Treatment of Meibomian Gland Dysfunction (MGD) with Intense Pulse Light Therapy (IPL) with Low Level Light Therapy (LLLT) Versus Lllt Alone

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MEDICAL DIRECTOR: LASER DEFINED VISION, PHYSICIANS PROTOCOL, PHYSICIANS PROTOCOL COSMETICS

Alcon	C,L,R
Allergan	C,L,R
Alphaeon	O
Bausch and Lomb	C,L
Espansione	C,L,R
Innovamed	L
J+J	L
Lombart	L
Nidek	C,L,R
Pogotec	C,O
Presbia	C,R
Refocus	C,L,R
Shire	C,L
Strathspey Crown	O

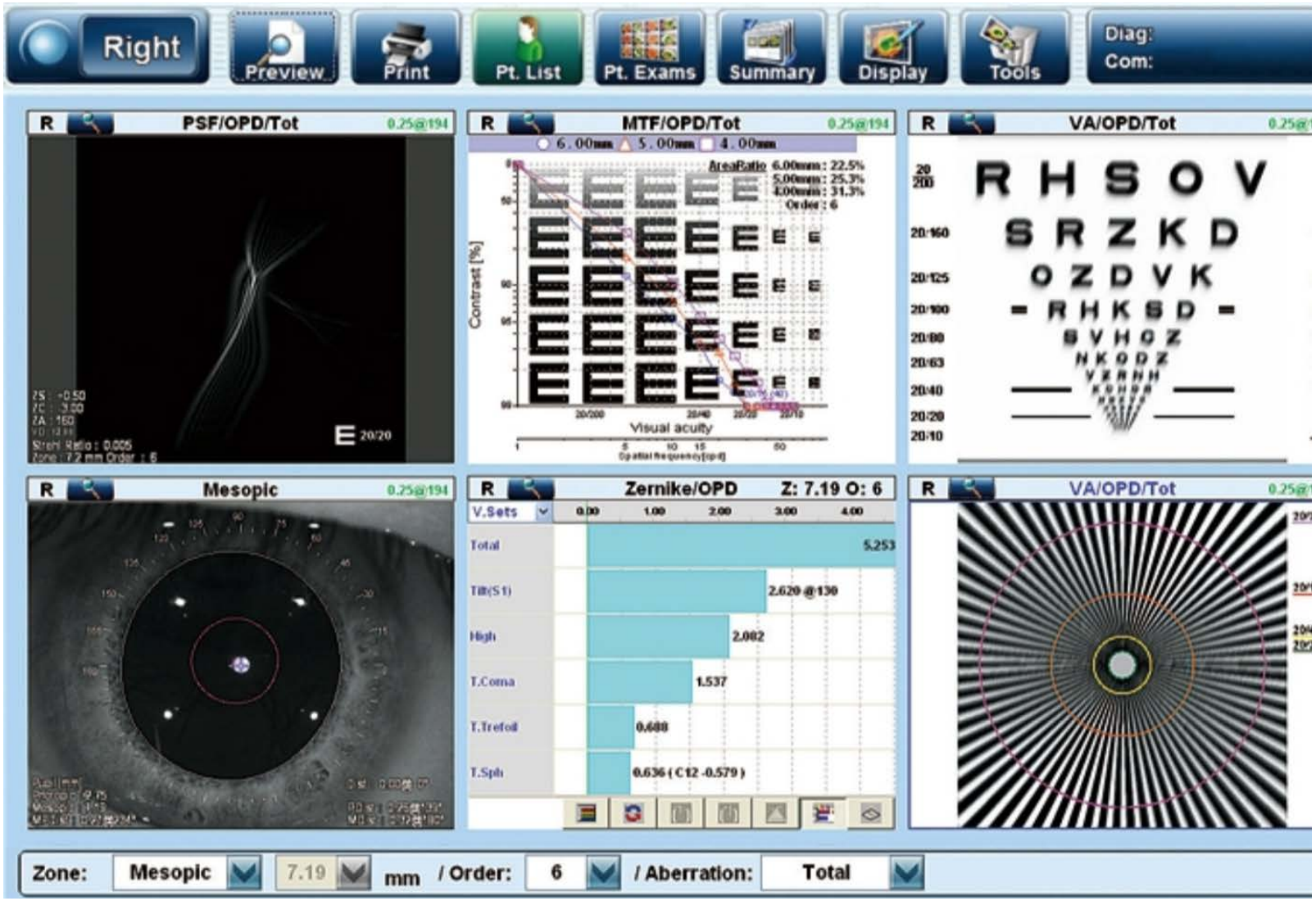
C-Consultant/Advisor
E-Employee
L-Lecture/Travel Fees
O-Owner/Equity
P-Patents/Royalty
R-Research

Functions of a Healthy Tear Film

- Optical clarity, refractive power
- Ocular surface comfort, lubrication
- Protection from environmental and infectious insults
  - Antibacterial proteins, antibodies, complement
  - Reflex tears flush away particles
- Trophic environment for corneal epithelium
  - Necessary electrolytes maintain pH
  - Protein factors for growth and wound healing
  - Antioxidants

Rolando M, et al. In: Pflugfelder SC, et al, eds. *Dry Eye and Ocular Surface Disorders*; New York, NY: Marcel Dekker; 2004.

Stern ME, et al. In: Pflugfelder SC, et al, eds. *Dry Eye and Ocular Surface Disorders*; New York, NY: Marcel Dekker; 2004.



DAMIEN GATINEL IS A ROCK STAR!

