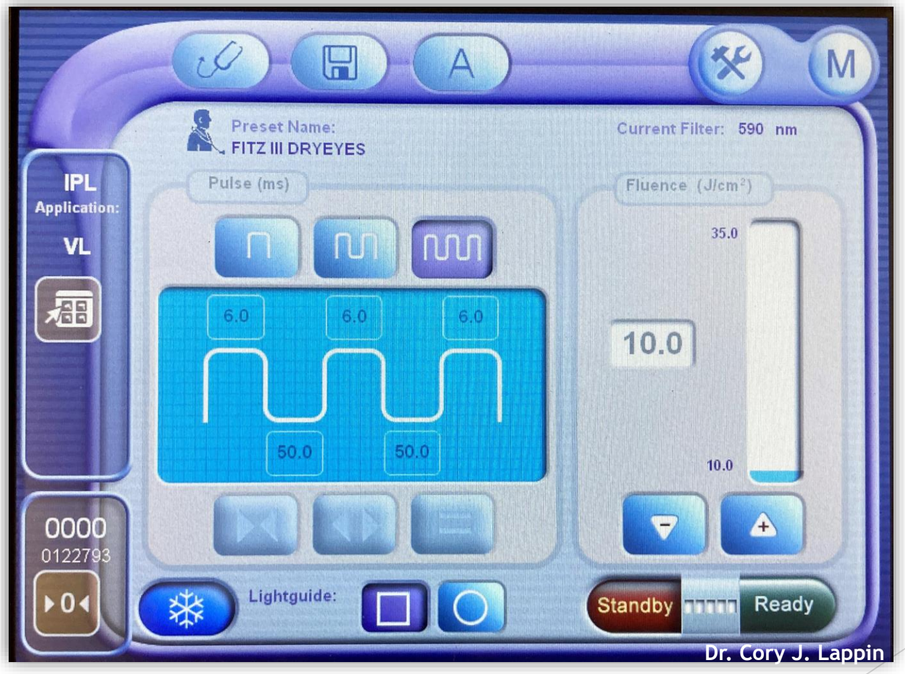
Fitzpatrick Score & Fluence

- **Fluence**
  - energy applied over a given area (joules/centimeter^2)
- **Fitzpatrick score will determine fluence used**
  - **Inverse relationship**
    - Higher Fitzpatrick score, lower fluence needed
    - Lower Fitzpatrick score, higher fluence needed
    - Based on pigment absorption of light energy
      - More pigment present, more energy absorbed
  - **Critical step - most adverse events involve too high of fluence**
    - When in doubt, start low and increase with subsequent treatment once tolerability is established



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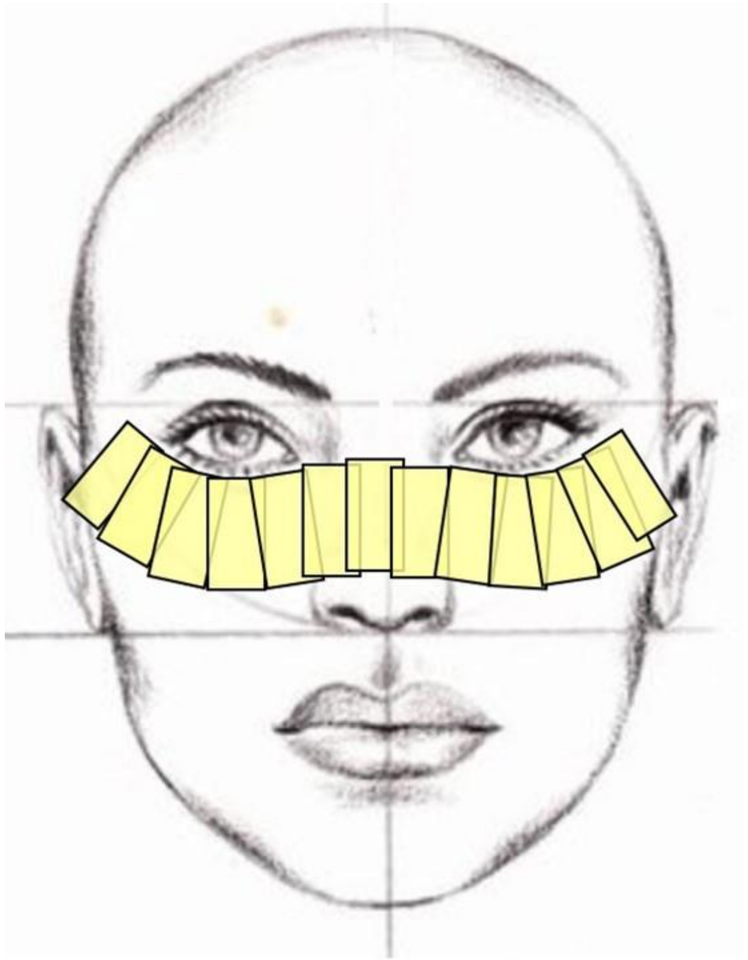
Treatment Pattern

