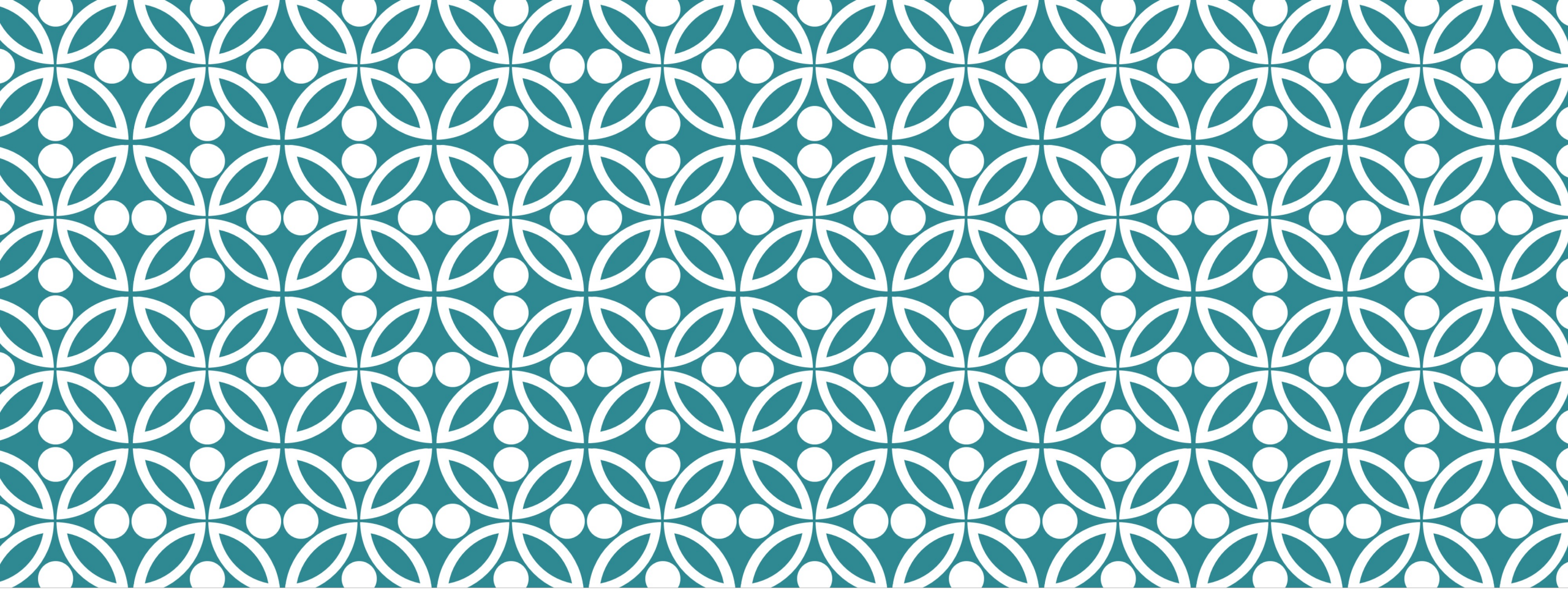


OCULAR ADNEXA

Selina R. McGee, OD, FAAO

FINANCIAL DISCLOSURES

Allergan-
Speaker/Consultant

Bausch & Lomb-
Speaker/Consultant

Bruder-Consultant

CynoSure-
Speaker/Consultant

Dompe-
Speaker/Consultant

Eyevance-Consultant

Horizon-Consultant

Lumenis-
Speaker/Consultant

OptovueSpeaker/Consultant

Osmotica-
Speaker/Consultant

Oyster Point-
Speaker/Consultant

Compulink-Consultant

Novartis-
Speaker/Consultant

Versant-Consultant

Science Based Health-
Speaker/Consultant

Sun-Speaker/Consultant

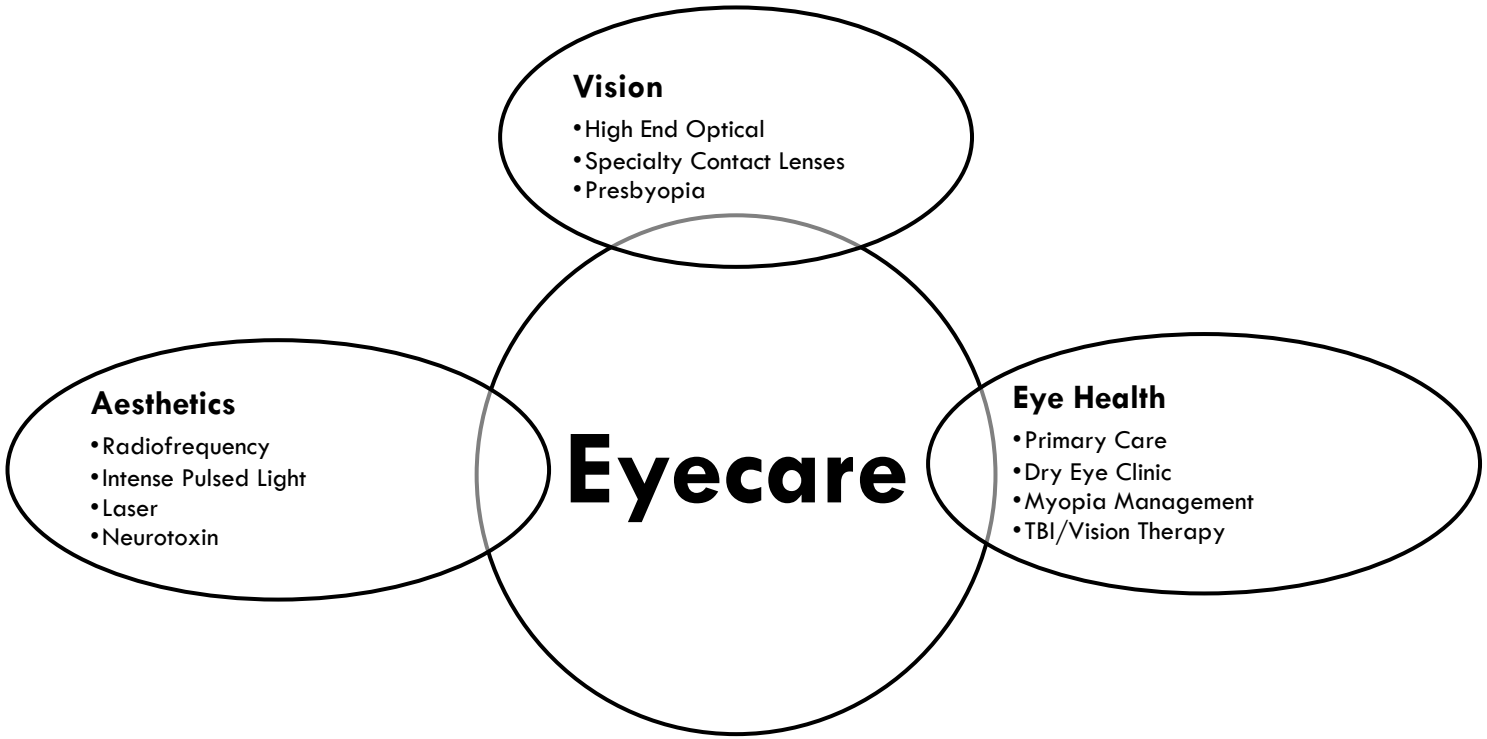
Tarsus-Speaker/Consultant

All financial relationships have been mitigated.

THINK DIFFERENTLY- OPTOMETRY 2.0

What is comprehensive eyecare?

COMPREHENSIVE EYECARE



WHAT'S YOUR LID AND LASH STRATEGY?

Do you have one?

Clean EYES ARE healthy EYES

Keeping lids & lashes free of debris and bacteria helps to relieve and prevent many bacterial-triggered eye concerns

DRY EYE / MGD

BLEPHARITIS

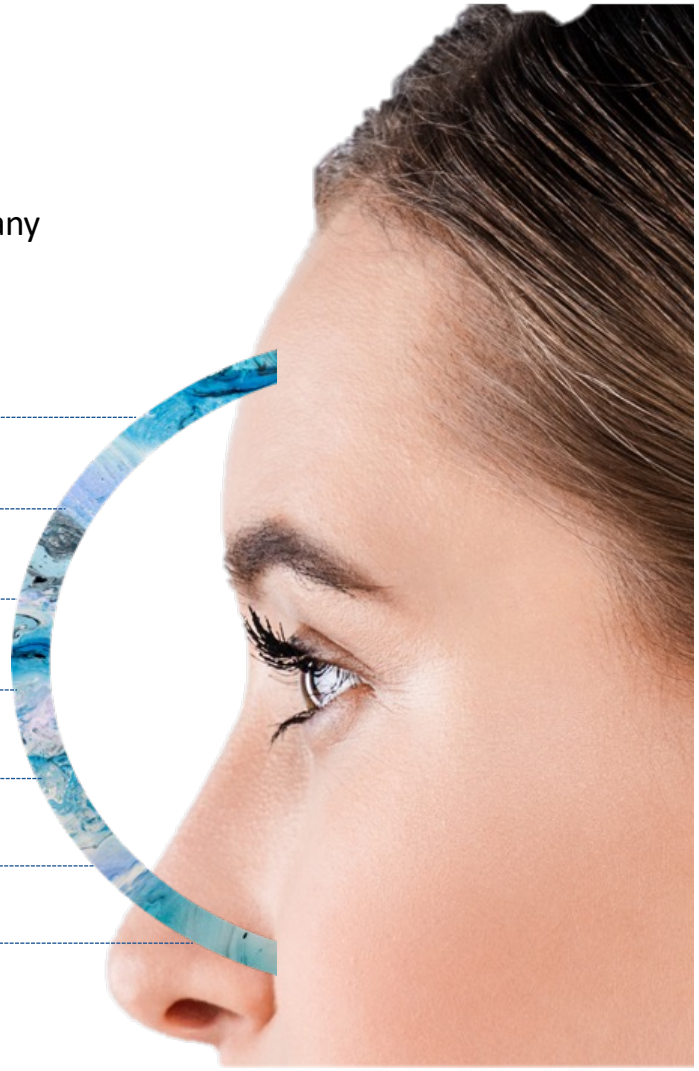
EYELASH EXTENSIONS CARE

CONTACT LENS DISCOMFORT

STYES / CHALAZIA

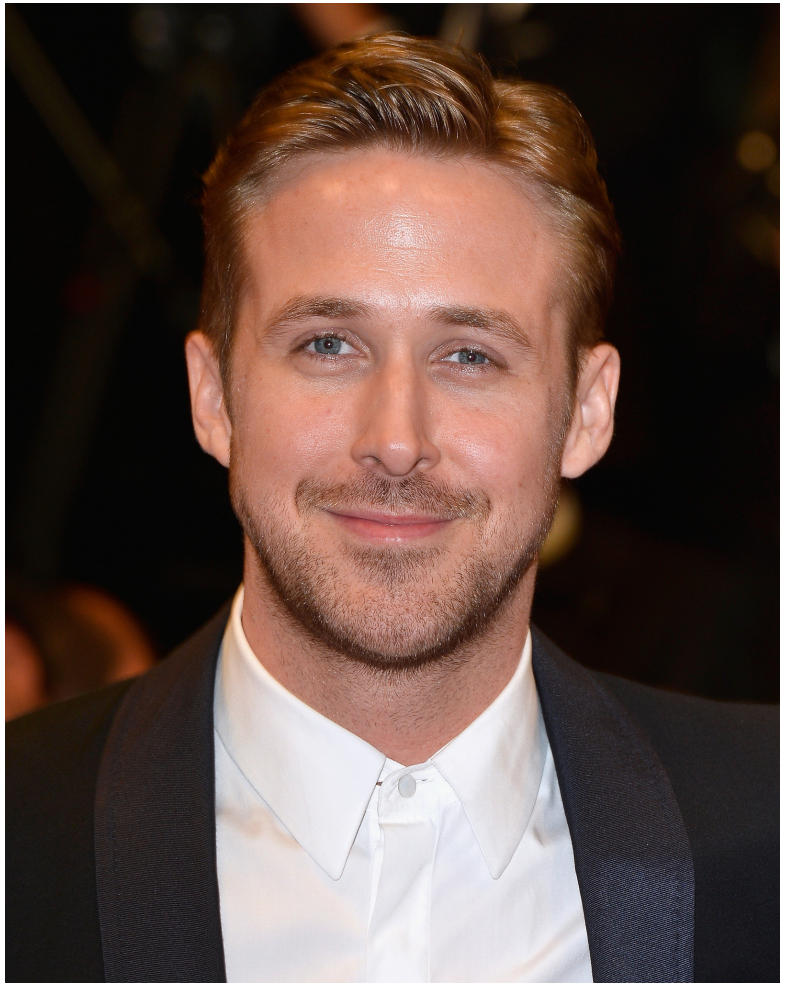
OCULAR ROSACEA

DEMODEX



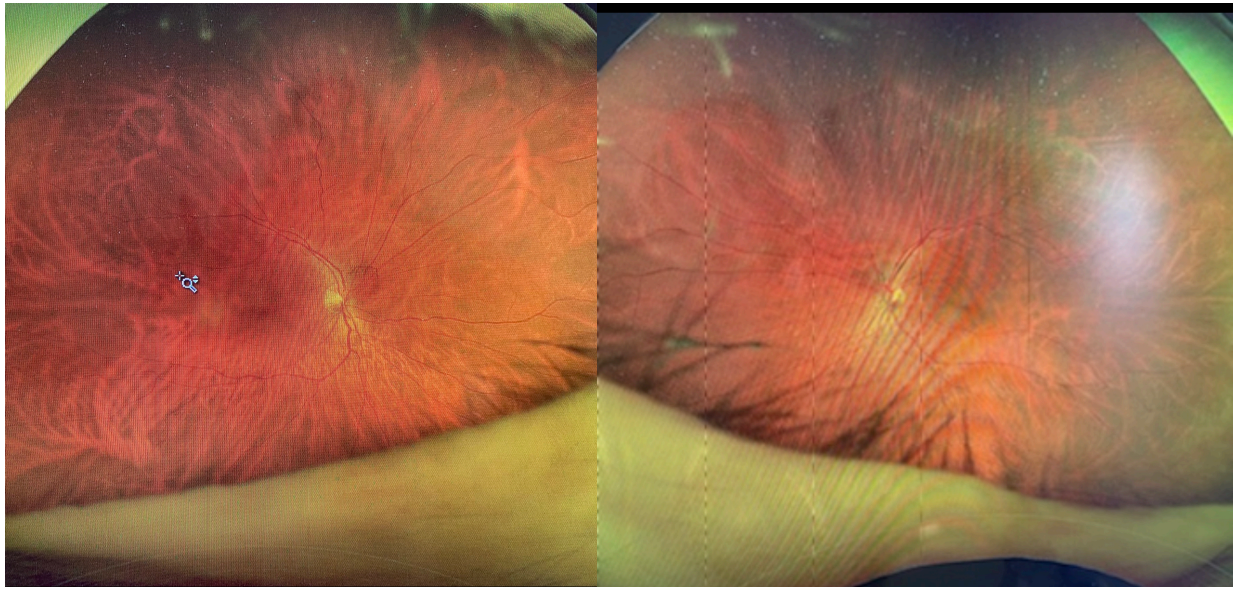
WHAT DO YOU SEE?

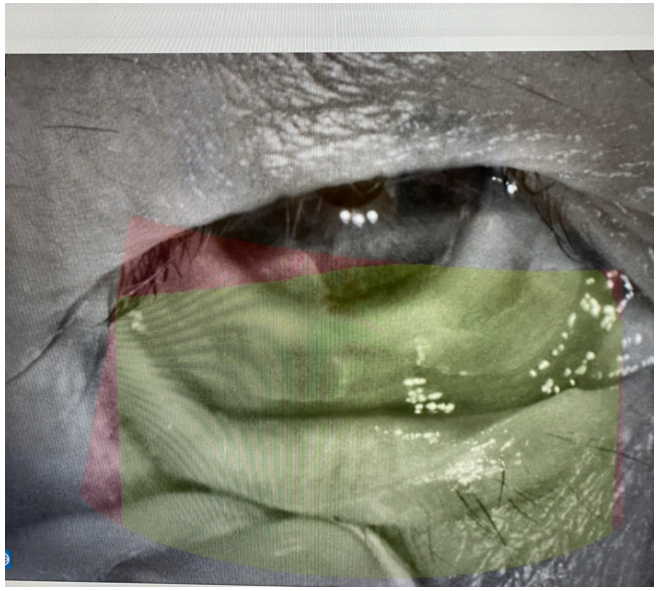
I SEE…

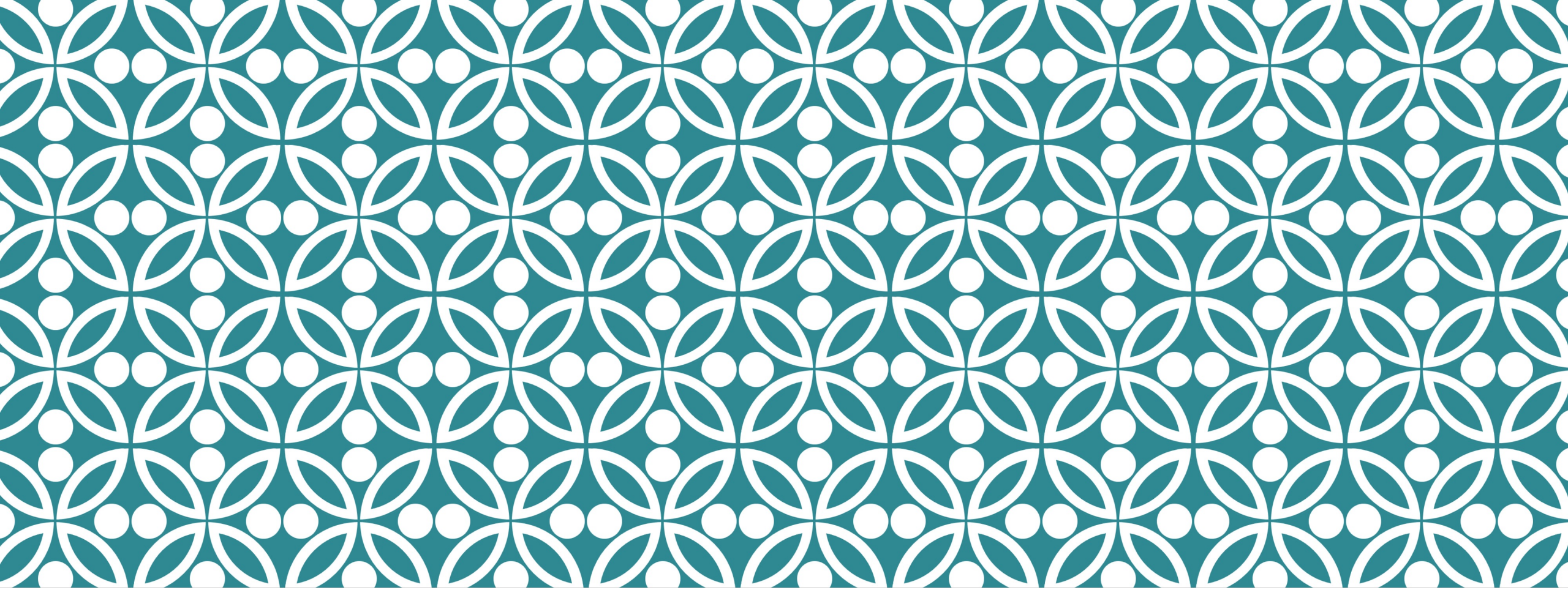


I SEE…

WHAT DO YOU NOTICE?