Blepharitis/MGD

Treatments Options:

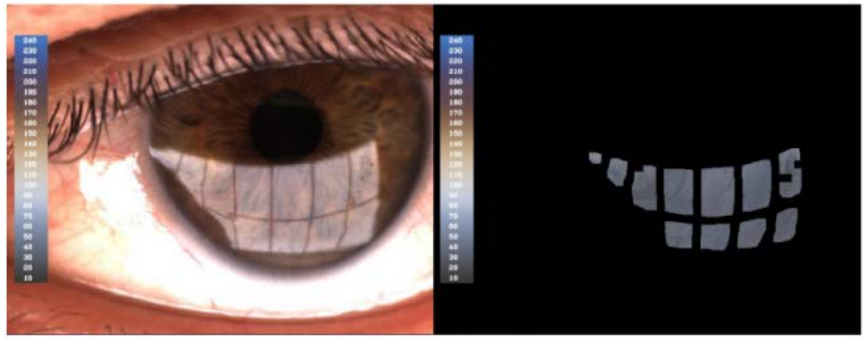
- Metronidazole ophthalmic ointment - compounded
- Topical doxycycline drops - compounded
- Topical clindamycin ointment - compounded
- Oral nutritional supplements
  - Flaxseed oil (short-chain omega-3 fatty acid) - thins meibomian gland oils and thickens the oil layer but does not suppress inflammation
  - Fish oil (long-chain omega-3 fatty acid) - suppresses inflammation, but does not thicken the oil layer
- Androgen therapy
- Pulsed light therapy (IPL)
- Eye Light,LipiFlow, EyeXpress, Meiboflow,Ilux
- Meibomian gland probing

EYELIGHT

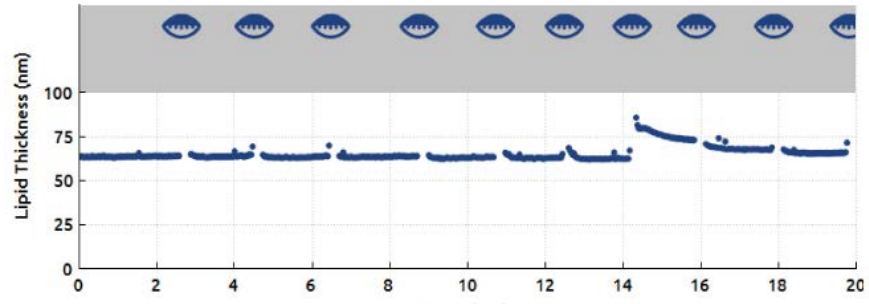
EPI-C TREATMENTS

Intense Pulsed Light Therapy (OPE-Optimal Power Energy)

The interaction of OPE/IPL technology with tissue is essentially thermal, and it allows to optimize heat emission, stimulating the Meibomian glands to resume improved functionality.



Average LLT:	65 nm	Partial Blinks:	10 / 10
Maximum LLT:	86 nm @ frame 430	CFactor:	0.94
Minimum LLT:	62 nm @ frame 404	Standard Dev:	4



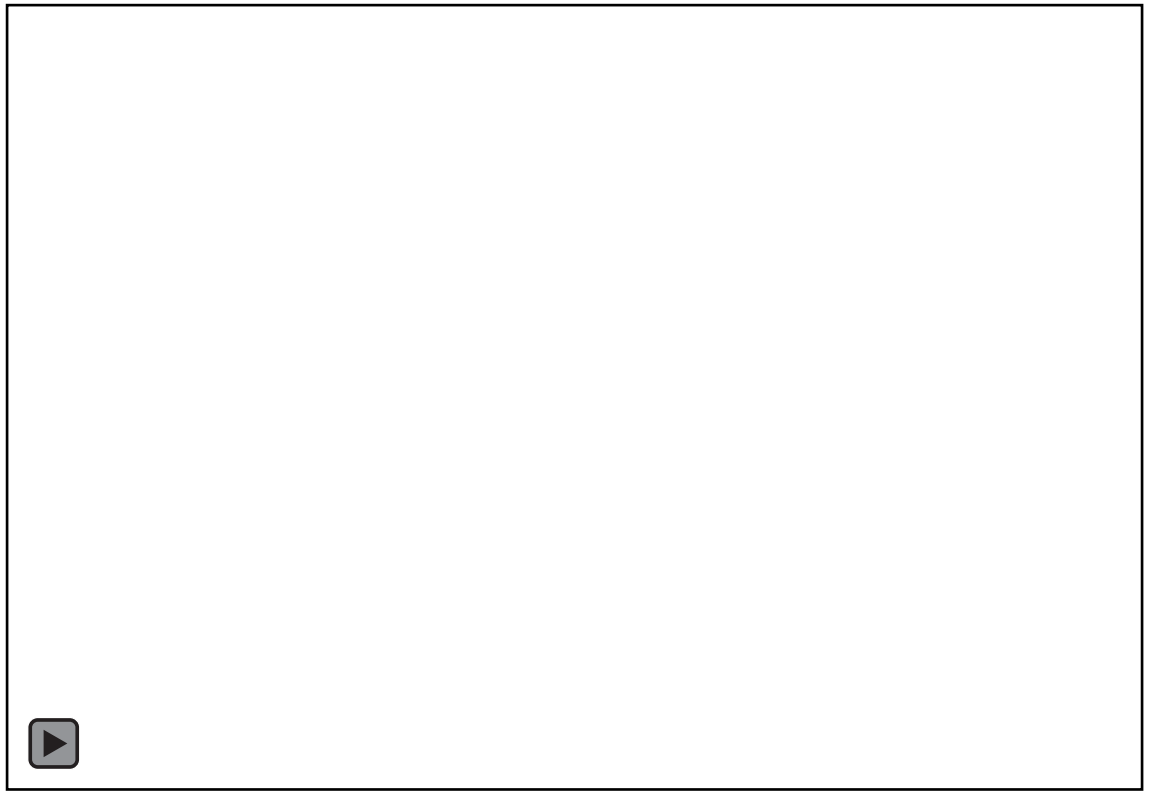
OPE® (IPL) is a polychromatic light that thanks to thermal pulses stimulates the Meibomian glands to resume normal activities. Applied to the periorbital areas and cheekbone, it stimulates contraction of the glands, increasing the lipid stream and reducing the evaporation of tears.