- Tragus to Tragus
  - Below orbital rim
  - Include nose



From Dell SJ. Intense pulsed light for evaporative dry eye disease. Clin Ophthalmol. 2017;11:1167-1173.

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Supplies

- **Coupling gel**
  - Transparent
  - Fragrance-free
- **Eye protection**
  - Adhesive eye patches
  - Laser-grade corneal shields
  - Opaque goggles
- **Photoprotective eyewear**
  - Operator

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Step-by-Step Process

Preparation

- **Determine Fitzpatrick Skin Type**
  - I-IV (V with caution)
- **Set Fluence**
  - Inversely related to Fitzpatrick score
- **Apply Eye Protection**
  - Adhesive eye patches
  - Laser-grade corneal shields
  - Goggles
- **Apply Ultrasound Gel**
  - Transparent, fragrance free
- **Put on Photoprotective Eyewear**

Performing Tx

- **Tragus to Tragus**
  - over nose and below orbital rim
- **Two Passes**
- **Remove Gel**
- **Remove Eye Protection**
  - Perform corneal scan if corneal shields used
- **Apply Sunscreen**
- **Post-Treatment Education**
- **Repeat for Four Total Treatments**
  - Spaced 2-4 weeks apart
  - Standard Series

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Treatment Approaches

- Toyos Protocol
- Epstein Protocol
- Periman Protocol

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Treatment Approaches

- **Toyos Protocol**
  - First and standard treatment approach
- **Epstein Protocol**
  - Greater number of shots at lower energy
    - Greater cumulative energy delivery
- **Periman Protocol**
  - Includes additional aesthetic components

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Toyos Protocol

Created by Rolando Toyos, MD

- Adhesive eye patches placed
- Gel applied from tragus to tragus below orbital rim and over nose
- Two passes of shots applied to treatment area
  - ~10% overlap between shots
- Adhesive patches and gel are removed
- Manual meibomian gland expression is performed
  - 1% proparacaine is instilled in each eye prior
  - One drop of topical steroid or NSAID is instilled upon completion
- Process is then repeated 2-4 weeks later
  - Four total treatment sessions performed

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Epstein Protocol

Created by Arthur Epstein, OD

- 590 nm filter used
- Adhesive eye patches placed
- Gel applied from tragus to tragus below orbital rim and over nose
  - Forehead sometimes also treated (standard for male patients)
  - Eyelids treated if significant telangiectasia present
- Two passes of shots applied to treatment area
  - **~50% overlap between shots**
    - Greater number of total shots, so fluence is decreased accordingly to compensate
- Adhesive patches and gel are removed
- Manual gland expression NOT performed
  - Recommend dedicated thermal pulsation procedure
- Process is then repeated 2-4 weeks later
  - Four total treatment sessions performed