SKIN AND AGING

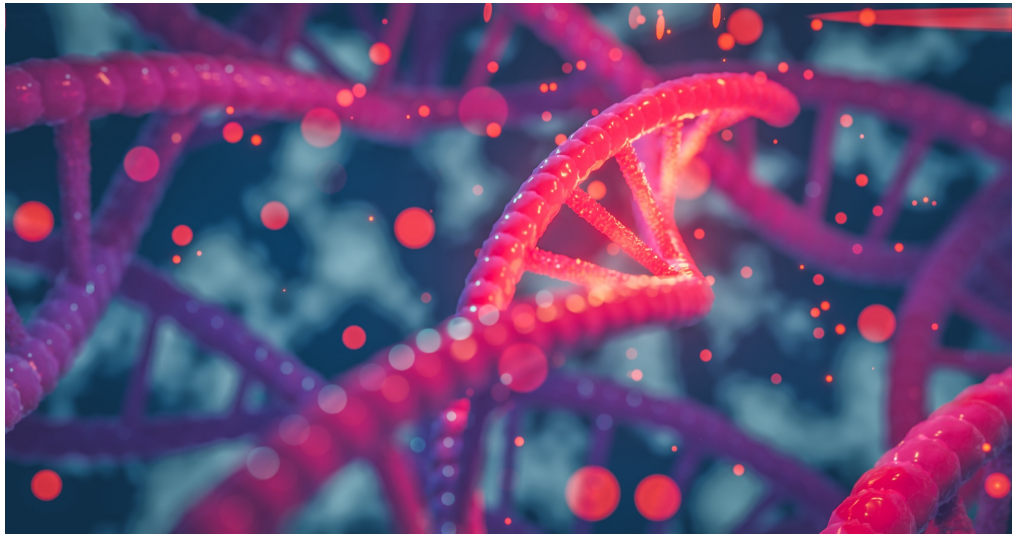
INTRINSIC AND EXTRINSIC AGING

Genes

Ethnicity

Disease

Medical Conditions



WRINKLE GENERATORS

Sun Exposure

Smoking

Excessive alcohol intake

Poor nutrition

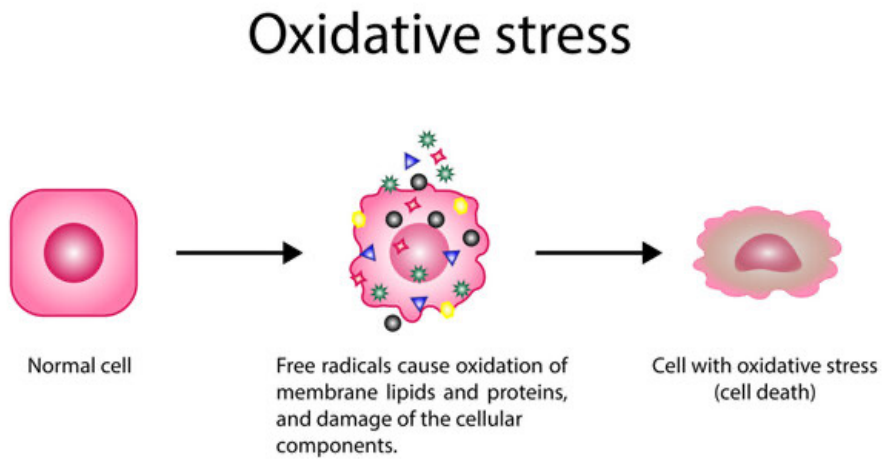
- Relative oxygen species (ROS) are produced. It's not just aging that is a risk factor, it's also cigarette smoke, low humidity, sunlight (UV radiation), pollutants, autoimmune diseases like Sjogren's, Lupus, rheumatoid arthritis, and also certain preservatives (like BAK.)

ROS-REACTIVE OXYGEN SPECIES

While the aging process is still not well understood, there is a wide agreement that oxidative stress plays a role.

Oxidative stress does in fact increase with age and has been linked to dry eye disease. Oxidative stress happens when an imbalance between the generation of free radicals and the ability of antioxidants to neutralize them occurs. During this imbalance, relative oxygen species (ROS) are produced.

It's not just aging that is a risk factor, it's also cigarette smoke, low humidity, sunlight (UV radiation), pollutants, autoimmune diseases like Sjogren's, Lupus, rheumatoid arthritis, and also certain preservatives (like BAK.)



ANATOMY AND AGE

UV exposure-Free Radicals

Gravity

Loss of collagen

Loss of elasticity

Skin thinning

WHY DO WE AGE?

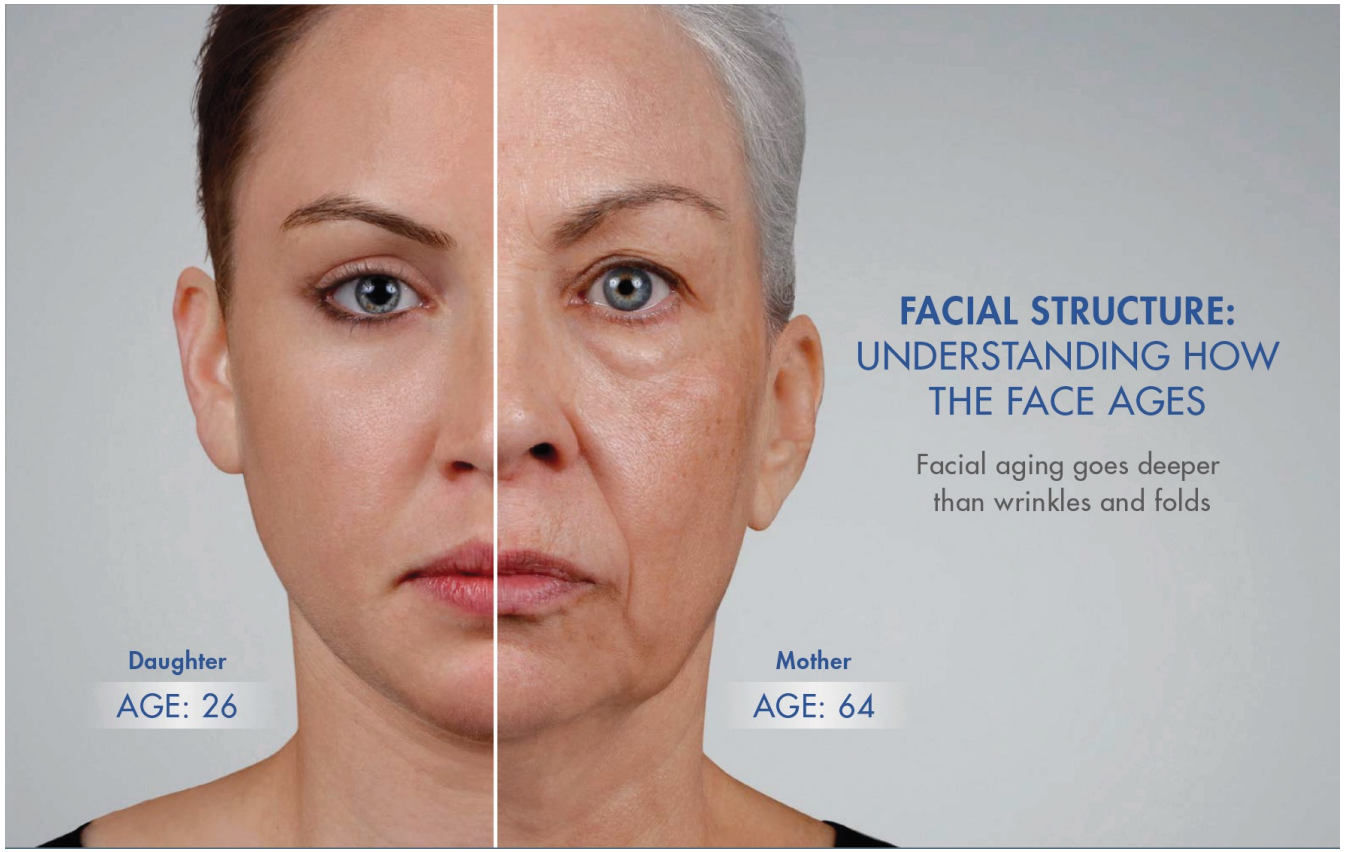
Causes / Signs of Aging

- Loss of collagen / elastin / volume
  - At ~35 yrs of age, women begin to lose collagen faster than men at a rate of 1.5% every year
- Damage from environment
  - Free radical damage from smoking, sun damage, autoimmune

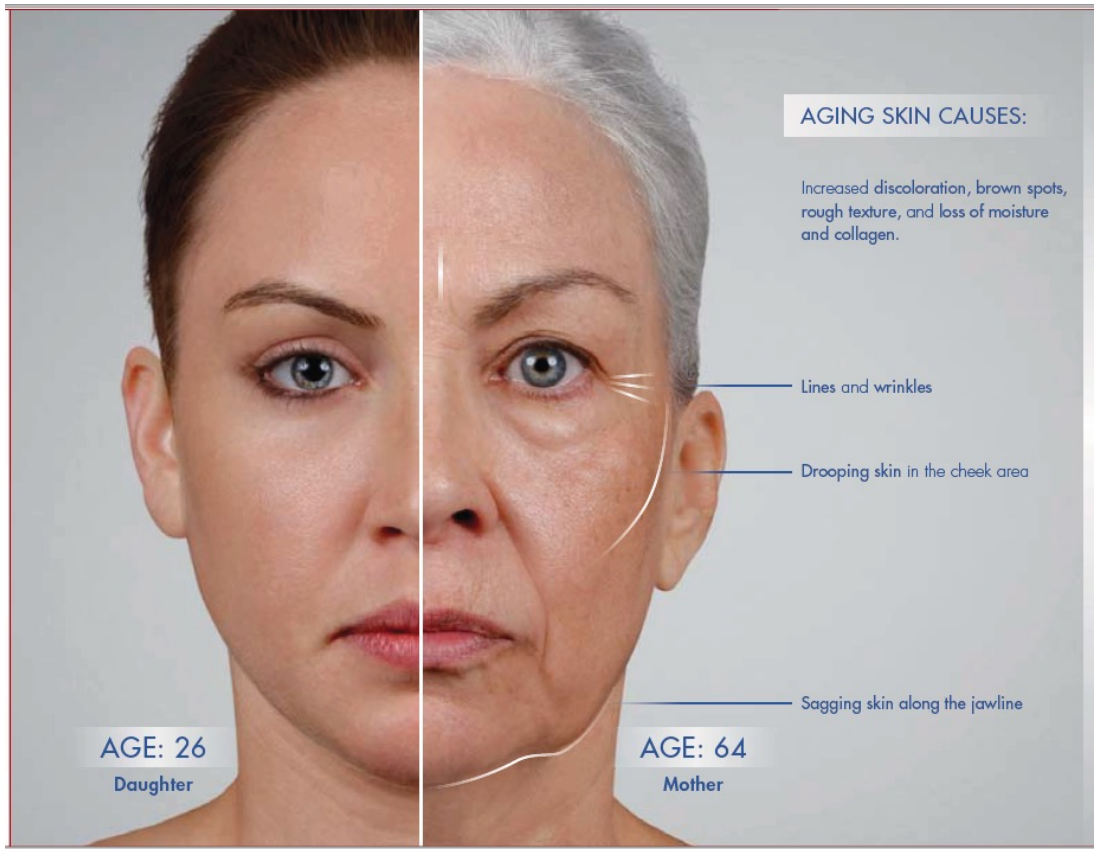
Shift from radical surgical reconstruction → utilization of natural processes to restore / reverse signs of aging

- Our bodies are capable of replenishing / restoring collagen & elastin
- Specific reactions are required to stimulate / mobilize our bodies resources