DON’T DO THIS…

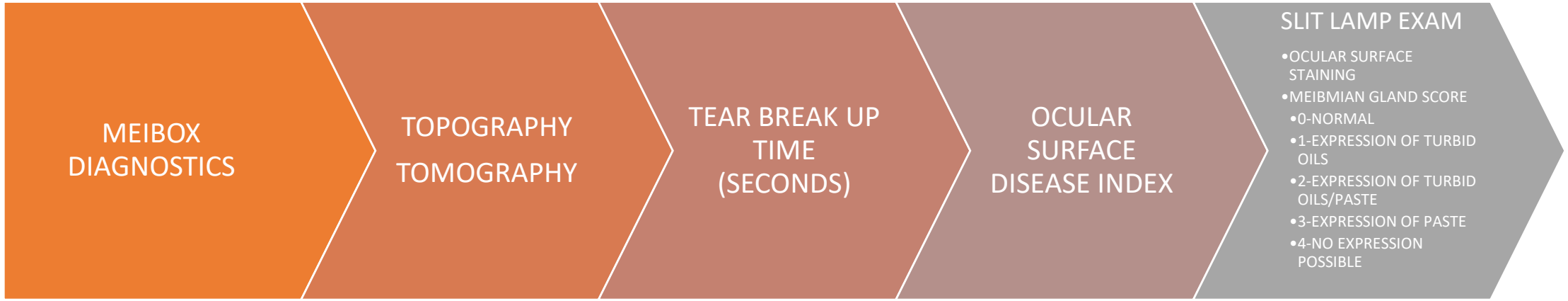
Low Level Light Therapy (LLLT)

LIGHT MODULATION® (LLLT) is a unique technology of photobiomodulation used for many years in various fields of medicine (dermatology, dentistry, etc.). The emission of a particular light - to a certain wavelength - triggers an endogenous heating of the eyelids. This treatment eases the spill - from the Meibomian glands - of the tear film's oily component, stabilizing the lipid layer of the tear.

The emission of light requires a specific wavelength and a proper distance to obtain a deep impact on the treated tissue. Cells absorb light photons and transform their energy into bio-chemical energy producing this way the metabolic processes required to repair and regenerate cells. Light modulation is a patented photobiomodulation technology, a strong metabolic enhancer that stimulates the production of ATP (Adenosine Triphosphate) to increase cellular action and emphasize cells activities. The Light-emitting diode/LED emitting matrix trigger eyelids endogenous heat, directly stimulating the normalization of glands and supporting the thermal impact of the OPE technology.



OUR BASIC WORK UP CONSISTS OF THE FOLLOWING



OCULAR SURFACE DISEASE INDEX (OSDI)

- NORMAL 0-12
- MILD 13-22
- MODERATE 23-32
- SEVERE 33-100

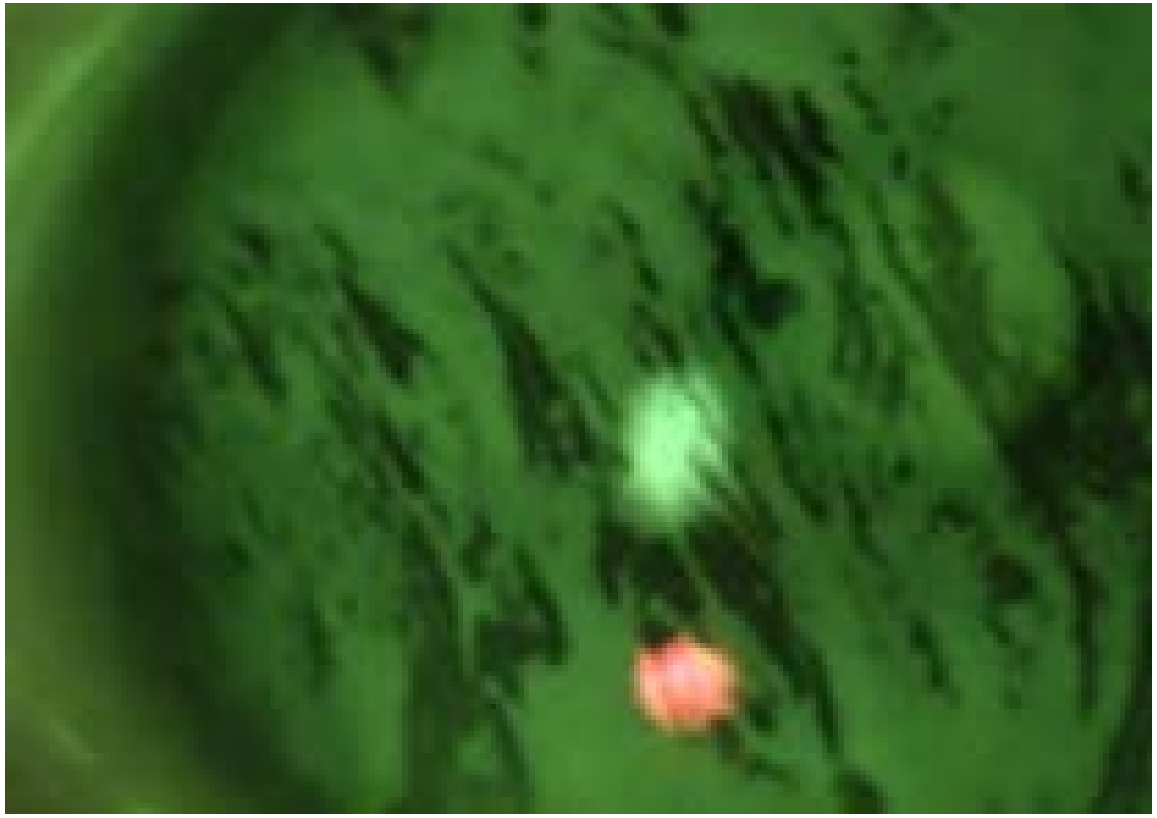
- THERE’S AN APP FOR THAT!