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Epstein Protocol

On-lid Treatment

- 590 nm filter used
- Laser-grade corneal shields placed
  - 1% proparacaine is instilled in each eye prior
- Gel applied from tragus to tragus below orbital rim and over nose + upper and lower eyelids
  - Gel kept ~2 mm from lash line (want to avoid any potential lash loss)
- Two passes of shots applied to treatment area
  - ~50% overlap between shots for tragus to tragus treatment area
  - ~3-4 shots applied to upper and lower eyelid of each eye individually for two passes
    - Switch to smaller lightguide to accommodate treatment of smaller area of eyelids
    - Performed after completing two passes of standard tragus to tragus treatment area
- Corneal shields and gel are removed
- Manual gland expression NOT performed
  - Recommend dedicated thermal pulsation procedure
- Process is then repeated 2-4 weeks later
  - Four total treatment sessions performed

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Periman Protocol

Created by Laura Periman, MD

- **Four primary steps: Rosacea Treatment**, **Toyos Protocol**, **Eyelid Treatment**, and an **Aesthetic Cleanup**
- Laser-grade corneal shields placed
  - 1% proparacaine is instilled in each eye prior
- Gel applied to entire face + upper and lower eyelids
  - Gel kept ~2 mm from lash line (want to avoid any potential lash loss)
- **Rosacea Treatment**: One pass of shots applied to whole face using a light filter intended for facial rosacea treatment, followed by one pass over standard tragus to tragus pattern (therefore two total passes performed in this region using rosacea filter)
  - ~10% overlap between shots

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Periman Protocol

Continued

- **Toyos Protocol**: Two additional passes of standard tragus to tragus treatment area using 590 nm filter
  - ~10% overlap between shots
- **Eyelid Treatment**: ~3 shots applied to upper and lower eyelid of each eye individually for two passes
    - Switch to smaller lightguide to accommodate treatment of smaller area of eyelids
- **Aesthetic Cleanup**: spot treatments for specific conditions such as angiomas, focal telangiectasia, hyperpigmentation, and unwanted facial hair
  - Vascular filter used
- Corneal shields and gel are removed
- Process is then repeated 2-4 weeks later
  - Four total treatment sessions performed

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Chalazion Treatment

Chalazion Treatment

- 590 nm filter used
- Laser-grade corneal shields placed
  - 1% proparacaine is instilled in each eye prior
- Gel applied from tragus to tragus below orbital rim and over nose + upper and lower eyelids
  - Gel kept ~2 mm from lash line (want to avoid any potential lash loss)
- Two passes of shots applied to treatment area
  - ~50% overlap between shots for tragus to tragus treatment area
  - **~3-4 shots applied to upper and lower eyelid of each eye individually for two passes + ~1-3 additional shots directly to the chalazion**
    - Switch to smaller lightguide to accommodate treatment of smaller area of eyelids
    - Performed after completing two passes of standard tragus to tragus treatment area
- Corneal shields and gel are removed
- Process is then repeated 2-4 weeks later
  - Minimum of two treatments, but may need four or more depending on each individual case
- Consider adjunct thermal pulsation procedure

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Side Effects

- Usually mild and transient
  - Typically resolve within 24-48 hours
- Redness
  - “Sunburn”-like (**NOT** from UV)
- Edema
- Blistering
- Depigmentation or hyperpigmentation
  - Can be permanent

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After-Care

- Sunscreen
  - SPF 30+
  - **NO TANNING**
- Avoid retinol
- Avoid abrasive facial scrubs
- Can use gentle moisturizer if needed
  - Aquaphor

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Frequency & Follow-up

- Standard Series
  - 4 sessions
  - Spaced 3-4 weeks apart (ideally, can be as soon as 2 and as late as 5 weeks)
  - Some require 5th session
- Follow-up
  - ~4-6 weeks after last treatment in series
  - Repeat dry eye testing
- Maintenance
  - Typically 6-12 months after last treatment
  - Usually only 1-2 treatments needed
  - Individualized

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Tips for Performing IPL

- Avoid too much pressure
  - Blanches blood vessels
- Give a few extra seconds between shots if too uncomfortable
- Can split fluence between first and second passes
- Test shot if unsure about reactivity
  - Apply to neck, wait ~7 days to assess tolerability
- Between Fitzpatrick Scores
  - Use Higher of two scores and/or lower energy fluence
  - Can adjust once tolerance is assessed
- Treating Fitzpatrick Type V
  - Approach with caution
  - Always perform test shot before full treatment
  - Start with lower number of shots and adjust after assessing tolerability

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What about Post-Treatment Expression?