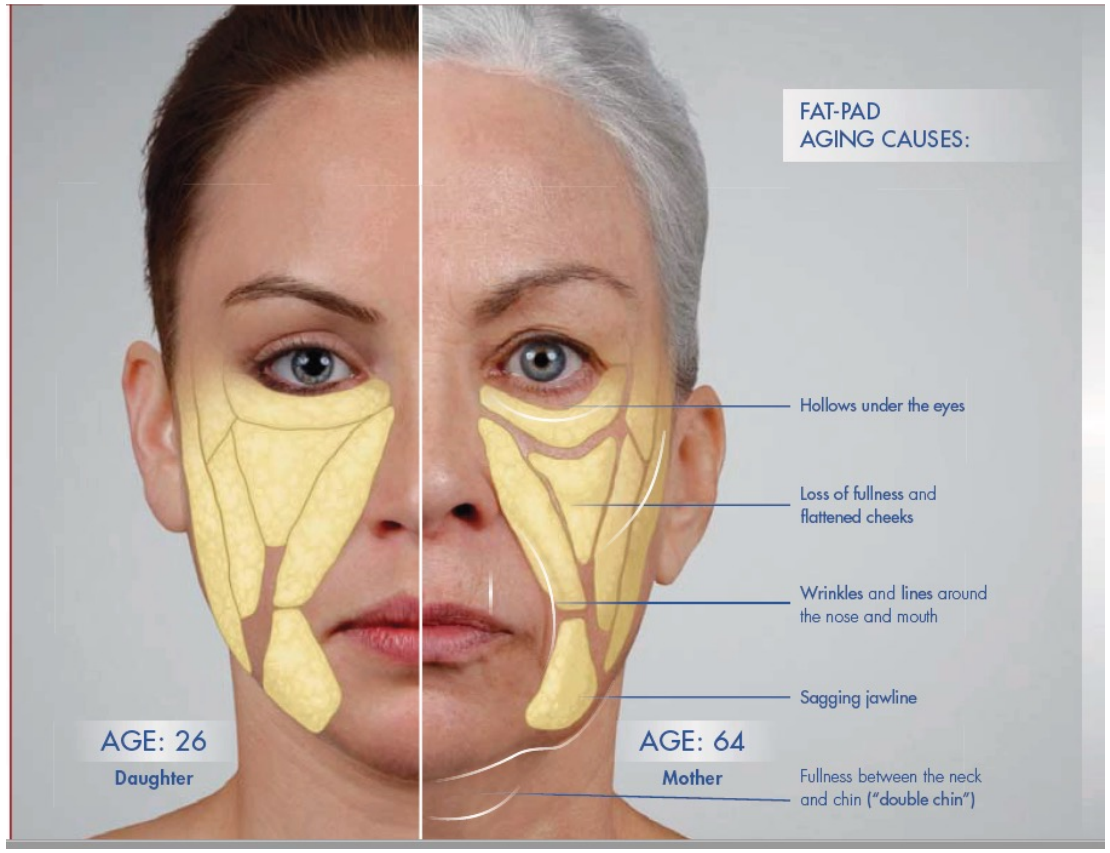
UNDERSTANDING HOW THE FACE AGES



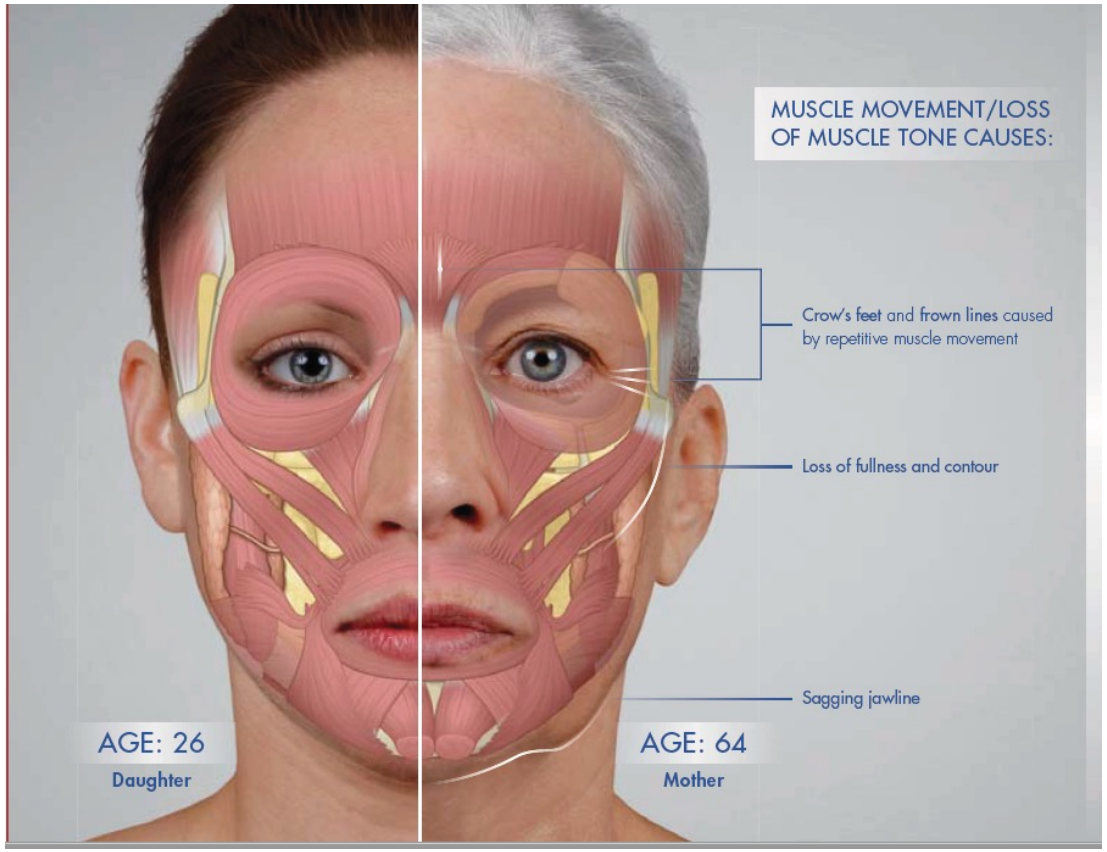
UNDERSTANDING HOW THE FACE AGES



UNDERSTANDING HOW THE FACE AGES

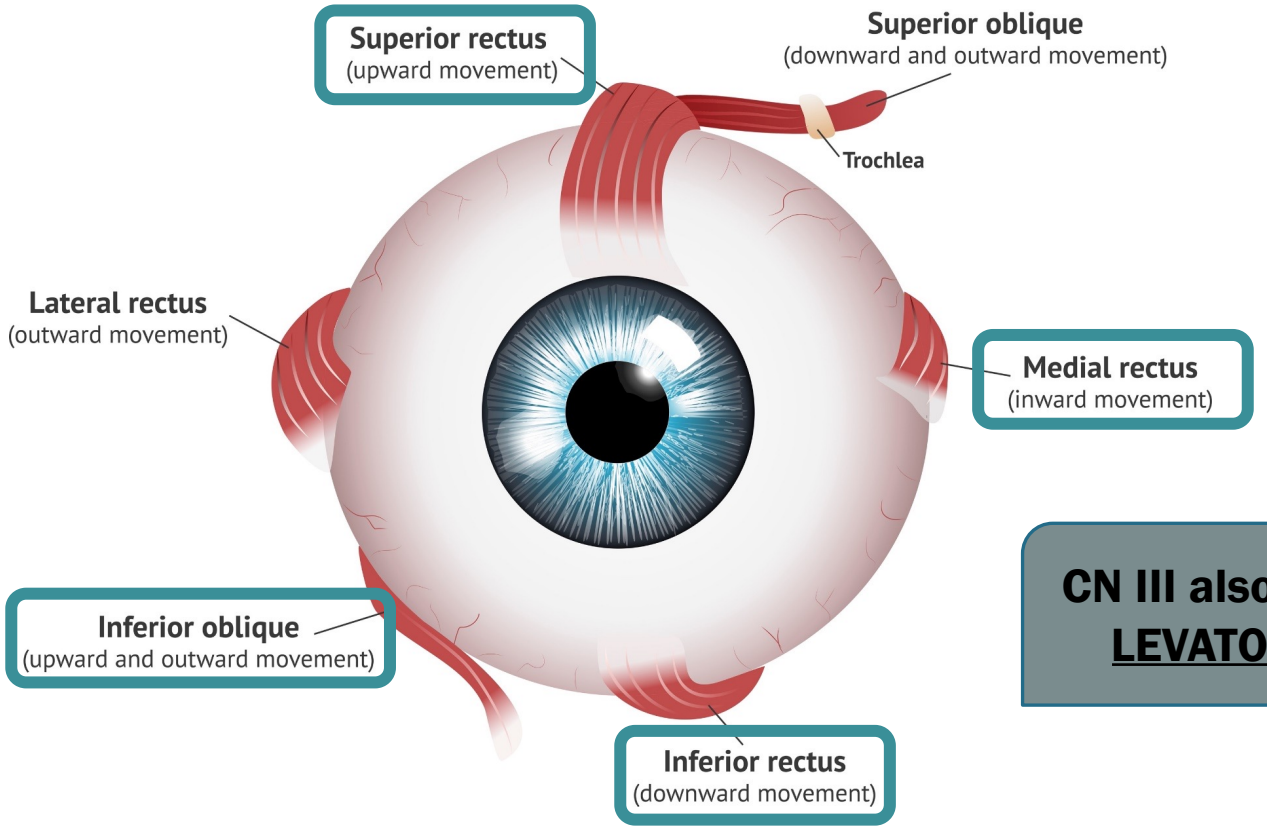


UNDERSTANDING HOW THE FACE AGES



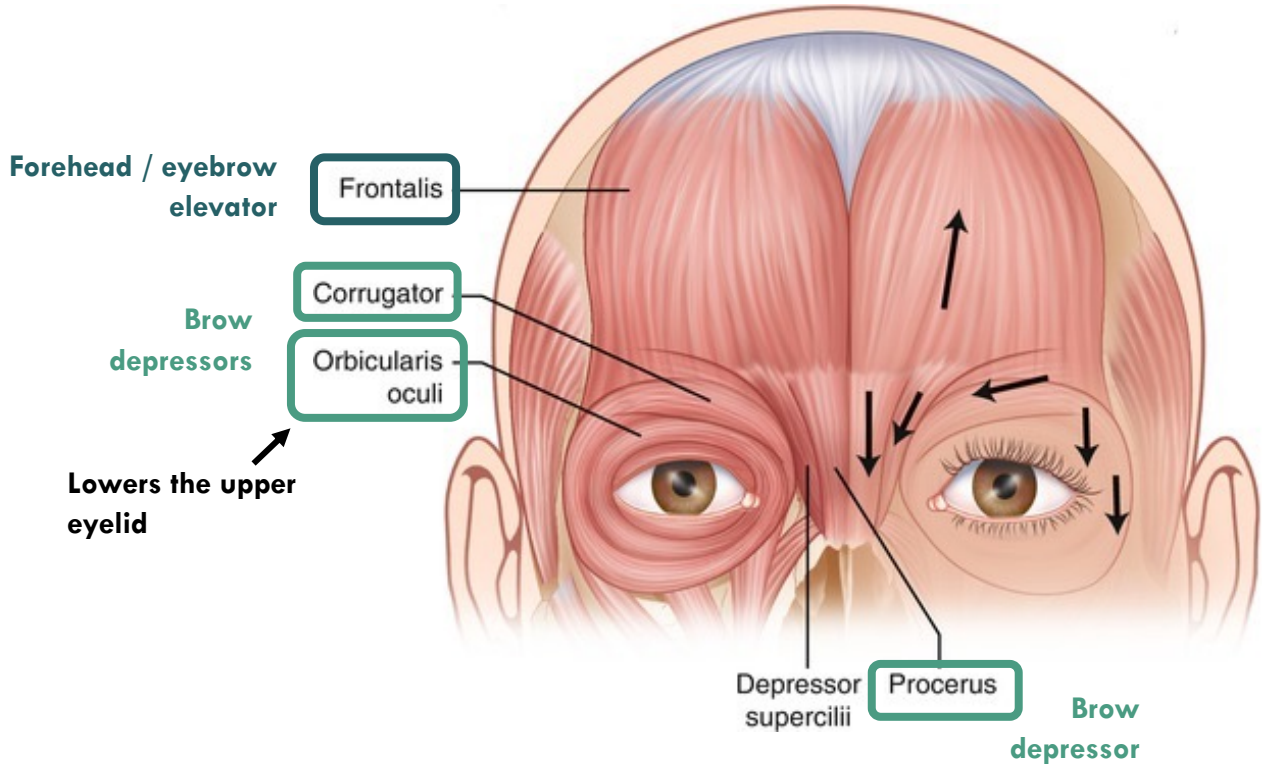
UNDERSTANDING HOW THE FACE AGES

OCULOMOTOR NERVE (CRANIAL NERVE III) INNERVATES 4 OF THE 6 MUSCLES



CN III also supplies the <u>LEVATOR MUSCLE</u>

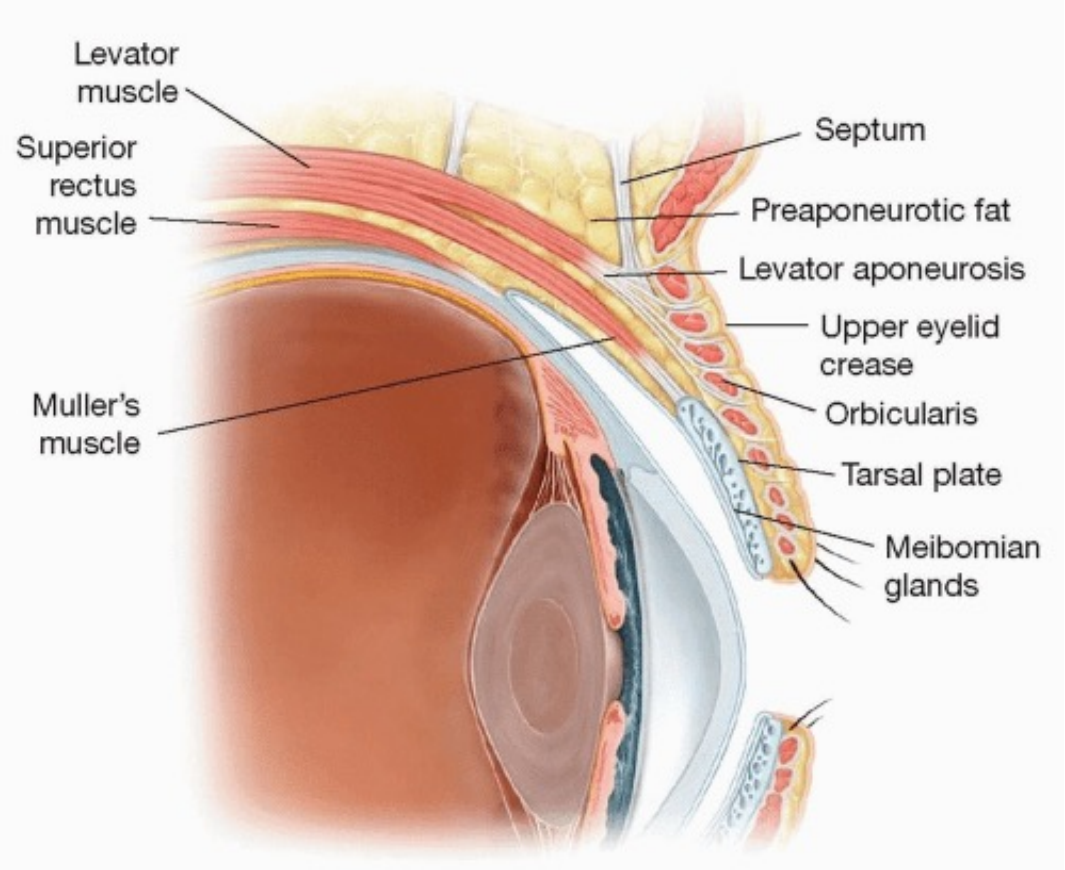
FOREHEAD & EYEBROW MUSCULATURE



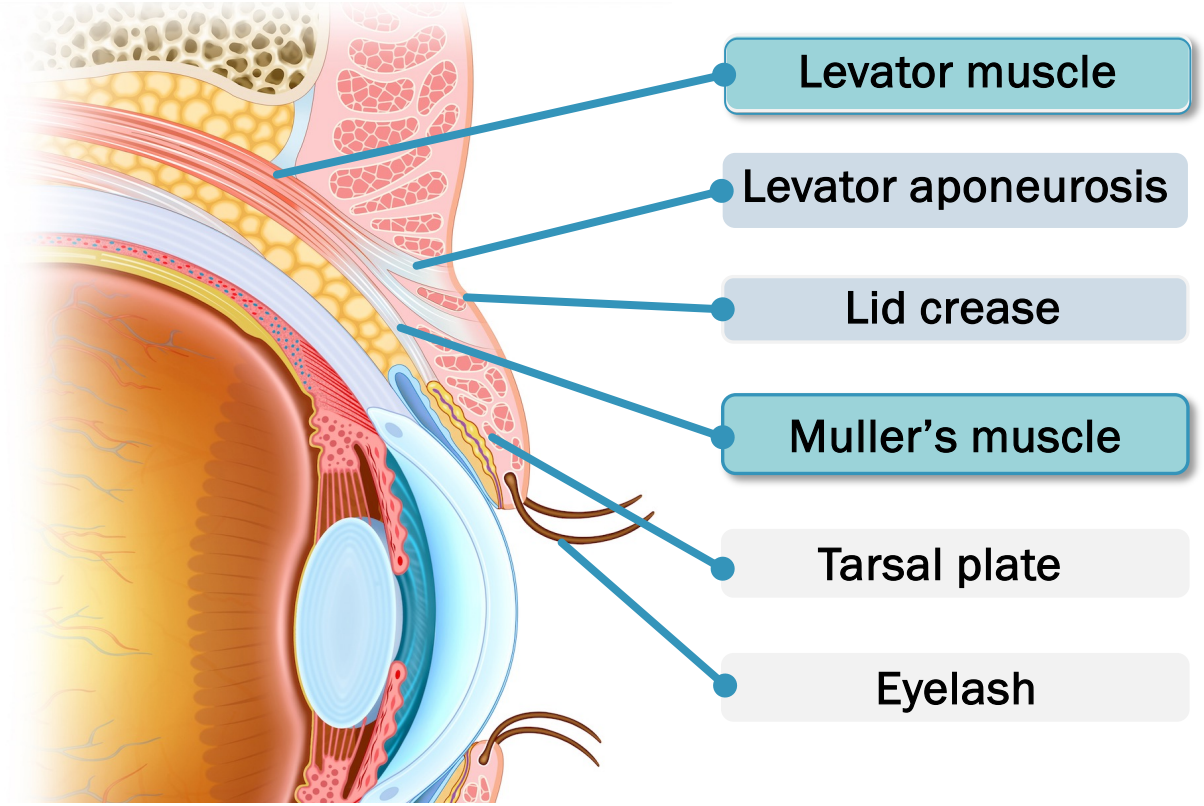
Black arrows indicate direction of muscle contraction

1. Massry GG. *Pearls and Pitfalls in Cosmetic Oculoplastic Surgery*. 2015. 2. Finsterer et al. *Aesth Plast Surg*. 2003; 27:193–204.

EYELID ANATOMY REFRESHER

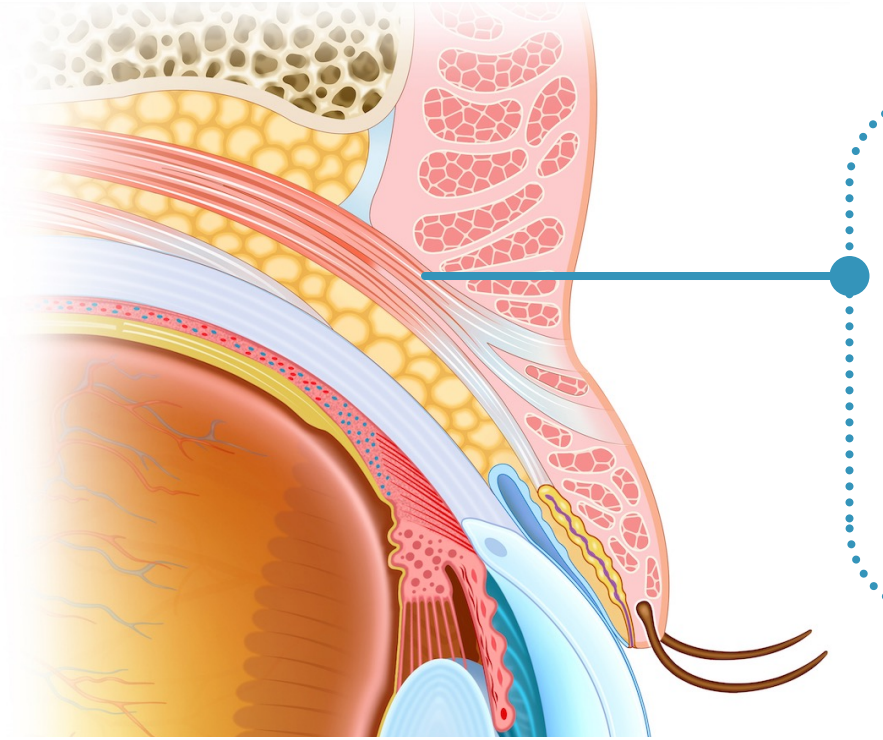


LID ANATOMY: TWO MUSCLES LIFT THE EYELID



Finsterer et al. *Aesth Plast Surg.* 2003; 27:193–204.

LEVATOR MUSCLE:
MAJOR ELEVATOR OF THE UPPER LID

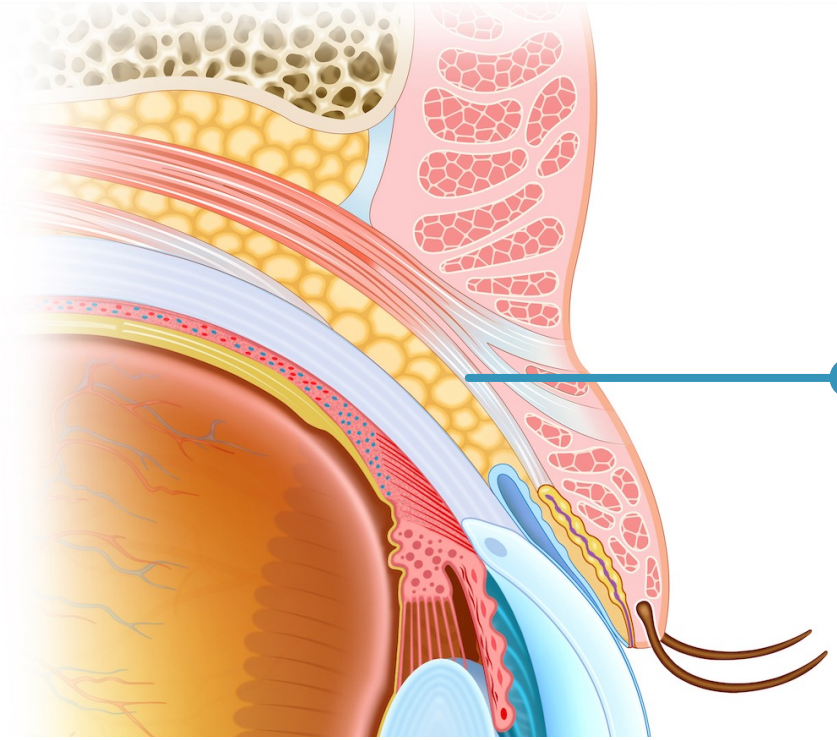


LEVATOR MUSCLE

- Innervated by CN III
- Controls lid opening
- Transitions from muscle to aponeurosis
- Inserts into anterior tarsal plate, forming the upper eyelid crease

Finsterer et al. *Aesth Plast Surg.* 2003; 27:193–204.