TOPOGRAPHY TOMOGRAPHY

- **NOTE THE IRREGULARITY OF THE SURFACE RINGS**
- **WE CAN GRADE THAT!**
- **SURFACE REGULARITY INDEX**
- **SURFACE ASYMMETRIC INDEX**

TEAR BREAK UP TIME
SECONDS

WE CONSIDER ANYTHING LESS THAN 7 SECONDS ABNORMAL



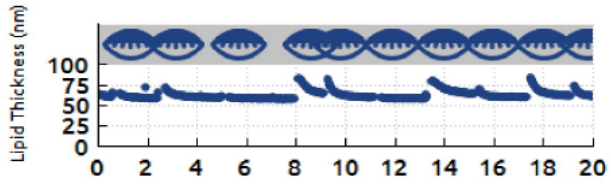
10/27/2015 5:42:20 PM
LipiView® Serial Number: 02055

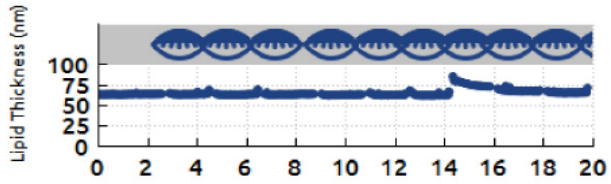
Summary Report

Patient: TEST, TEST (9/12/1988)

Patient ID:

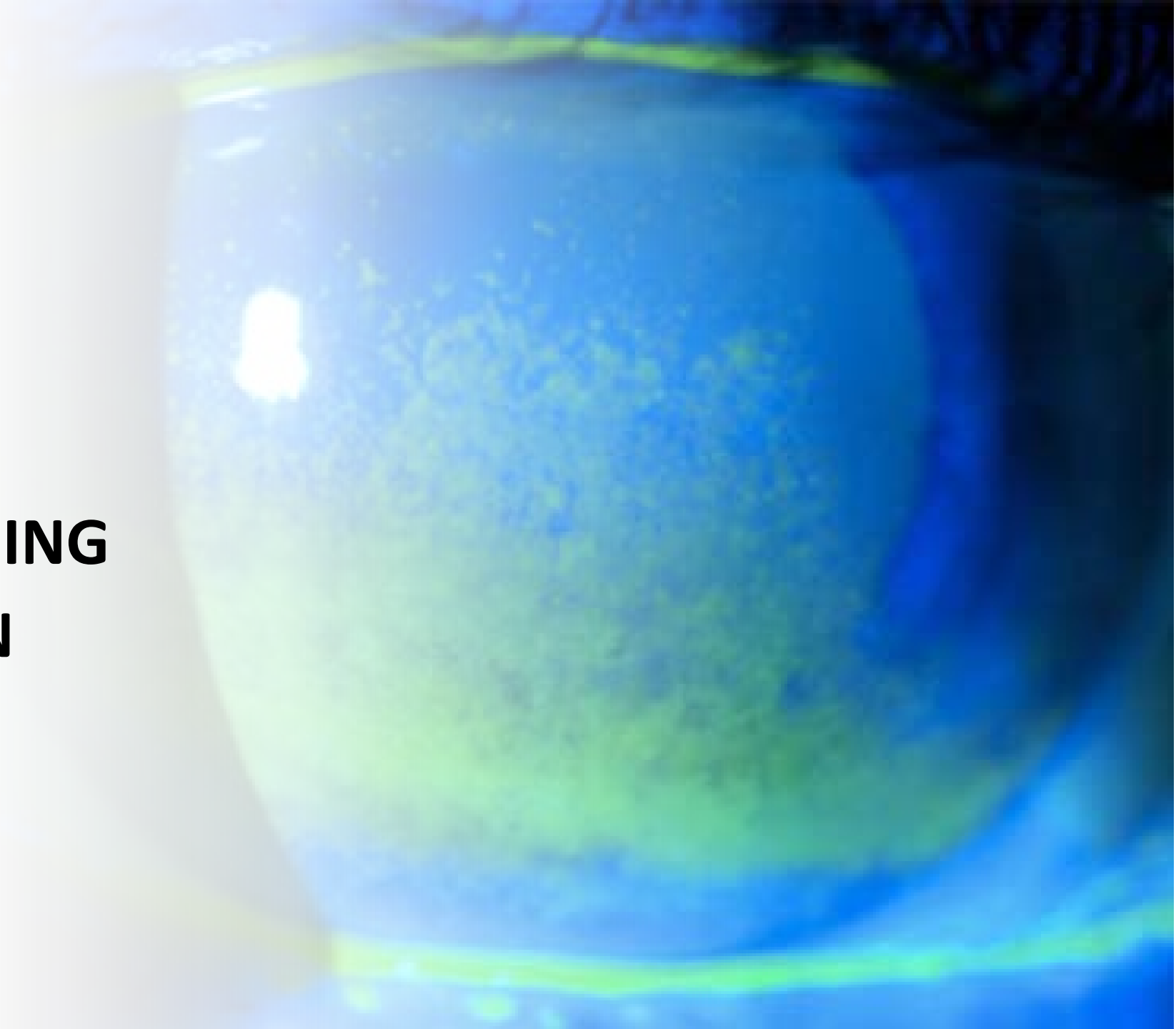
OD		OS	
Average LLT	63 nm	Average LLT	65 nm
Partial Blinks	10 / 10	Partial Blinks	10 / 10
C-Factor	0.95	C-Factor	0.94