Controversial

- Heat unlikely to provide substantial melting
  - Too brief, not sustained
- “Melting” of clogged Meibum
  - More likely photochemical process than thermal
  - Alters bonds in meibum
  - Want to avoid “cold” expression
    - Meibomian glands are delicate structures – uncomfortable, relatively ineffective (when compared to dedicated treatment), and potentially damaging
- Better Alternatives
  - Dedicated thermal pulsation procedures
  - Synergistic effect

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Direct On-Lid Treatment?

- Significant ocular rosacea/telangiectasia
- Chalazia
- Mechanical lid issues
  - Lid laxity
  - Lid margin notching/scarring
- Anatomical challenges
  - Orbicularis Oculi Muscle
  - Tarsal Plate

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Setting Expectations

- Effects not typically felt until ~3rd or 4th treatment
  - No need to be discouraged if no change felt after first two treatments
- Some patients need 5th treatment
- Will eventually need maintenance treatment
  - ~6-12 months, some sooner and others later
- Improvement in symptoms can lag behind signs
- Still need to be consistent with other foundational treatments
- Nothing is every 100% guaranteed
  - High success rate but everyone responds differently
  - Very rare a patient does not receive some benefit

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Discussing IPL & Patient Education

- Review condition and testing
  - Objective testing (Meibography, NITBUT, Lipid Layer Interferometry, Blink Analysis)
- Explain patient's individual issues
- Explain how IPL will address patient's specific issues
- Explain IPL MOA in understandable, relatable fashion
- Address as many questions as possible
- Financial discussion
- Want patient 100% on board
  - Our job is educate and provide best treatment options, not sell
  - Empower the patient, decision is completely their own
  - Advise against performing if IPL has any reservations

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Implementing IPL in Your Practice

- Workflow
  - Every 15 minutes
    - ~5 minutes of doctor time
    - Slightly longer when on-lid treatment performed
- “Procedure Day”
  - Schedule most or all IPL treatments on a single day and perform them back-to-back
- Staff training and education
  - Ability to field questions when doctor unavailable
  - Consistent message
  - Builds confidence
- Packages and bundles
  - Can include other treatments (ie thermal pulsation procedures)

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Summary

IPL addresses several contributory conditions of dry eye in a single treatment modality

- **Improves meibomian gland structure, function, quality of meibum, and tear breakup time (TBUT)**
  - Photobiomodulation: enhanced acinar activity, meibocyte proliferation
  - Improves contributory conditions (Ocular Rosacea, Demodex and Bacterial Blepharitis)
- **Reduces inflammatory factors found in the tear film and on the ocular surface**
  - Photobiomodulation: alters function of keratinocytes, T cells, and macrophages
  - Decreases levels of ROS present
- **Destroys proinflammatory telangiectatic blood vessels, which are often associated with ocular rosacea**
  - Coagulates blood in abnormal blood vessels
- **Decreases Demodex and bacterial populations on the lids and lashes**
  - Coagulative necrosis of mites

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Summary

IPL addresses several contributory conditions of dry eye in a single treatment modality

- **May improve blinking mechanics**
  - Photobiomodulation: Increase tone of lid skin and improve lid margin notching and scarring through stimulation of collagen synthesis via stimulation of fibroblasts
- **Medication and surgery-free alternative to chalazion treatment**
  - Breaks up debris/inflammatory material
- **Improved cosmetic appearance**
  - “Tighter” skin
  - Decreased erythema

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Thank you! Please join us for our next COPE events

Date: October 20, 2023
Time: 5:30 PM - 6:30 PM PT

Date: October 24, 2023
Time: 5:30 PM - 6:30 PM PT