MULLER'S MUSCLE: WORKS WITH LEVATOR TO ELEVATE LID

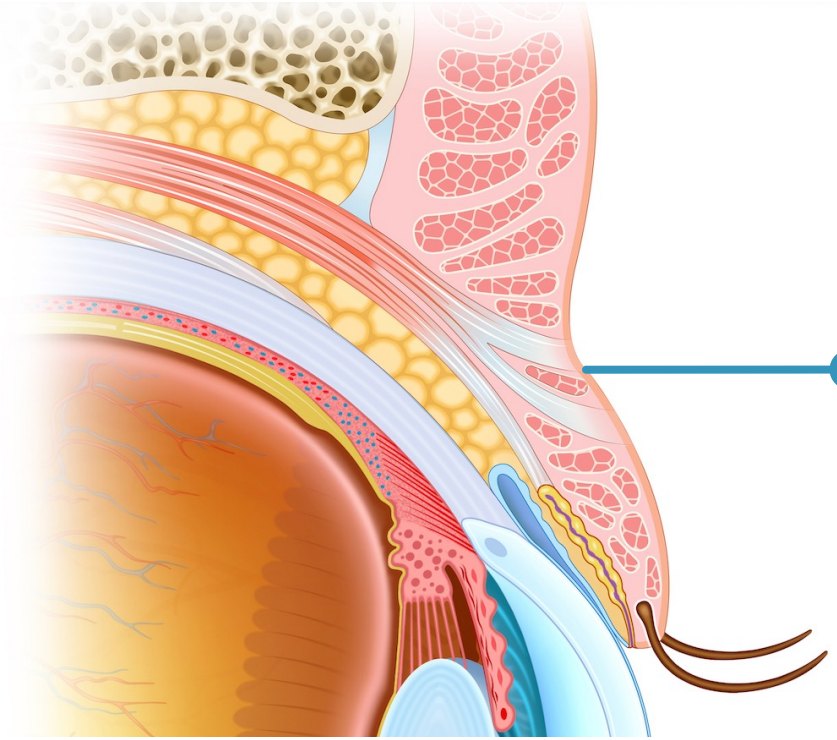


MULLER'S MUSCLE

- Sympathetically innervated
- Regulates palpebral fissure width
- Elevates lid ~2 mm
- Originates from & works with the levator muscle
- Inserts into superior tarsal plate

Finsterer et al. *Aesth Plast Surg.* 2003; 27:193–204.

UPPER LID CREASE



LID CREASE

- Forms due to attachment of levator aponeurosis to the tarsal plate and skin
- Average of 7-12 mm from lashes

Finsterer et al. *Aesth Plast Surg.* 2003; 27:193–204.

UPPER LID CREASE CREATES THE LID FOLD

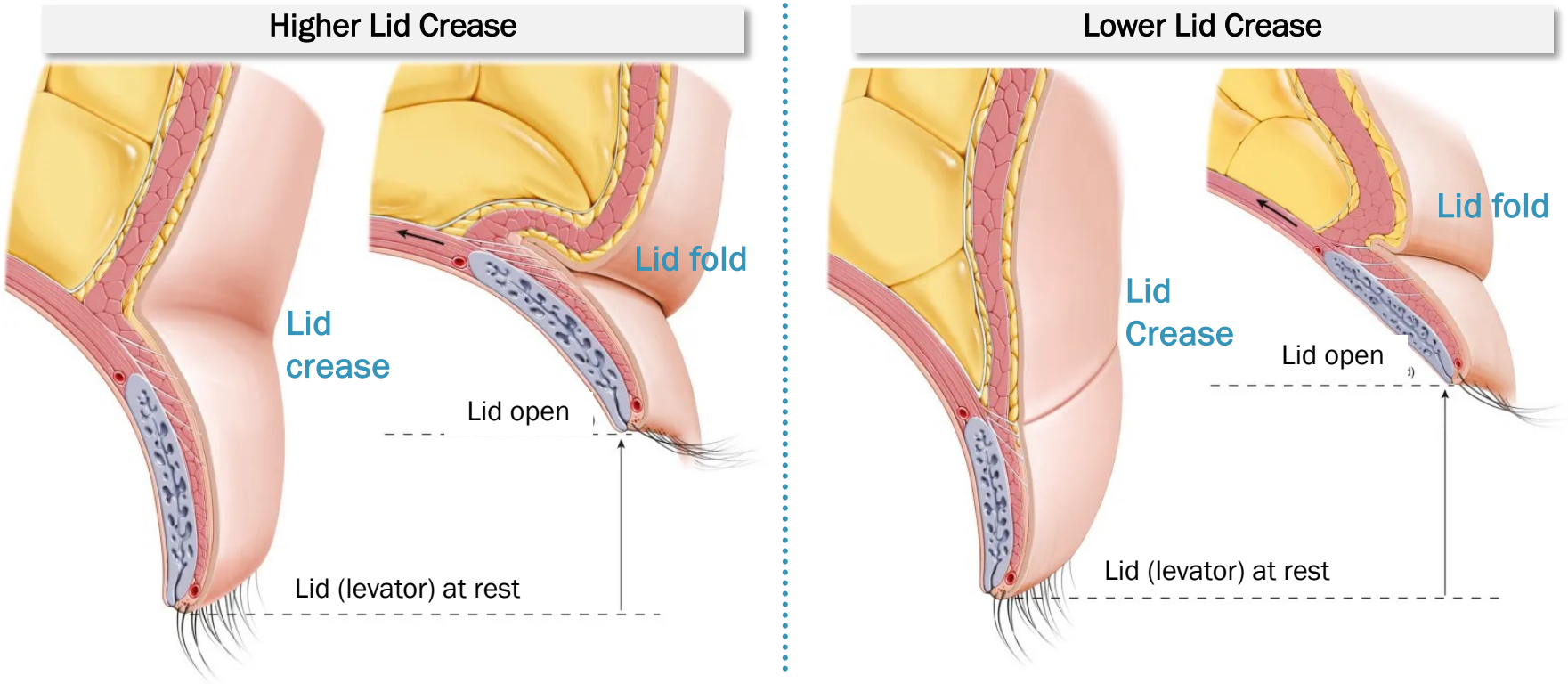
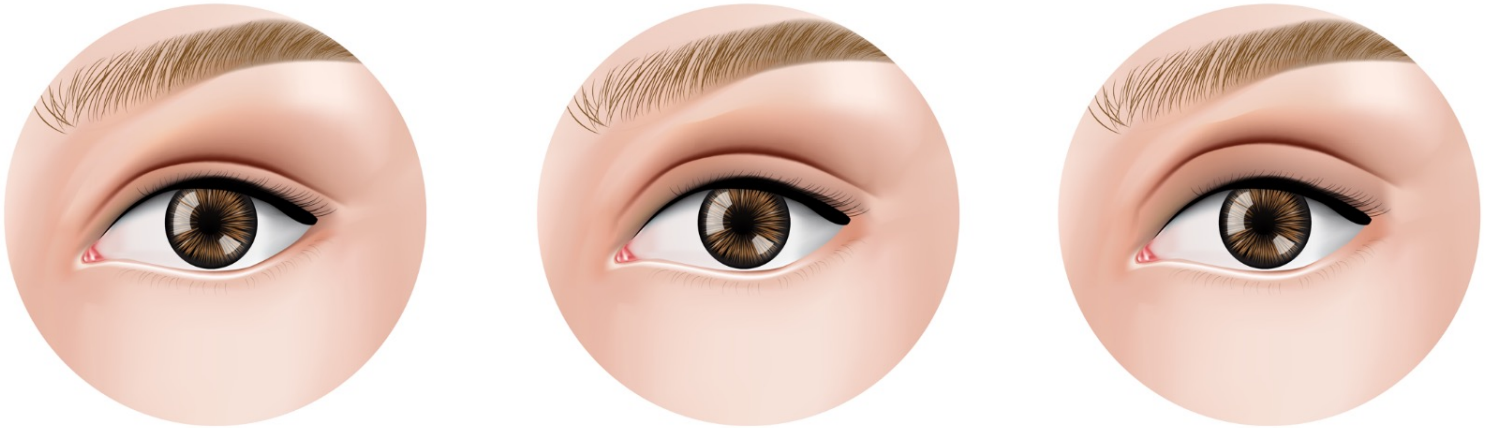


Image source: Ento Key; Available at: https://entokey.com/advanced-concept-of-a-glide-zone-as-it-relates-to-upper-lid-crease-lid-fold-and-application-in-asian-blepharoplasty/

VARIATIONS IN LID FOLD & LID PLATFORM



VARIATIONS IN LID FOLD & LID PLATFORM

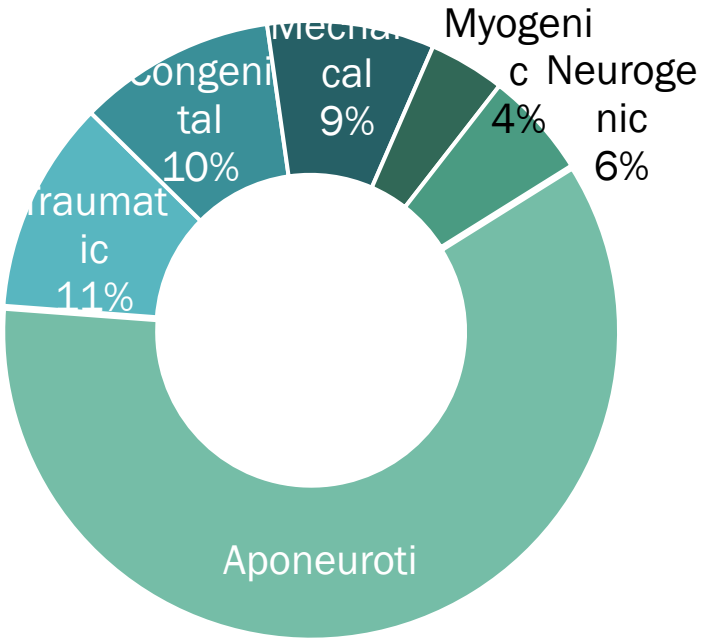
BLEPHAROPTOSIS BASICS

BLEPHAROPTOSIS: PTOSIS OR "DROOPY EYELID"

- Abnormal, low-lying (drooping) upper eyelid margin with eye in primary gaze
- Unilateral or bilateral
- Severity depends on degree of lid droop
- Common eyelid disorder affecting adults of all ages, especially over 50
- Typically, slowly progressive and most often associated with aging

Finsterer J. *Aesthetic Plast Surg*. 2003;27(3):193–204.

ETIOLOGIES OF PTOSIS



Congenital vs. Acquired Ptosis

CONGENITAL

- Typically, a result of developmental myopathy of the levator muscle or innervation abnormality

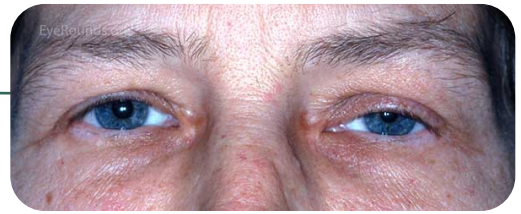
ACQUIRED

- **Aponeurotic:** Stretching or disinsertion of the levator muscle – MOST COMMON
- **Neurogenic:** Reduced nervous input to upper eyelid retractor muscles
- **Traumatic:** Injury
- **Mechanical:** Excess skin / eyelid heaviness
- **Myogenic:** Primary muscle dysfunction

1. Finsterer J. *Aesthetic Plast Surg*. 2003;27(3):193–204. 2. Sudhakar P, et al. *Am J Clin Med.* 2009;6(3):5-14. **3.** Custer PL. Blepharoptosis. In: Yanoff M, Duker JS, eds. *Ophthalmology*. 3rd ed. St Louis, United States: Elsevier; 2008. **4.** Klejch W, et al. Available at: http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm. Accessed November 27, 2021.

PTOSIS CAN BE A SIGN OF SERIOUS UNDERLYING NEUROLOGICAL DISEASE

- **Horner's syndrome:** Mild ptosis associated with ipsilateral pupil constriction, eye redness, and anhidrosis[1,2]
  - Can be secondary to trauma, stroke, vascular disease, or a pulmonary carcinoma
- **Myasthenia gravis:** Unilateral or bilateral ptosis with upper eyelid position variability, often accompanied by diplopia and/or strabismus[1,2]
- **Chronic progressive external ophthalmoplegia (CPEO):** Symmetric, bilateral ptosis and ophthalmoparesis, with initial presentation typically in patient's 30s[1,2]
- **Oculomotor nerve (CN III) palsy:** Ptosis associated with ophthalmoplegia, diplopia, and poorly-reactive dilated pupil[1,2]
  - Can be a result of ischemic injury or aneurysm



Ptosis in a patient with Horner's syndrome

Ptosis in a patient with Myasthenia gravis

CN III, third cranial nerve

1. Finsterer J. *Aesthetic Plast Surg*. 2003;27(3):193–204. 2. Klejch W, et al. Available at: http://webeye.ophth. Accessed September 27, 2019.

A CAUSE FOR PAUSE

Acute presentation

Unilateral ptosis

Asymmetry or aberrant pupillary function

Reduced levator function on either side

Based on these clinical observations, further consideration of other causes may be warranted.

PSEUDOPTOSIS CAN OCCUR IN THE ABSENCE OF UPPER LID MUSCLE PATHOLOGY OR APONEUROSIS

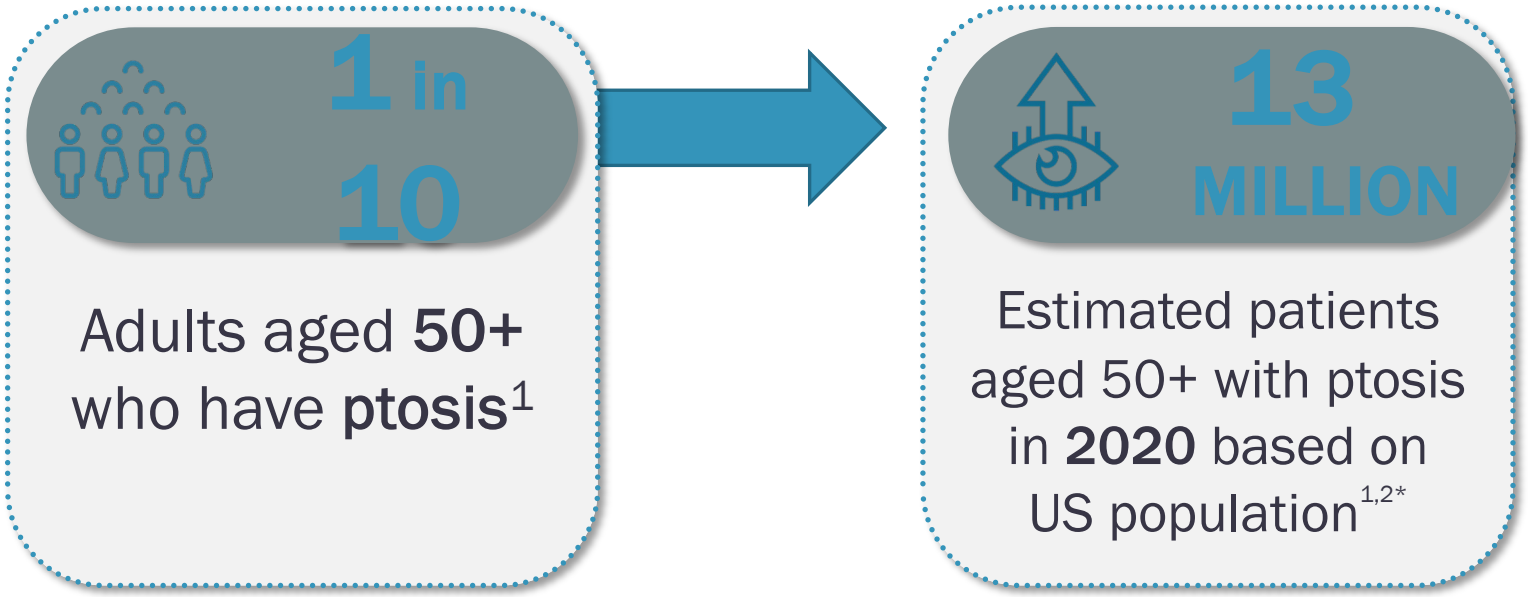
:

- Dermatochalasis
- Brow ptosis
- Superior sulcus deformity
- Microphthalmos
- Hemifacial spasm

Pseudoptosis due to dermatochalasis[2]

1. Finsterer J. *Aesthetic Plast Surg*. 2003;27(3):193–204. 2. Klejch W, et al. Available at: http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm. Accessed September 27, 2019.

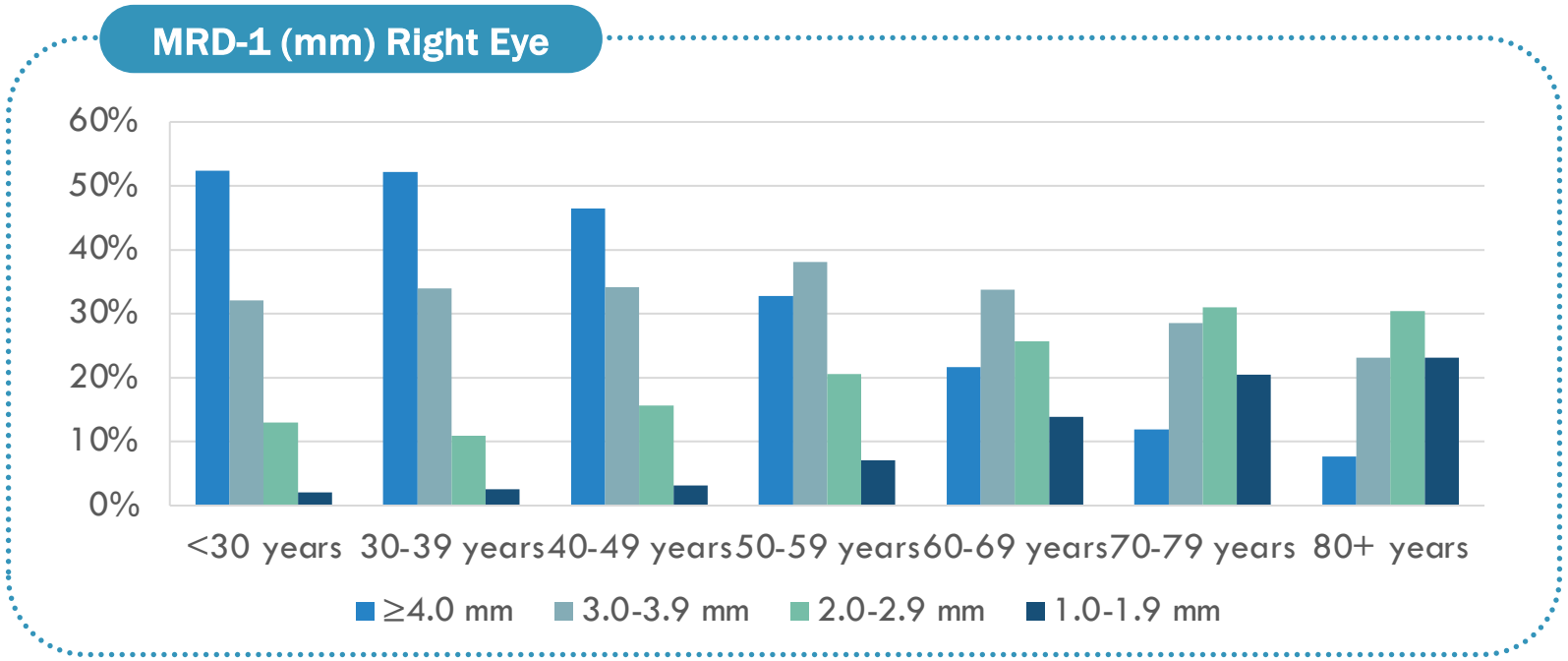
PREVALENCE OF PTOSIS PATIENTS



* Estimated U.S. population over 50 years of age with ptosis calculated as estimated number of individuals aged 50 and older (U.S. Census) multiplied by 11.5% prevalence observed in study by Sridrahan et al.