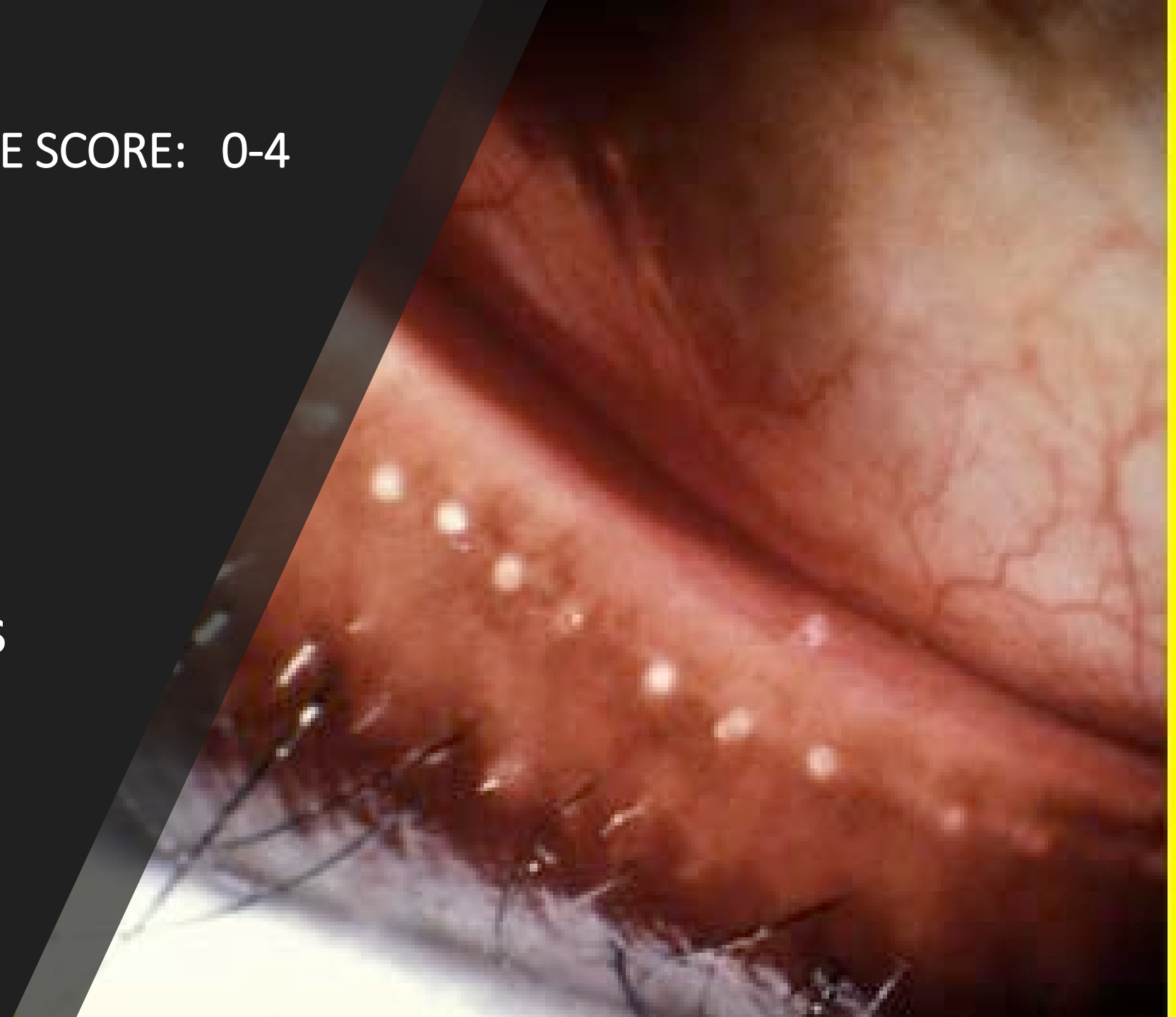
SLIT LAMP EXAM

- STAINING
- FLUORESCEIN STAINING
- LISSAMMINE GREEN STAINING



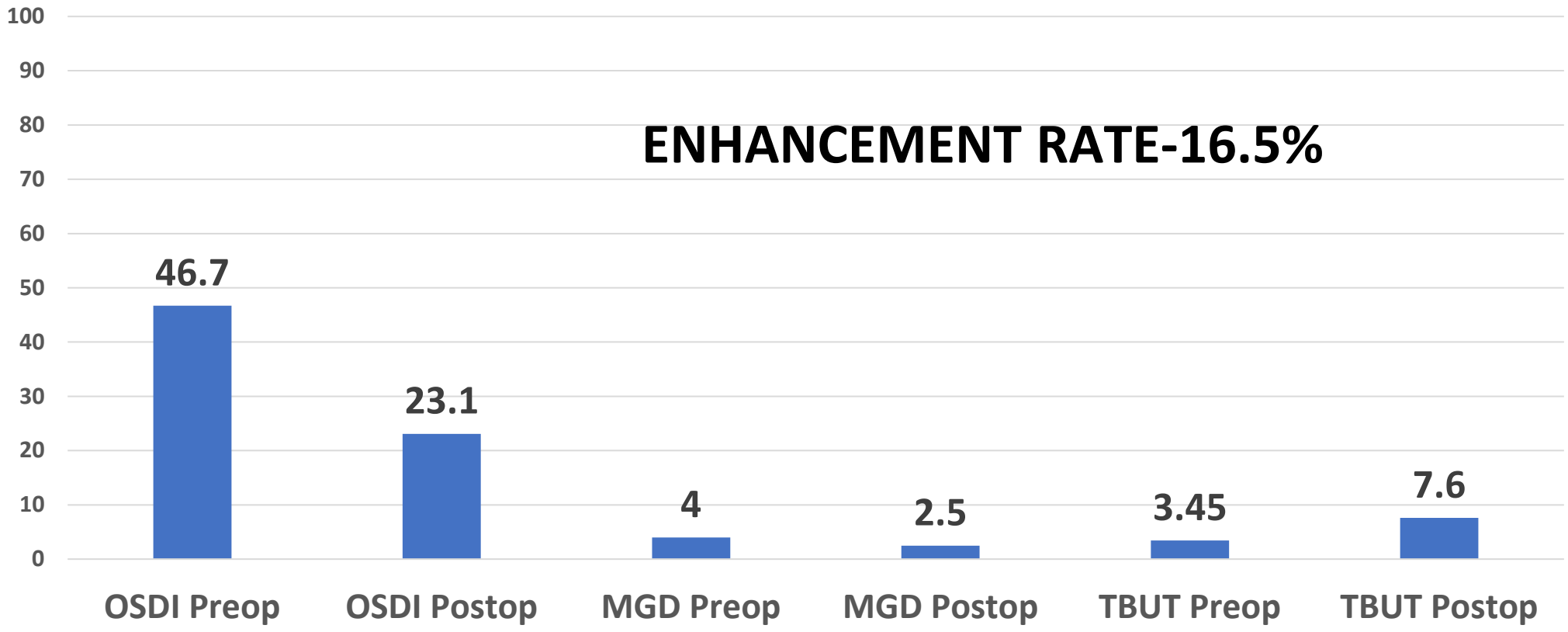
MEIBOMIAN GLAND DISEASE SCORE: 0-4

- **O NORMAL**
- **1 TURBID OILS**
- **2 TURBID IOLS/PASTE**
- **3 PASTE**
- **4 UNABLE TO EXPRESS**



RESULTS

EPIC TREATMENTS
N-370



Clinical Ophthalmology

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ORIGINAL RESEARCH

Combined low level light therapy and intense pulsed light therapy for the treatment of meibomian gland dysfunction

This article was published in the following Dove Press journal:
Clinical Ophthalmology

Karl Stonecipher[1]
Thomas G Abell[2]
Bennett Chotiner[3]
Erik Chotiner[3]
Rick Potvin[4]

[1]Physicians Protocol, Greensboro, NC, USA; [2]Abell Eyes, Lexington, KY, USA; [3]Memorial Eye Institute, Harrisburg, PA, USA; [4]Science in Vision, Akron, NY, USA

Purpose: To evaluate the effects of combined intense pulsed light therapy (IPL) and low-level light therapy (LLLT) on clinical measures of dry eye related to severe meibomian gland disease (MGD) in subjects unresponsive to previous medical management.