1. Sridharan GV, et al. *Age Ageing.* 1995;24:21-24. 2. US Census Bureau, Population Division. Table 9: Projections by sex and age for the United States: 2015 to 2060. NP2014-T9. December 2014.

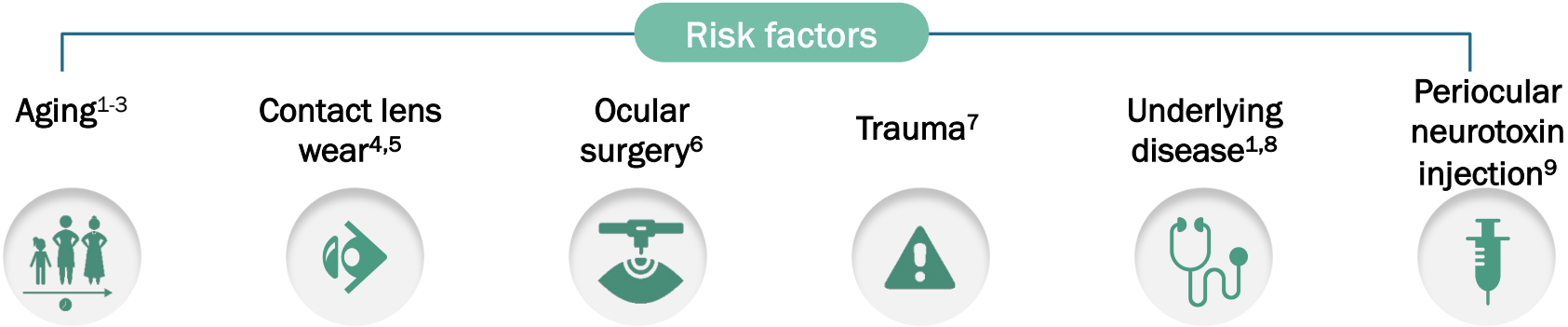
SEVERITY OF PTOSIS INCREASES WITH AGE



MRD-1 = Distance from lid margin to pupillary light reflex

Paik JS, et al. *BMC Ophthalmol.* 2020;20(99):1-8

ACQUIRED PTOSIS CAN HAVE A RANGE OF RISK FACTORS



Risk factors can contribute to aponeurotic or other forms of acquired ptosis (myogenic, neurogenic, mechanical, traumatic)

1. Forman WM, et al. *Age Ageing.* 1995;24:21-24. 2. Hashemi H, et al. *J Curr Ophthalmol.* 2016;28:142-145. 3. Kim MH, et al. *Eye (Lond).* 2017;31:940-946. 4. Hwang K, et al. *J Craniofac Surg.* 2015;26:e374-e374. 5. Bleyen I, et al. *Can J Ophthalmol.* 2011;46:333-336. 6. Wang Y, et al. *Graefes Arch Clin Exp Ophthalmol.* 2019;257:397-404. 7. Finsterer J. *Aesthetic Plast Surg.* 2003;27(3):193-204. 8. Reinhard E, et al. *Rev Optom.* April 15, 2020. 9. Steinsapir KD, et al. *Dermatol Surg.* 2015;41:833-840. 10.

AAO OPHTHALMIC TECHNOLOGY ASSESSMENT REPORT
VISUAL FIELD IMPAIRMENT CAUSED BY PTOSIS

- 13 studies established that **visual field impairment caused by ptosis** is a **functional indication** for surgical repair

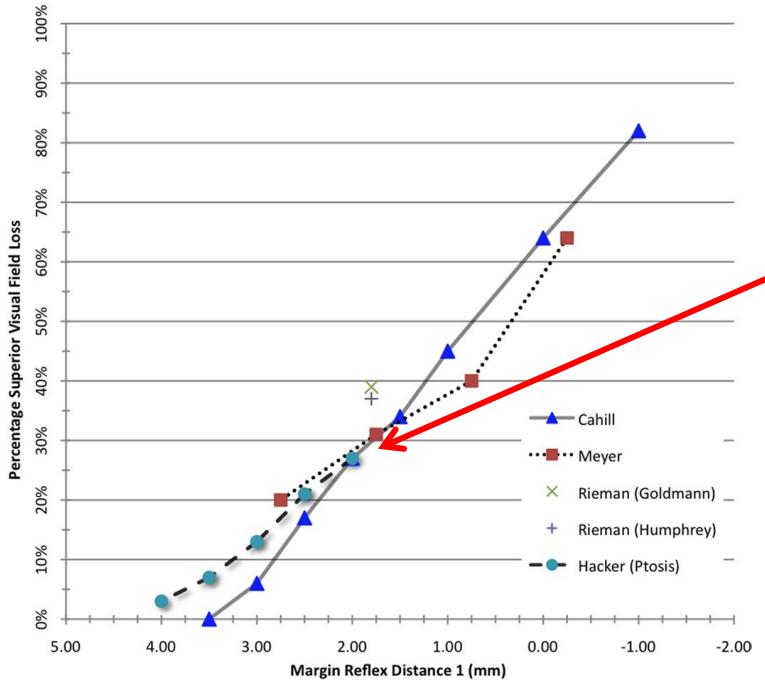
Ptosis-Related Vision Impairment Indicators

- MRD-1: 2 mm or less
- Superior visual field loss: >12 degrees or 24%
- Down-gaze ptosis impairing reading and other close-work activities
- Chin-up backward head tilt due to obscured visual axis
- Symptoms of discomfort/eye strain due to droopy lids
- Central visual interference due to upper lid position
- Patient self-reported functional impairment

MRD-1 = Distance from lid margin to pupillary light reflex

Cahill KV et al. *Ophthalmology.* 2011;118:2510–2517.

PERCENTAGE OF SUPERIOR VF LOSS INVERSELY CORRELATES TO MRD-1



Investigators Cahill, Meyer, Rieman, and Hacker each used different perimetric techniques.

Cahill KV et al. *Ophthalmology.* 2011;118:2510–2517.

- Unobstructed normal superior VF = ~50 degrees
- MRD-1 < 4mm → Visual field impairment can occur
- MRD-1 = 2 mm → Superior visual field impairment is 24% to 30%
  - Corresponds to 12 to 15 degrees of superior VF loss
- Superior visual field loss was just as important as inferior field loss.
- Findings are similar to the results of studies of **patients with visual field loss due to glaucoma.**

RISK OF FALLS DUE TO VISUAL FIELD LOSS

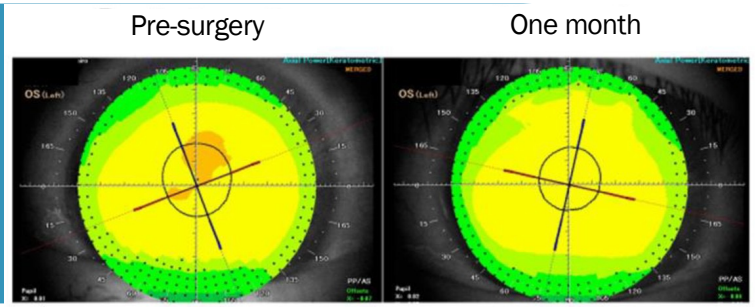
- Each 10% visual field loss corresponds with an **8% higher risk of falls in adults aged 65+**
- **Peripheral vision loss was more highly associated with falls** than visual acuity, contrast sensitivity, stereo acuity, and central visual field loss.

Cahill KV et al. *Ophthalmology.* 2011;118:2510–2517.

REPOSITIONING THE UPPER LID AFFECTS VISUAL FUNCTION DUE TO ASTIGMATIC CHANGES

- ATR astigmatism was common in age-related ptosis
- WTR astigmatism was most common in contact-lens related ptosis
- At 1-month post-op, 41% of AP and 13% of CLP patients had a shift in astigmatism type

Numerous patients undergoing cataract surgery have astigmatism; Evaluating lids prior to cataract surgery may ensure the best visual outcome.

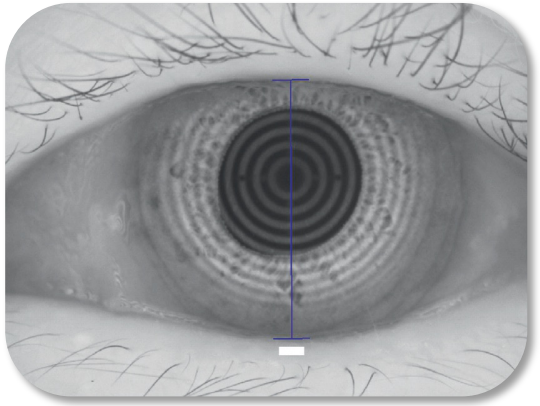


Dannoue K, et al. *PLOS One.* Oct 28, 2021.

POOR VISUAL QUALITY HAS BEEN DEMONSTRATED IN PTOSIS PATIENTS

Fellow-eye comparison in 17 patients with unilateral congenital ptosis where a significant difference was observed in VFH between normal and ptotic eyes ($p<0.05$):

- **Mean BCVA significantly worse in ptotic eyes ($p<0.05$)**
- **Significant changes in anterior corneal HOAs**
- **Changes posterior corneal HOAs**



Lid position & pressure impacted corneal HOAs.
Ptotic eyes demonstrated significant degradation in visual quality.

BCVA = Best Corrected Visual Acuity.
VFH = Vertical Fissure Height.
HOA = Higher Order Aberration.

Shen J, et al. *Hindawi Journal of Ophthalmology.* 2020. Article ID 2653250: 1-9.

VISUAL QUALITY IMPROVEMENTS HAVE BEEN OBSERVED AFTER PTOSIS CORRECTION

Study of 39 patients (n=79 eyelids) who underwent upper eyelid blepharoplasty and had significant change in vertical palpebral fissure aperture 1 week & 3 months postop (p<0.001):

- **Contrast sensitivity** was significantly enhanced at 3 months post-op (p=0.009)

A significant improvement in visual quality (brighter vision) was observed after surgery

Vision with reduced Contrast Sensitivity

Normal Vision

Seoung HA, et al. *Int J Ophthalmol.* 2016;9(9):1320-1324.

PTOSIS DIAGNOSIS

INITIAL DIAGNOSTIC STEP

- Patient history
  - Timing of onset: Sudden appearance could signal serious underlying pathology
  - Symptoms, e.g. double vision
- Evaluation of commonly encountered neurological/muscular conditions:
  - Horner's syndrome
  - CN III palsy
  - Myasthenia gravis
  - CPEO

Bacharach et al. 2021.

ASK THESE QUESTIONS

Congenital or Acquired?

Pupil Involvement?

Double Vision?

Levator Dehiscence present?

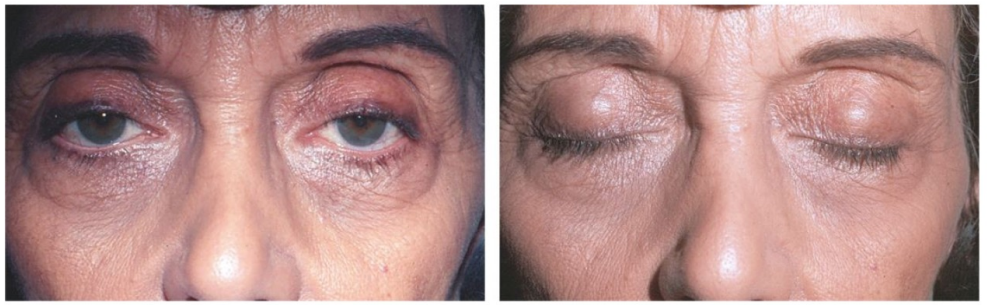


Fig. 22-7 This woman shows classic signs of levator dehiscence with ptosis, a high lid crease, and thinning of the lid above the tarsal plate. In many patients with levator dehiscence, the high crease is not evident because of dermatochalasis and herniated fat.

MD, Mark A. C. Eyelid and Periorbital Surgery. Available from: VitalSource Bookshelf, (2nd Edition). Thieme Medical Publishers Inc., 2016.

EXCLUSION OF PSEUDOPTOSIS

- If dermatochalasis or brow ptosis present, examine upper eyelid while raising excess skin
- Examine globe for dystopias or asymmetry
- If contralateral retraction is suspected, examine for thyroid eye disease

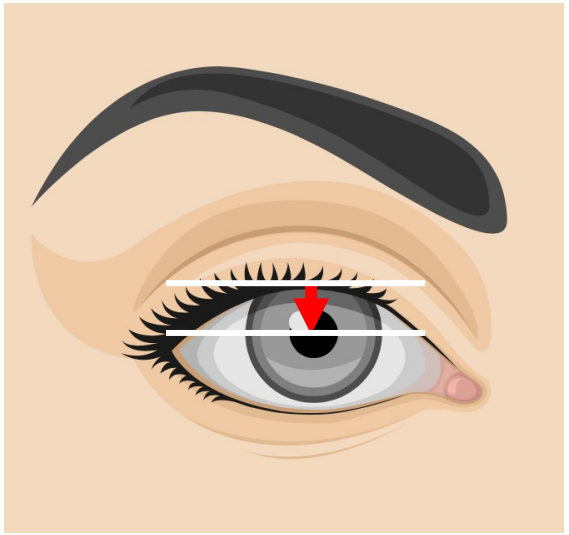
Bacharach et al. 2021.

ACQUIRED PTOSIS EVALUATION

- MRD 1
- Eyelid crease height
- Palpebral fissure height
- Levator function
- Mullers function via phenylephrine
- Visual field testing to measure functional deficits

MARGINAL REFLEX DISTANCE 1 (MRD 1)

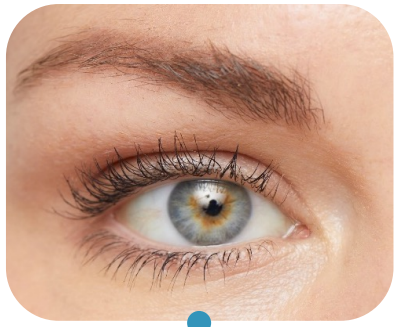
Distance from LID MARGIN to CORNEAL LIGHT REFLEX



- Easily defined by a penlight
- Normal MRD 1 = 4-5 mm
  - A decrease in this measure signals ptosis
- Difference in MRD 1 between two eyes classifies ptosis:
  - Mild = 2 mm
  - Moderate = 3 mm
  - Severe = 4 mm

Can you see the twinkle in their eye?

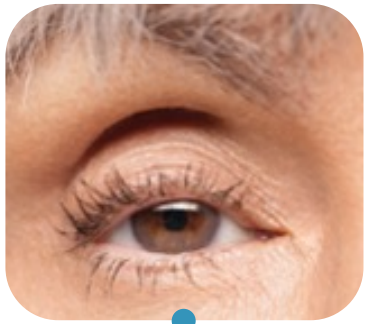
RANGE OF MRD-1



Normal

Mild

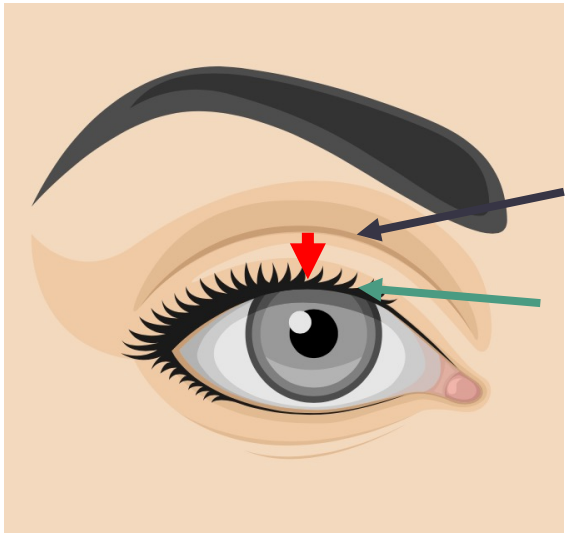
Moderate



Severe

EYELID CREASE HEIGHT / MARGINAL CREASE DISTANCE (MCD)

MCD = Distance between LID MARGIN and LID CREASE

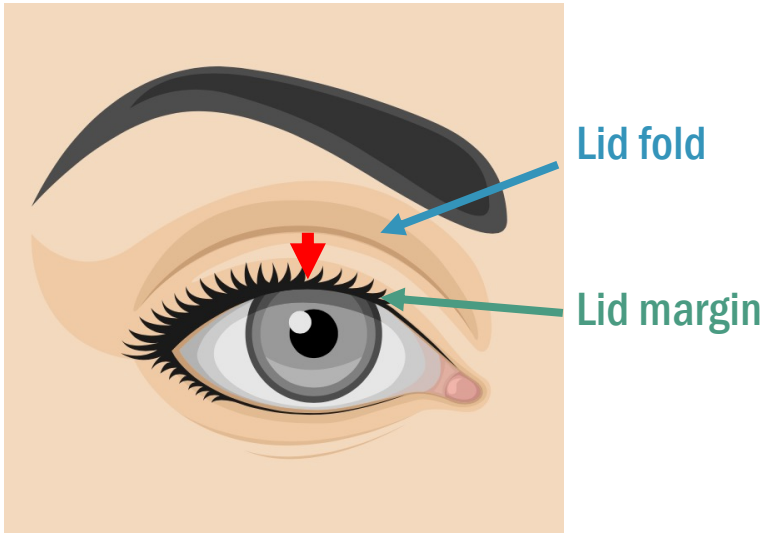


- Normal MCD:
  - 8-9 mm in men
  - 10-11 mm in women
  - Can vary by race
- MCD is higher than normal in aponeurotic ptosis

https://www.ncbi.nlm.nih.gov/books/NBK539828/#!po=90.6250; Bacharach et al

LID PLATFORM OR TARSAL PLATE SHOW (TPS)

TPS = Distance between LID FOLD and LID MARGIN

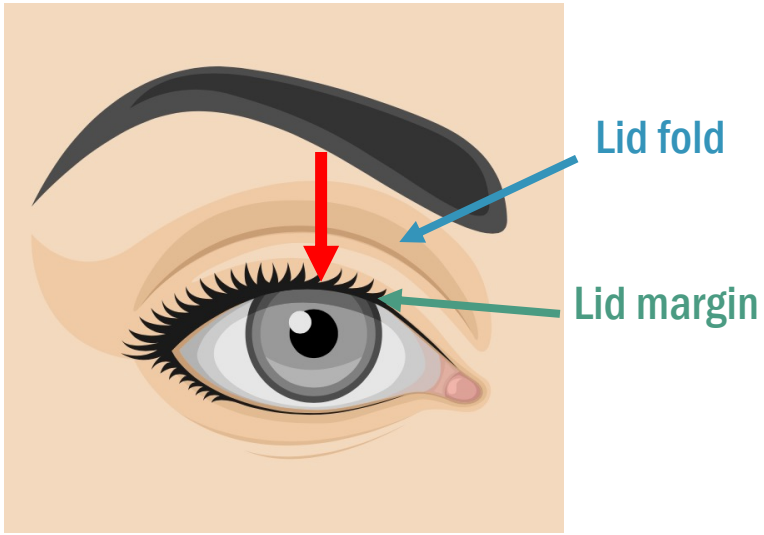


- Attractive eyes exhibit less TPS[1]
- Increased TPS is associated with higher perceived age, tiredness, and sadness[2]
- **Lifting the upper eyelid decreases TPS**

1. Vaca EE, Bricker JT, Helenowski I, Park ED, Alghoul MS. Identifying Aesthetically Appealing Upper Eyelid Topographic Proportions. Aesthetic Surgery Journal 2019, Vol 39(8) 824-834. 2. The Influence of Forehead, Brow, and Periorbital Aesthetics on Perceived Expression in the Youthful Face. Knoll, Bianca et all. American Society of Plastic Surgery. 2008.

UPPER EYELID HEIGHT (UEH)

UEH = Distance between lower brow border to center of lid margin

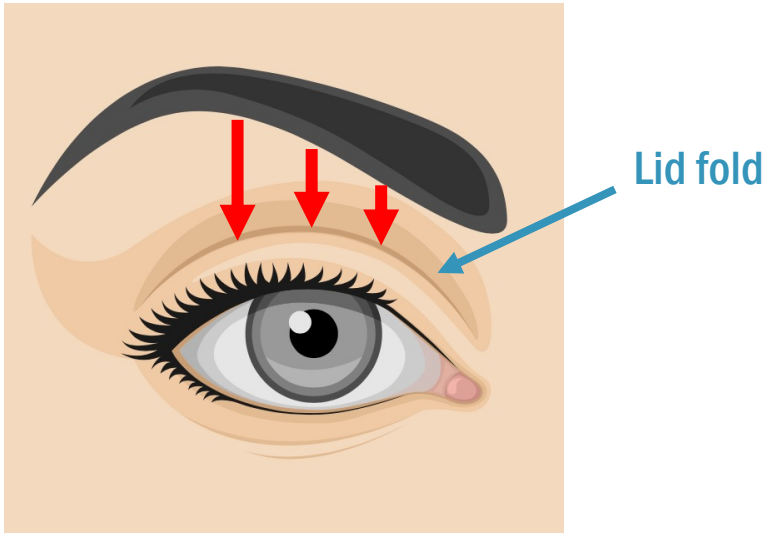


- Attractive eyes exhibit <u>lower UEH</u>
  - Evidence that correlation holds across ethnicities
- Neuromodulator injections that lift the brow increase UEH, often creating an undesirable look
- **Lifting the upper eyelid <u>decreases</u> UEH**

1. Biometric Study of Eyelid Shape and Dimensions of Different Races with References to Beauty. Rhee, Seung et. all. International Society of Plastic Surgery. 2012

BROW PLATFORM OR BROW FAT SPAN (BFS)

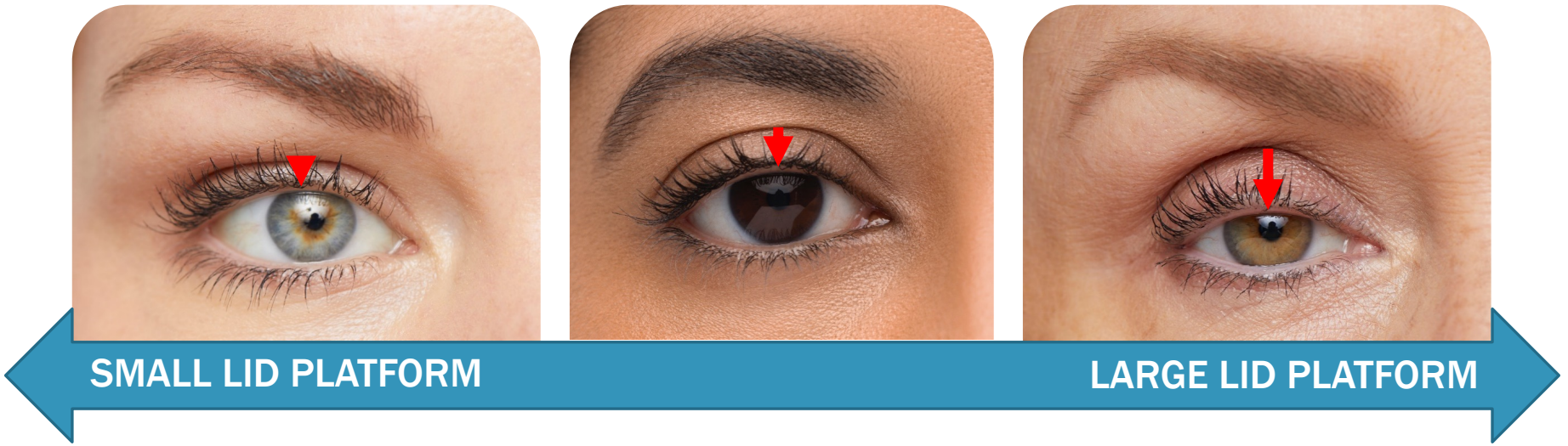
BFS = Distance from the lid fold to inferior brow



- Assessment of **symmetry**
- Medial to lateral **alignment**
  - Apex aligned approximately above corneal limbus
  - medial edge aligned on the same vertical line as the lateral nasal ala and inner canthus

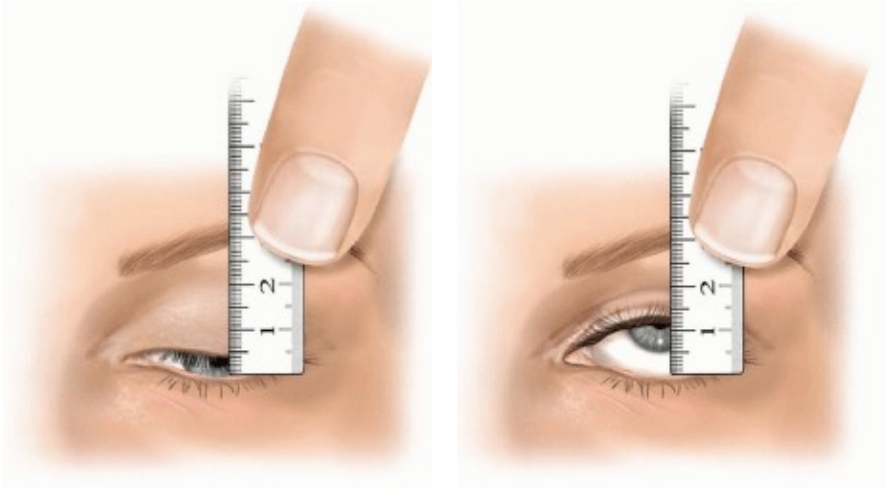
Sweis et al. Aesthetic Surgery Journal. 2018, Vol 38(9) 941–948.

VARIATION IN LID PLATFORM



LEVATOR FUNCTION

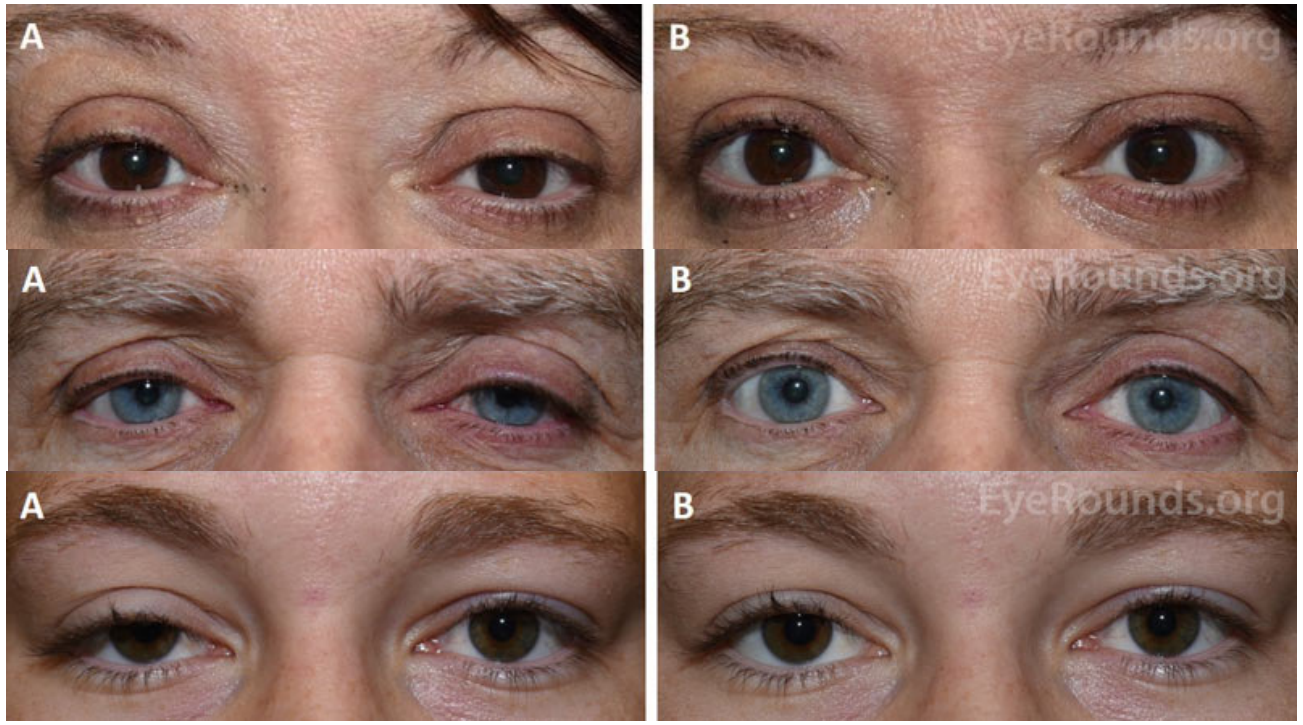
Distance between excursion of upper lid margin from full downgaze to full upgaze without brow movement



Excellent	>10 mm	
Good	8-10 mm	Mild Ptosis
Fair	5-7 mm	Moderate Ptosis
Poor	1-4 mm	Severe Ptosis

Finsterer et al. *Aesth Plast Surg*. 2003; 27:193–204.

PHENYLEPHRINE TESTING DEMONSTRATES MARKED ELEVATION IN LIDS AFTER 10 MINUTES



Ophthalmic Atlas Images by EyeRounds.org, The University of Iowa

MARKED ELEVATION IN LID 2 HOURS AFTER OXYMETAZOLINE INSTILLATION

Before instillation

After instillation (2 hr)

Data on file. RVL Pharmaceuticals, Inc.

MARKED ELEVATION IN LID 2 HOURS AFTER OXYMETAZOLINE INSTILLATION

Before instillation

After instillation (2 hr)

Data on file. RVL Pharmaceuticals, Inc.

MARKED ELEVATION IN LID 60 MINUTES AFTER OXYMETAZOLINE INSTILLATION

Before instillation

After instillation (60 mins)

Data on file. RVL Pharmaceuticals, Inc.

MARKED ELEVATION IN LID 60 MINUTES AFTER OXYMETAZOLINE INSTILLATION

Before instillation

After instillation (60 mins)

Data on file. RVL Pharmaceuticals, Inc.

MARKED ELEVATION IN LID 60 MINUTES AFTER OXYMETAZOLINE INSTILLATION

Before instillation

After instillation (60 mins)

Data on file. RVL Pharmaceuticals, Inc.

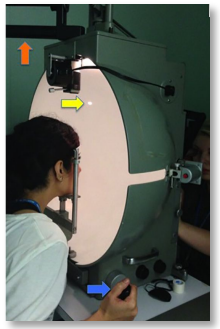
MARKED ELEVATION IN LID 15 MINUTES AFTER OXYMETAZOLINE INSTILLATION

38-year old female with moderate blepharoptosis in, as shown in the pre-dose image

- This subject also had marked elevation of the upper eyelids after receiving RVL-1201, as shown in the image at right, which was taken 15 minutes after RVL-1201 instillation
- Consistent with the images, evaluation of MRD-1 at this time point revealed an increase on this measure, and this was also accompanied by improvement on the LPFT

VISUAL FIELD TESTING

	Goldmann Visual Field (GVF)	Humphrey Visual Field (HVF)	Leicester Peripheral Field Test (LPFT)
Testing apparatus[1,2]	Goldmann bowl	HVF analyzer	HVF analyzer
Test type[1,2]	Kinetic perimetry	Static perimetry	Static perimetry
Manual / automated[1,2]	Manual	Automated	Automated
Details[1,2]	Visual field manually mapped	24° tested in superior field, 54-point grid (24-2 setting)	48° tested in superior field, 35-point grid in superior field, 14-point grid in inferior field



Goldmann bowl. *Wong SH, Plant GT. Pract Neurol 2015;15:374–381.*

HVF analyzer

1. Wong SH, Plant GT. How to interpret visual fields. *Pract Neurol*. 2015;15:374–381.. 2. Ho SF, Morawski A, Sampath R, Burns J. Modified visual field test for ptosis surgery (Leicester Peripheral Field Test). *Eye*. 2011;25:365-369.

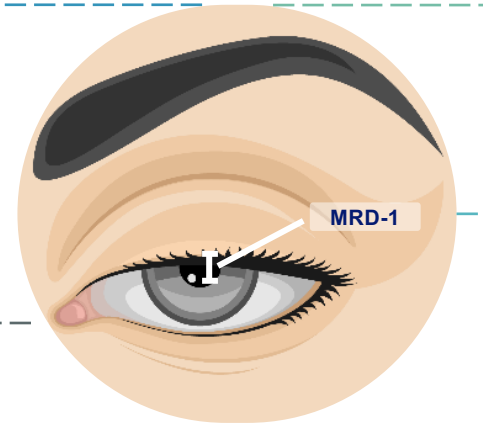
METHODS FOR EVALUATING THE PTOTIC UPPER EYELID

Marginal Reflex Distance (MRD-1)[1]

- Distance between the center of the pupillary light reflex and the upper eyelid margin with the eye in primary gaze
- Normal range: ≥4 mm

Eyelid crease height (superior sulcus deformity)[1]

- Distance between the upper eyelid margin and eyelid crease
- Normal range:7-8 mm in males, 9-10 mm in females



Visual field testing[2]

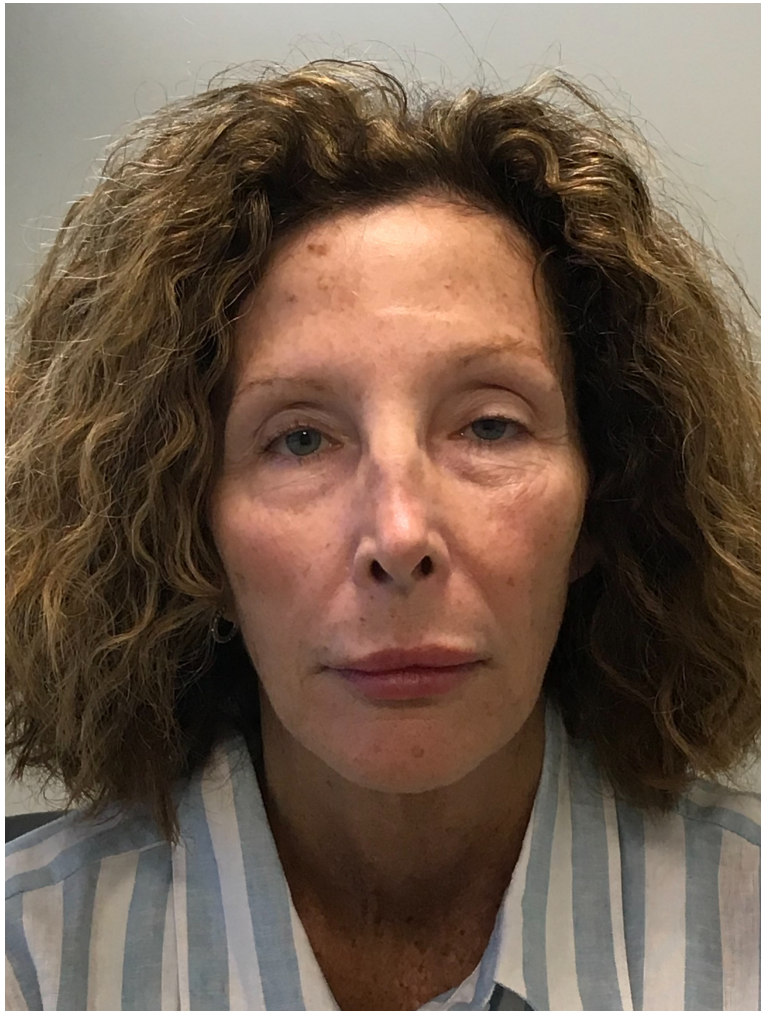
- Functional assessment of the visual field, performed using various methods (Humphrey, Leicester Peripheral Field, Goldmann)

Levator muscle function[1]

- Upper eyelid excursion when the patient shifts from downgaze to upgaze (with frontalis negated)
- Normal range: >15 mm