Patients and Methods: This was a retrospective chart review of patients treated by 4 physicians at 3 centers. All patients were documented treatment failures with traditional pharmaceutical therapy. They all had their MGD evaluated before treatment using a grading scale (0–4), tear breakup time in seconds and the Ocular Surface Disease Index (OSDI) questionnaire. To be included, all patients had to have had a short course of adjunct pharmaceutical or device-related therapy, along with a combined IPL/LLLT treatment. As well, a second MGD evaluation with the same three measures had to have been conducted 1–3 months post treatment.

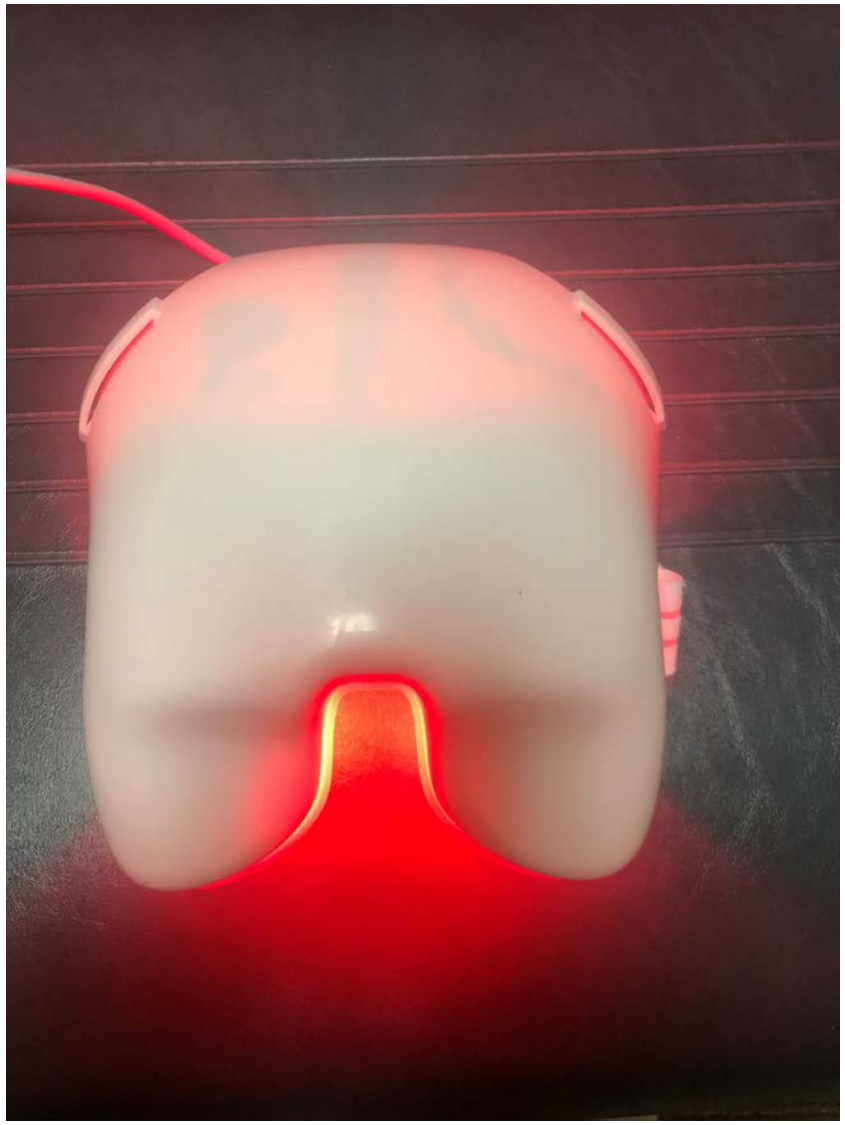
Results: A total of 460 eyes of 230 patients were identified for inclusion in the data set. Mean OSDI scores were significantly lower after treatment; 70.4% of patients had pretreatment OSDI scores indicative of dry eye; this dropped to 29.1% of patients after treatment. A 1-step or greater reduction in MGD grading was observed in 70% of eyes, with 28% of eyes having a 2-step or greater reduction. Tear breakup time was ≤6 seconds in 86.7% of eyes pretreatment, dropping to 33.9% of eyes after treatment. There were no ocular or facial adverse events or side effects related to the combined light treatment.