1. Klejch W, Vislisel JM, Allen RC. A primer on ptosis. Available at: http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Ptosis/index.htm. Accessed September 27, 2019. **2.** Ho SF, Morawski A, Sampath R, Burns J. Modified visual field test for ptosis surgery (Leicester Peripheral Field Test). *Eye*. 2011;25:365-369

DIAGNOSIS PTOSIS



MARKED ELEVATION IN LID 15 MINUTES AFTER OXYMETAZOLINE INSTILLATION

38-year old female with moderate blepharoptosis in, as shown in the pre-dose image

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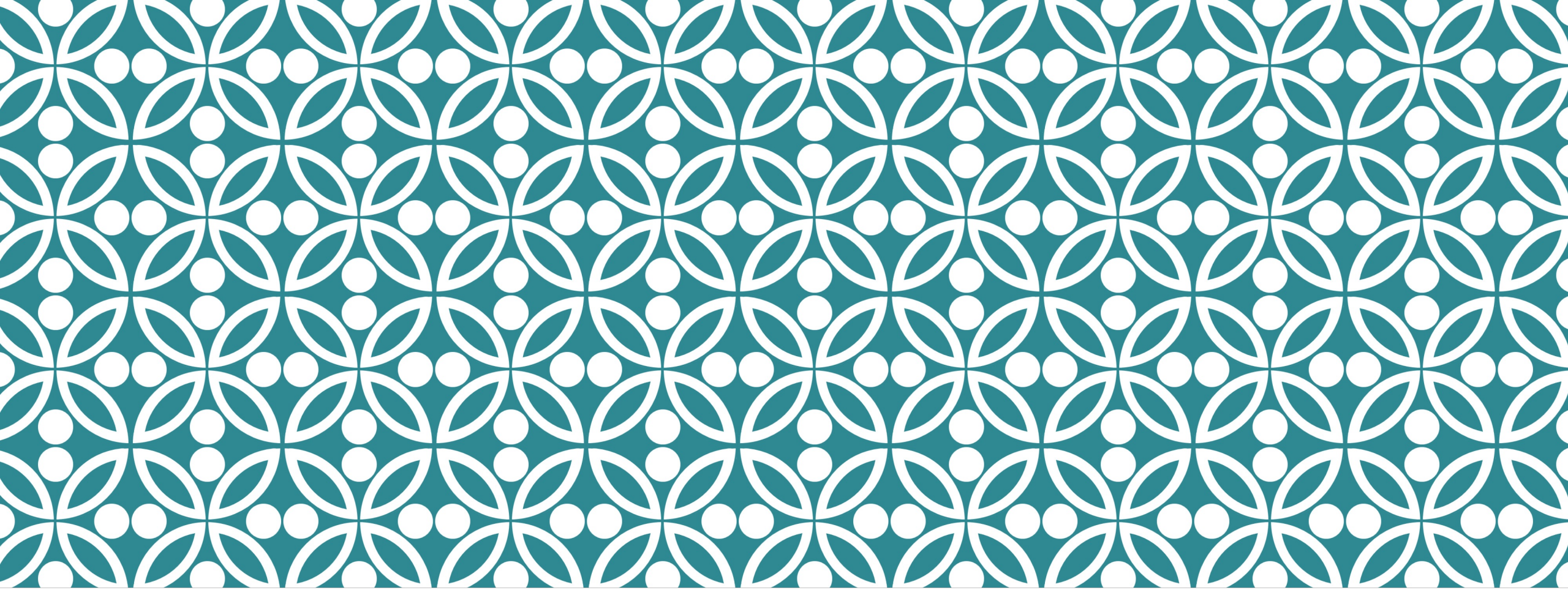
- Consistent with the images, evaluation of MRD-1 at this time point revealed an increase on this measure, and this was also accompanied by improvement on the LPFT



LASHES

EYE LASHES

FUNCTION, LENGTH AND COMMON ISSUES

Main Function

- To lubricate the eyelid, hydrate the cornea and remove particles deposited onto the eye

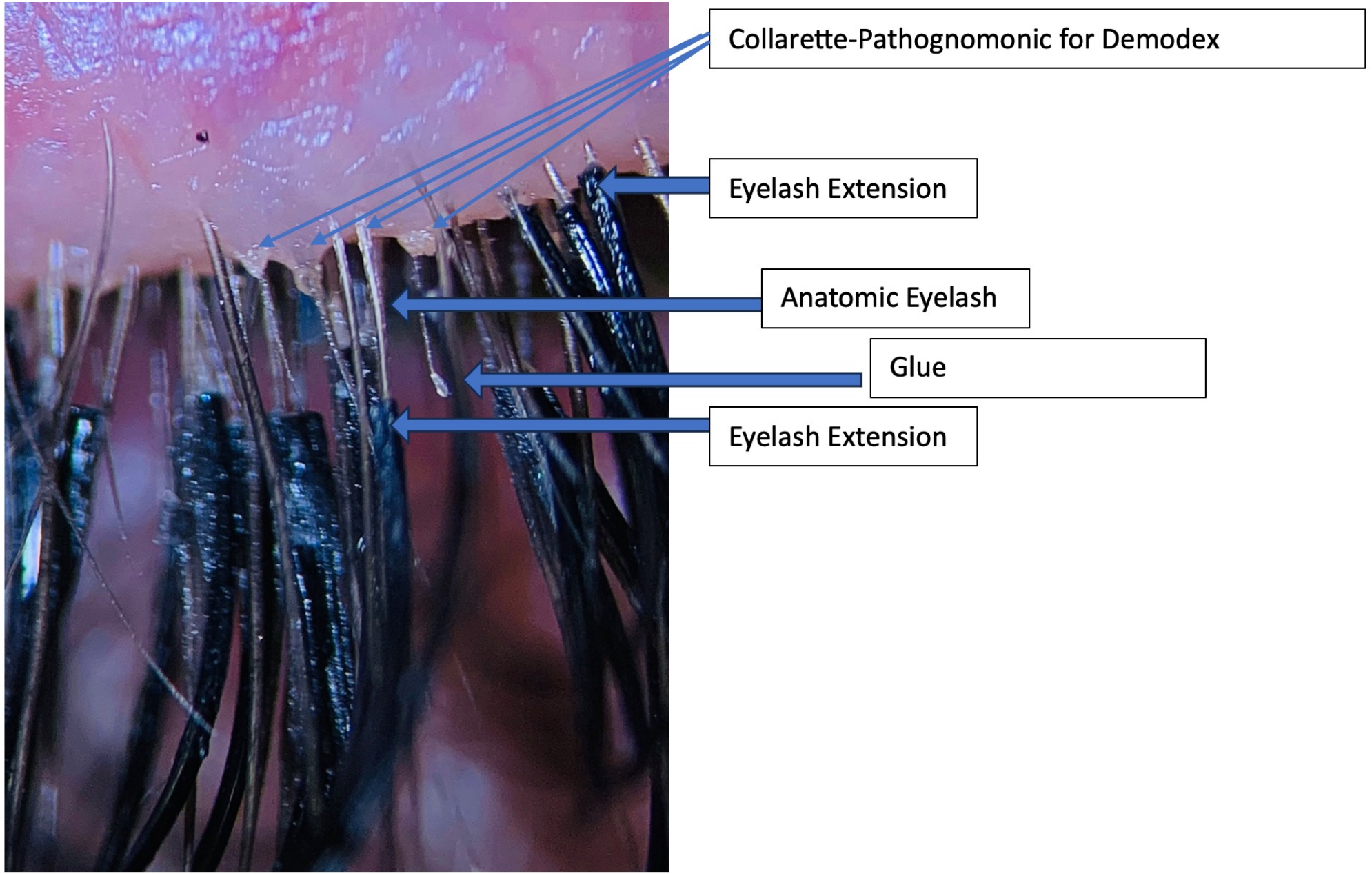
Lash Length

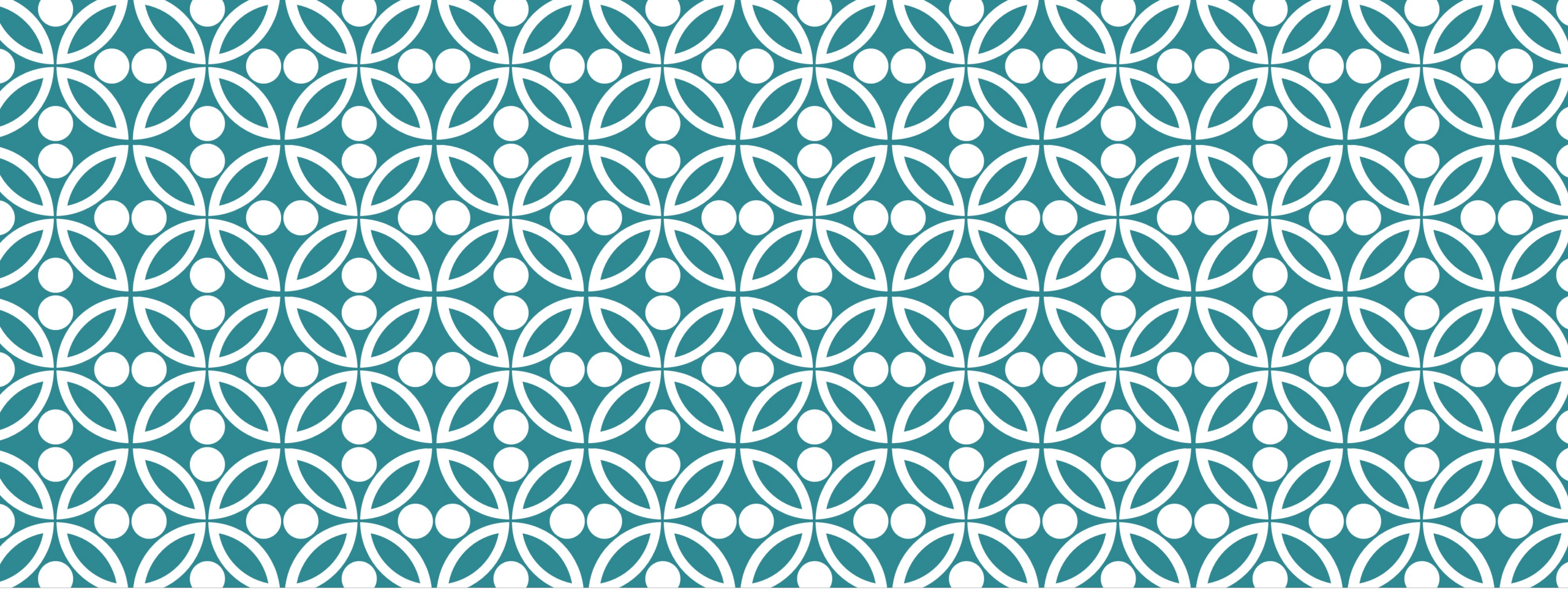
- Increased eyelash length can effectively help reduce water evaporation[1]

Common Issues include sparse/thinning lashes:

- May be due to genetics, aging, damage, medical conditions, medications or a combination thereof

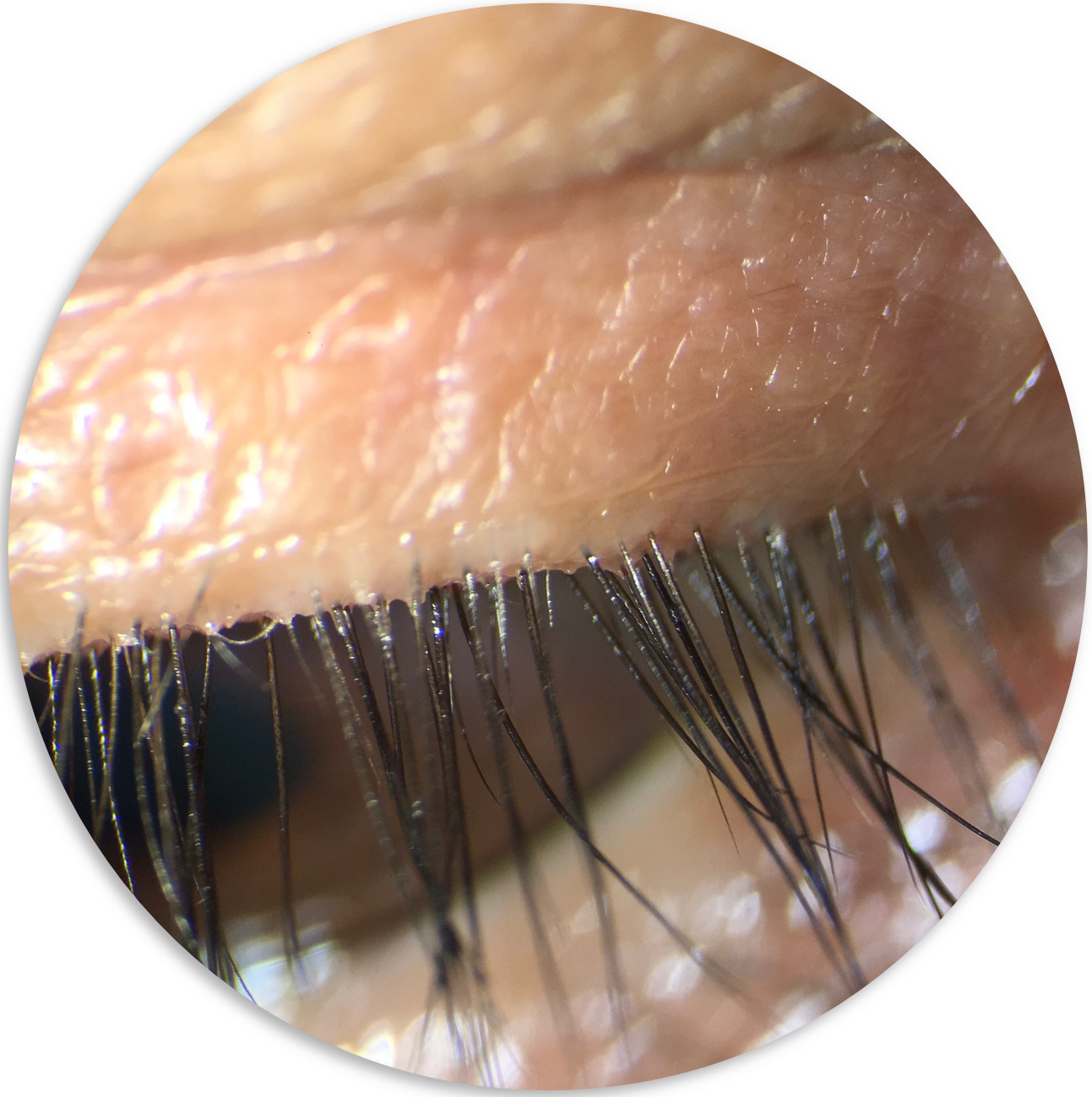
1. Zou S, et al. *J R Soc Interface*. 2019;16(159):20190425. **2.** CICS hair care study 2015 - BR, DE, CN, JP, US, ZA


Collarette-Pathognomonic for Demodex
Eyelash Extension
Anatomic Eyelash
Glue
Eyelash Extension