Conclusion: The use of combined IPL/LLLT for the treatment of severe MGD appears to be beneficial in patients who have failed topical and/or systemic therapy.

Keywords: LLLT, low level light therapy, IPL, intense pulsed light, meibomian gland dysfunction, ocular surface disease index

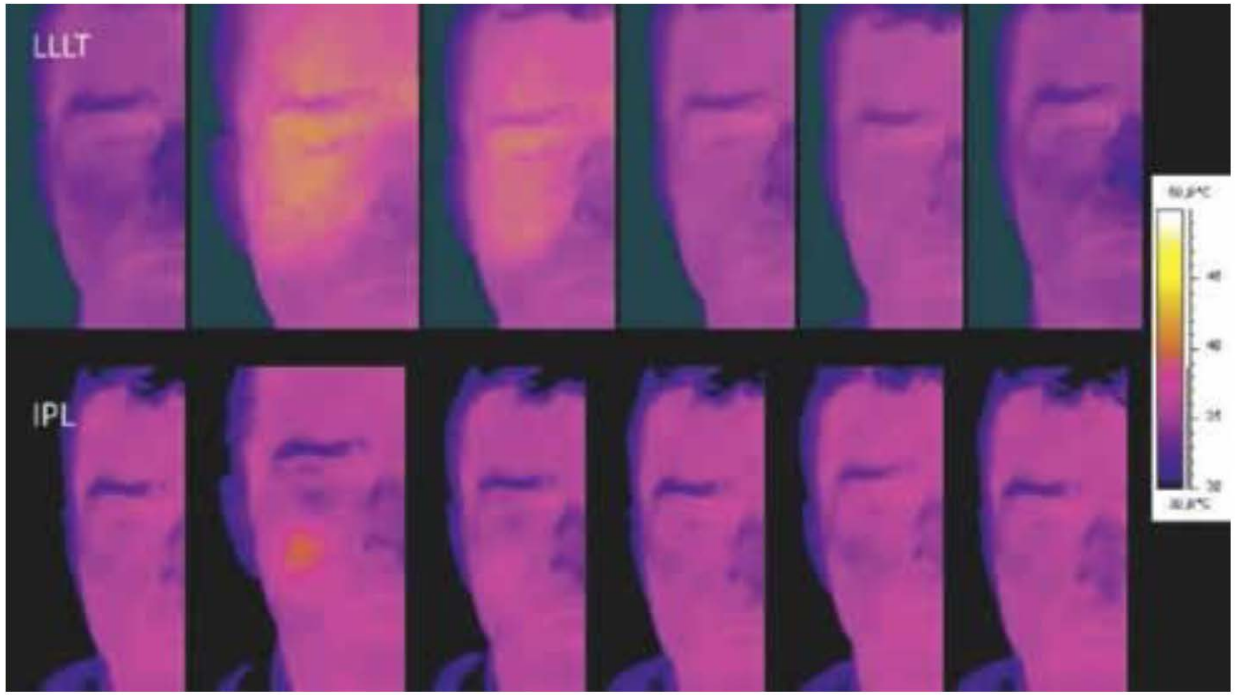
Plain language summary

PHOTOBIOMODULATION
EQUINOX
EPI-C MASK



LOW LEVEL LIGHT THERAPY

LOW LEVEL LIGHT THERAPY



◂Image 4 | Example recordings of a series of measurements before and after LLLT- (above) and IPL application (bottom row).

OPTOMETRIE

Messung der Hauttemperatur nach Intense Pulse Light (IPL)-Anwendung sowie Low-Level-Light-Therapie (LLLT)

Heiko Pult[1,2]

Skin temperature measurement after intensive pulse light (IPL) and low-level light therapy (LLLT) application

Das Ziel dieser Studie war die Hauttemperatur der entsprechenden Gesichtsareale nach Anwendung von Intense Pulse Light (IPL) und Low-Level Light Therapy (LLLT) zu messen.

Methoden | Die Temperatur der Ober- und Unterlider, Wange und Schläfe vor und nach einmaliger Anwendung von IPL und LLLT wurde mit einer Thermokamera vor (T_{vorher}) und direkt nach Anwendung bei 10 Testpersonen mit Dysfunktion der Meibomdrüsen gemessen. Nach der jeweiligen Anwendung wurde sofort (T_{0min}), nach 2 Minuten (T_{2min}), nach 15 Minuten (T_{15min}) und 25 Minuten (T_{25min}) die Temperatur gemessen.

Ergebnisse | Direkt nach der Anwendung (T_{0min}) von IPL war die Temperatur an den Ober- und Unterlidern gegenüber T_{vorher} nicht signifikant erhöht. Die Temperatur der Wange (T_{0min} 39,6° C) und Schläfe (T_{0min} 37,6°C) war signifikant höher (T_{vorher} 35,5° C; 36,0° C). Nach Anwendung (T_{0min}) von LLLT war die Temperatur an den Ober- (40,4° C) und Unterlidern (39,6° C) sowie der Wange signifikant höher als vor LLLT. An den Oberlidern wurde bei T_{2min} und T_{5min} eine signifikant ($p < 0,001$) höhere Temperatur als an den Unterlidern gemessen.

Zusammenfassung | Wogegen nach LLLT-Behandlung eine ausreichende Erwärmung der Lider zu messen war, konnte nach IPL nur die Erwärmung der Wangen und Schläfen festgestellt werden.

The aim of this study was to measure the heat after application of Intense Pulse Light (IPL) and Low-Level Light Therapy (LLLT) of the according facial areas.

Methods | The heat of the upper and lower eyelids, cheek and temple before and after a single application of IPL and LLLT was measured with a thermal camera before (T_{before}) and directly after application in 10 meibomian gland dysfunction subjects. After each application, the temperature was measured immediately (T_{0min}), after 2 minutes (T_{2min}), after 15 minutes (T_{15min}) and 25 minutes (T_{25min}).

Results | Immediately after the application (T_{0min}) of IPL, the heat at the upper and lower eyelids was not significantly increased compared to T_{before}. The heat of the cheek (T_{0min} 39,6° C) and temple (T_{0min} 37,6° C) was significantly higher than before (T_{before} 35,5° C, 36,0° C). After LLLT (T_{0min}) the temperature at the upper (40,4° C) and lower eyelids (39,6° C) as well as the cheek was significantly higher than before LLLT. At the upper eyelids a significantly ($p < 0,001$) higher temperature was measured at T_{2min} and T_{5min} than at the lower eyelids.

Summary | Whereas after LLLT treatment a sufficient warming of the eyelids was measured, no warming of the eyelids but of cheeks and temple could be observed after IPL.

Low Level Light Therapy-LLLT

LLLT Therapy – Developed By NASA – Effective MGD Treatment

Low Level Light Therapy (LLLT) harnesses focused high intensity LED illumination to stimulate ATP generation which heats tissue endothermically. This has been shown to affect MGD as well as other ocular conditions.

LLLT IN PATIENTS UNRESPONSIVE TO OTHER THERAPIES

RESULTS

- Patients were treated 3 times with expression at 48-hour intervals and followed up one month later.
- A total of 50 eyes of 25 patients were identified for inclusion in the data set. After treatment with LLLT, OSDI scores improved in 75% of patients (15/20), TBUT improved in 60% of eyes (24/40), LGS improved in 57.5% of eyes (23/40) and MGD improved in 65% of eyes (26/40).
- Significant improvements in the mean OSDI score ($p = 0.002$), MGD grading ($p < 0.001$), TBUT ($p < 0.001$) LG staining ($p < 0.02$) were observed. There were no ocular or facial adverse events or side effects related to the treatment.

Journal of *Clinical Medicine*

MDPI

Article

Low level light therapy as an adjunct treatment for meibomian gland dysfunction

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Abstract: This retrospective review was designed to evaluate the effects of a short series of low-level light therapy (LLLT) treatments on clinical measures of dry eye related to meibomian gland disease (MGD) in a group of subjects unresponsive to previous therapeutic intervention. Data were collected from charts of patients treated by a single physician (KS) at one site. All extracted results were from patients who were documented treatment failures with multiple traditional pharmaceutical therapies or with devices incorporating IPL (Intense Pulsed Light) technology, lid-specific warming technology or lid thermopulsation. Pre-treatment and post-treatment evaluation included a graded MGD score (grading scale 0-4), tear breakup time (TBUT), an Ocular Surface Disease Index (OSDI) questionnaire score and lissamine green (LG) staining. Included patients were limited to those treated with 3 LLLT treatments in one week, with adjunct use of a topical steroid/antibiotic combination. Post treatment evaluation had to have been made 3 to 5 weeks after the last LLLT treatment. Fifty eyes of 25 patients were evaluated. Significant improvements in the mean OSDI score ($p = 0.002$), MGD grading ($p < 0.001$), TBUT ($p < 0.001$) LG staining ($p < 0.02$) were observed. There were no ocular or facial adverse events or side effects related to the treatment. Results indicate LLLT can be beneficial for patients who failed to improve with alternative pharmaceutical and device interventions.

OPHTHALMIC TREATMENTS

TREATMENT	IPLs	ESPANSIONE LLLT / LIGHT MODULATION MASK
MGD	YES: AT 50%	YES: AT 100%
BLEPHARITIS	YES: AT 50%	YES: AT 100%
CHALAZION	NO	YES
DEMODEX	NO	YES
STYE	NO	YES
SJöGREN SYNDROME	NO	YES
PRE/POST REFRACTIVE SURGERY	VERY COMPLEX/DIFFICULT TO ORGANIZE	YES: AS A PRE/POST REFRACTIVE AND CATARACT SURGERY TREATMENTS, THE MASK IS IDEAL BECAUSE IT DOES NOT TAKE UP DOCTOR'S TIME (IT IS THE NURSE WHO APPLIES THE MASK ON PATIENT'S FACE) AND DOES NOT REQUIRE DEDICATED SPACES (A NORMAL RECLINABLE CHAIR IS ENOUGH)
POST-BLEPHAROPLASTY	NO	YES
CLD - CONTACT LENS DISCOMFORT	VERY COMPLEX/DIFFICULT TO ORGANIZE	YES

Open Access Full Text Article

ORIGINAL RESEARCH

Low level light therapy for the treatment of recalcitrant chalazia: a sample case summary

This article was published in the following Dove Press journal:
Clinical Ophthalmology

Karl Stonecipher[1]
Richard Potvin[2]

[1]Physicians Protocol, Greensboro, NC, USA; [2]Science in Vision, Akron, NY, USA

Purpose: To evaluate the effects of low-level light therapy (LLLT) on the resolution of recalcitrant chalazia.

Patients and Methods: This was a single-site retrospective chart review of patients with chalazia, all of whom were unresponsive to previous pharmaceutical therapy or surgical intervention, who received a 15 min LLLT treatment in conjunction with a standard pharmaceutical regimen. A second treatment was applied 24 hrs to as late as 2 months if there was no evidence of progression of resolution in appearance.

Results: A total of 26 eyes of 22 patients with relevant history and treatment were reviewed, all with a history of prior pharmaceutical treatment for their chalazia. After a single 15 min LLLT treatment, followed by a standard pharmaceutical regimen, 46% of eyes (12/26) showed resolution of their chalazia. Resolution was noted from 3 days to one-month post-treatment. With a second treatment, the chalazia resolved in 92% of eyes (24/26). Only two eyes of the 26 (8%) required incision and curettage after LLLT treatment.

Conclusion: The use of LLLT for the treatment of recalcitrant chalazia appears to be beneficial in patients who have failed topical and/or systemic therapy, significantly reducing the likelihood of requiring surgical intervention.

Keywords: LLLT, low level light therapy, chalazion, chalazia

RECALCITRANT CHALZAIA

92% OF PATIENTS RESPONDED TO TREATMENT

Before

After

ADULTS


THANK YOU
THANK YOU!