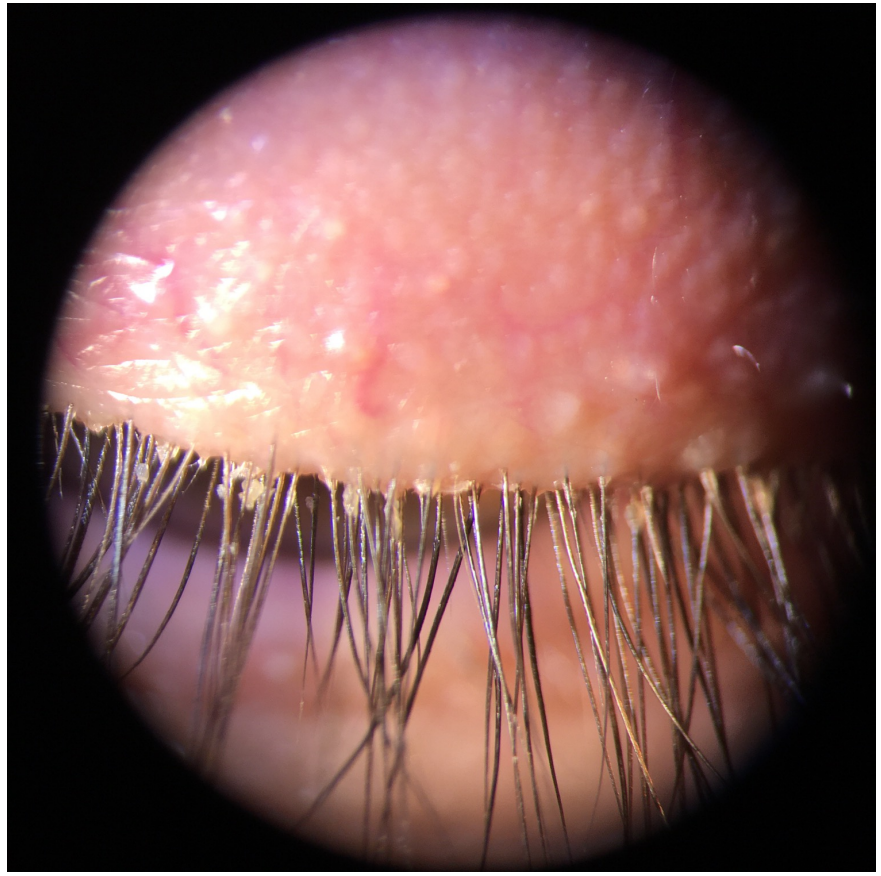


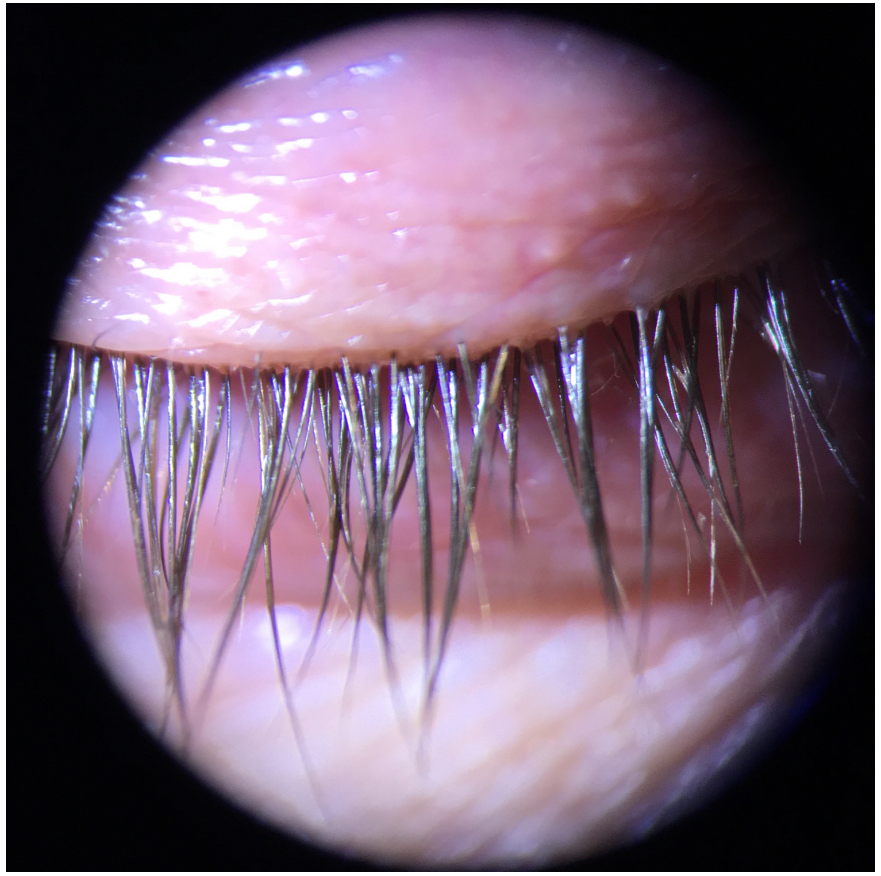
DEMODEX

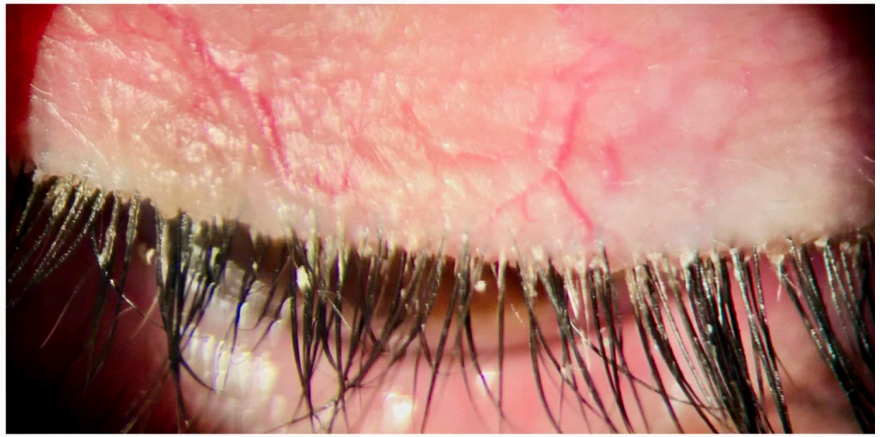
I SEE

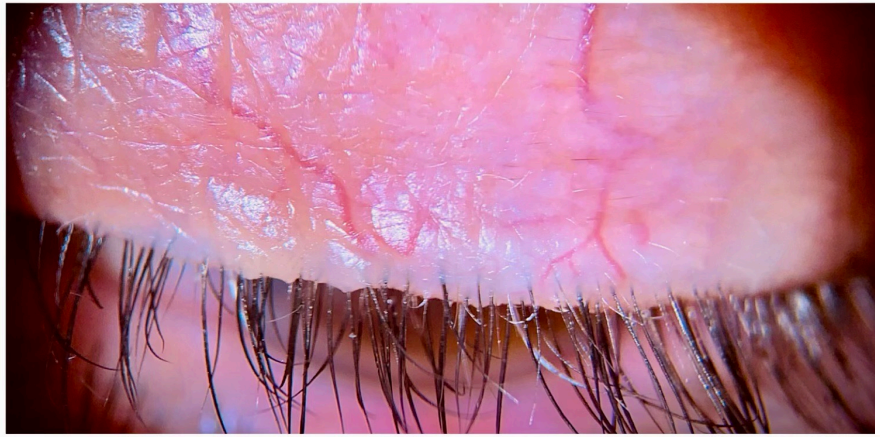


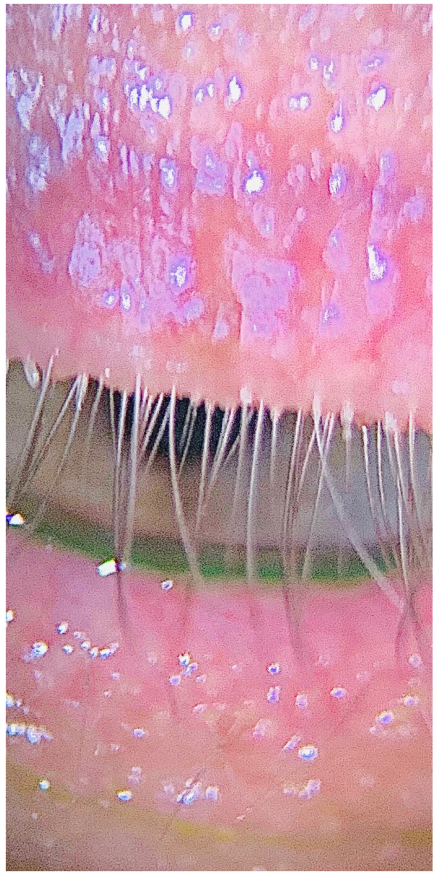
PATIENT ASSESSMENT

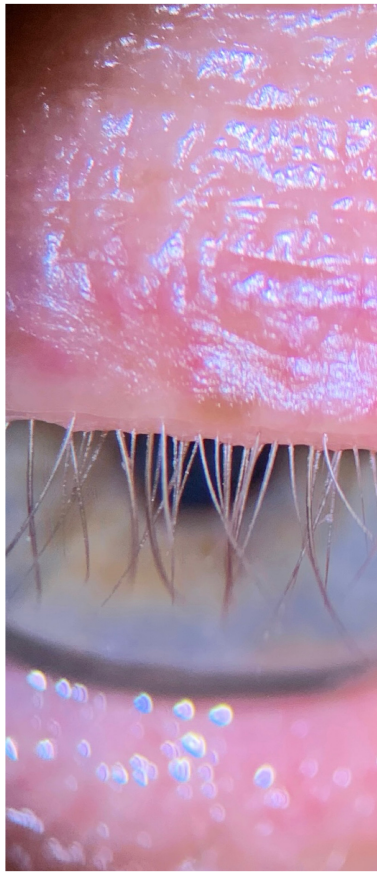


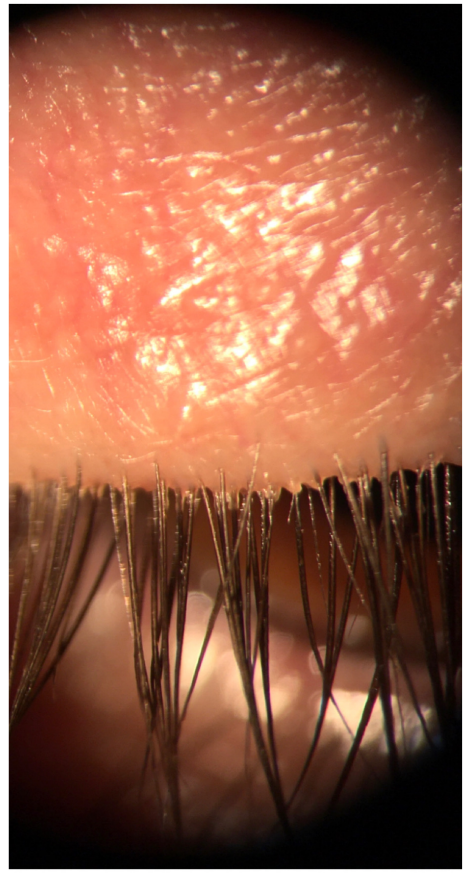


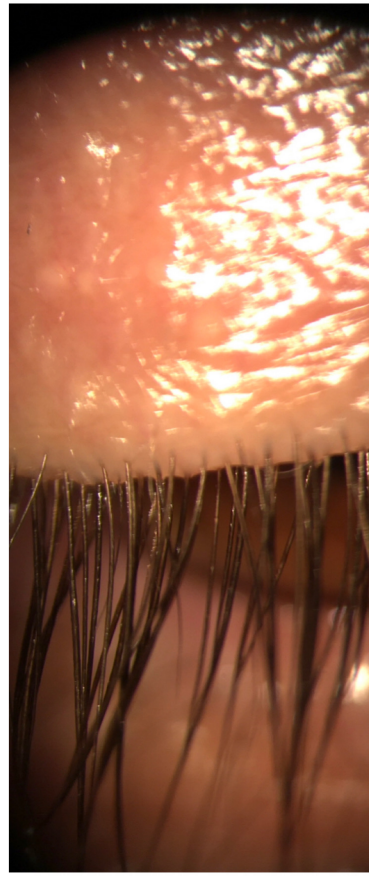












COLLARETTES ARE THE PATHOGNOMONIC SIGN OF *DEMODEX* BLEPHARITIS

Confirming the presence of **collarettes** can be used to confidently make a diagnosis

- In a clinical study, ***Demodex* mites, detected via epilation, were found on 100% of lashes with collarettes**[1]
- In another clinical study, ***Demodex* mites, detected via molecular technique (PCR), were found on 100% of lashes with collarettes**[2]

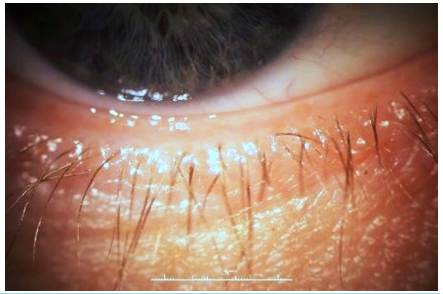
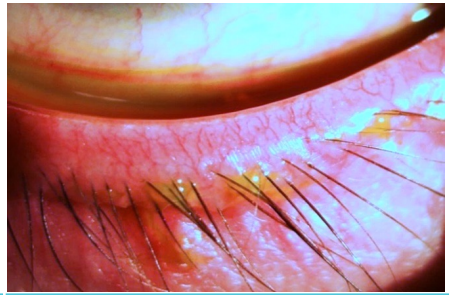
Collarettes are composed of mite waste and eggs

- Regurgitated undigested material combined with epithelial cells, keratin, mite eggs, and digestive enzymes, which cause irritation[3,4]
- Translucent, waxy plugs typically at base of lashes[3]

Photos courtesy of Elizabeth Yeu, MD; Paul Singh, MD; Paul Karpecki, OD
Used with permission.

1. Gao YY, Di Pascuale MA, Li W, et al. High prevalence of Demodex in eyelashes with cylindrical dandruff. *Invest Ophthalmol Vis Sci*. 2005;46(9):3089-3094. **2.** Kasetsuwan, N., et al. Prevalence of ocular demodicosis among patients at Tertiary Care Center, Bangkok, Thailand. *Int J Ophthalmol* 2017; 10(1): 122-127. **3.** Zhang AC, Muntz A, Wang MTM, Craig JP, Downie LE. Ocular Demodex: a systematic review of the clinical literature. *Ophthalmic Physiol Opt*. 2020;40:389-431. **4.** Nicholls S, Oakley CL, Tan A, Vote BJ. Demodex species in human ocular disease: new clinicopathological aspects. *Int Ophthalmol*. 2017;37(1):303-312.

LID MARGIN ERYTHEMA SCALE

Erythema grade (non-linear)			
0	1	2	3
	Baseline 1.5		
			
None	Mild	Moderate	Severe

Hosseini K, Bourque LB, Hays RD. Development and evaluation of a measure of patient-reported symptoms of blepharitis. Health and Quality of Life Outcomes 2018;16:11 May 2018. Drug Design, Development and Therapy Volume 12:1269-1279

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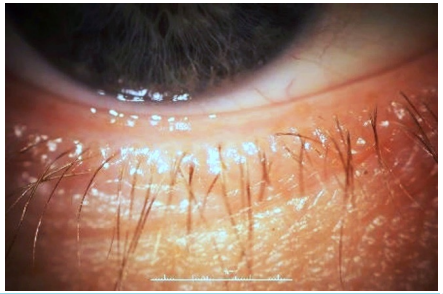
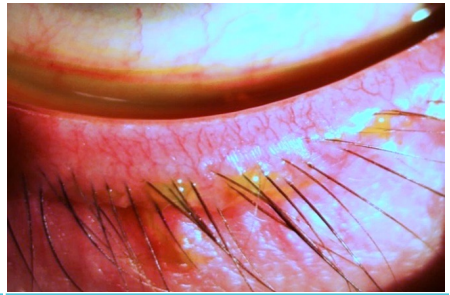
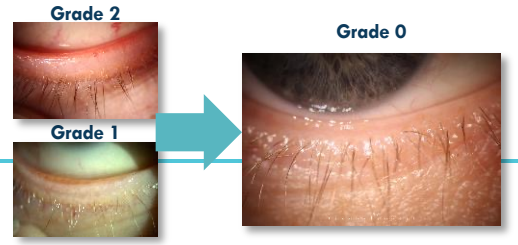
LID MARGIN ERYTHEMA SCALE USED IN SATURN-1

Erythema grade (non-linear)			
0	1	2	3
	Baseline 1.5		
			
None	Mild	Moderate	Severe

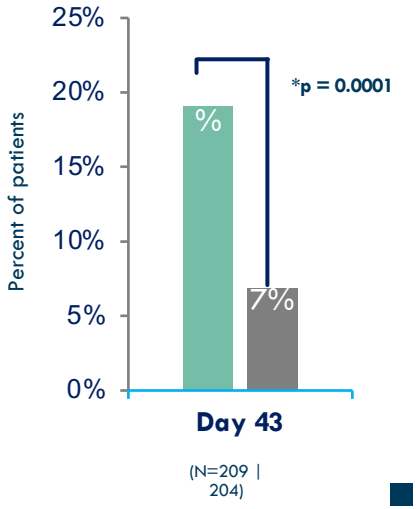
Hosseini K, Bourque LB, Hays RD. Development and evaluation of a measure of patient-reported symptoms of blepharitis. Health and Quality of Life Outcomes 2018;16:11 May 2018. Drug Design, Development and Therapy Volume 12:1269-1279

SATURN-1 RESULTS | ERYTHEMA CURE



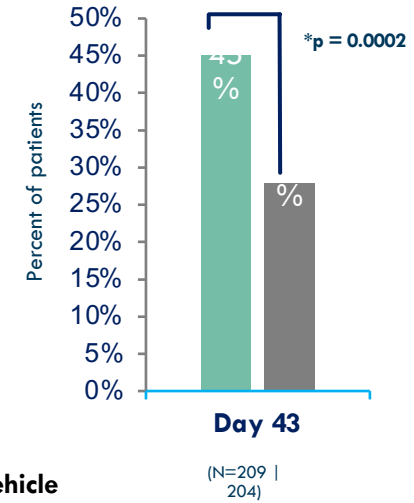
Grade 0

"erythema cure"



At least 1 grade

"erythema improvement"



TP-03 Vehicle

Baseline erythema score = 1.5

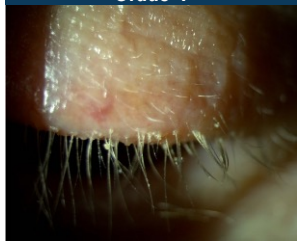
IMPROVEMENTS SEEN HAVE POTENTIAL SIGNIFICANT IMPACT ON YOUR PATIENTS

Cure

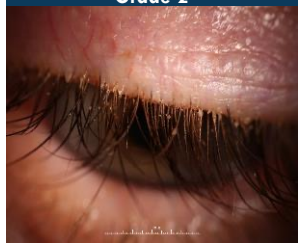
Baseline (Day 0)
Grade 4

Post Treatment (Day 43)
Grade 0

Baseline (Day 0)
Grade 4



Baseline (Day 0)
Grade 2



Post Treatment (Day 43)
Grade 1

Post Treatment (Day 43)
Grade 1

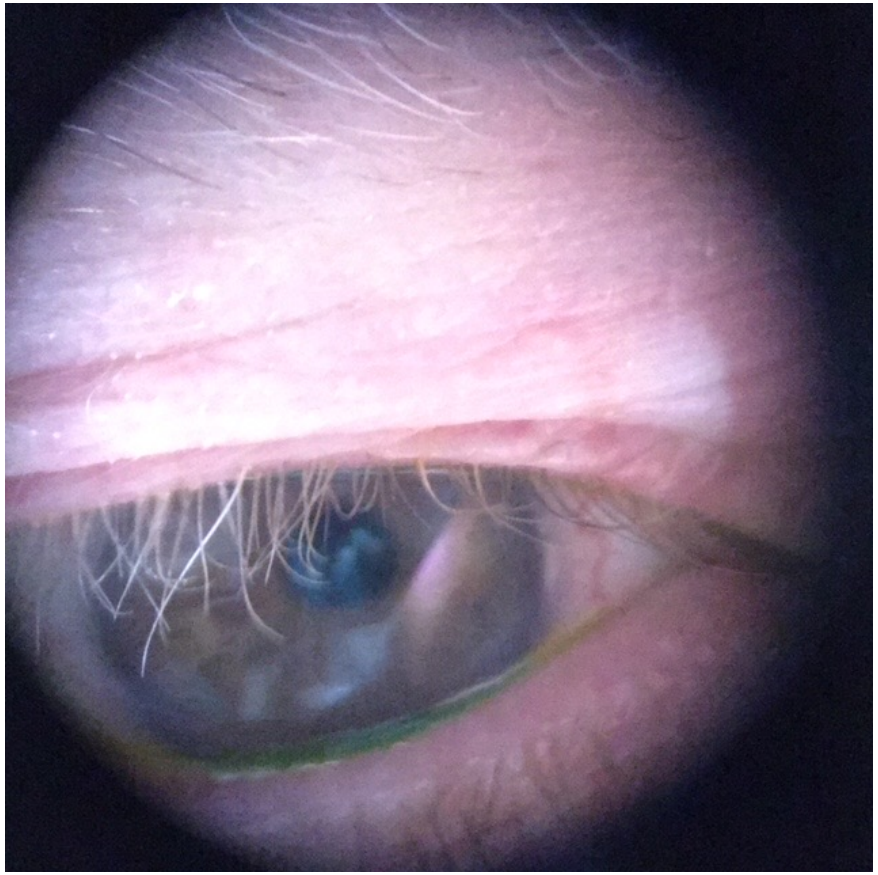
Baseline (Day 0)
Erythema Grade 2

Post Treatment (Day 43)
Erythema Grade 1

Photos are images taken of patients in Saturn-1. Images demonstrate results which we believe are representative of favorable treatment with TP-03 for patients participating in the Saturn-1 trial. Other patients may experience different or less favorable results.

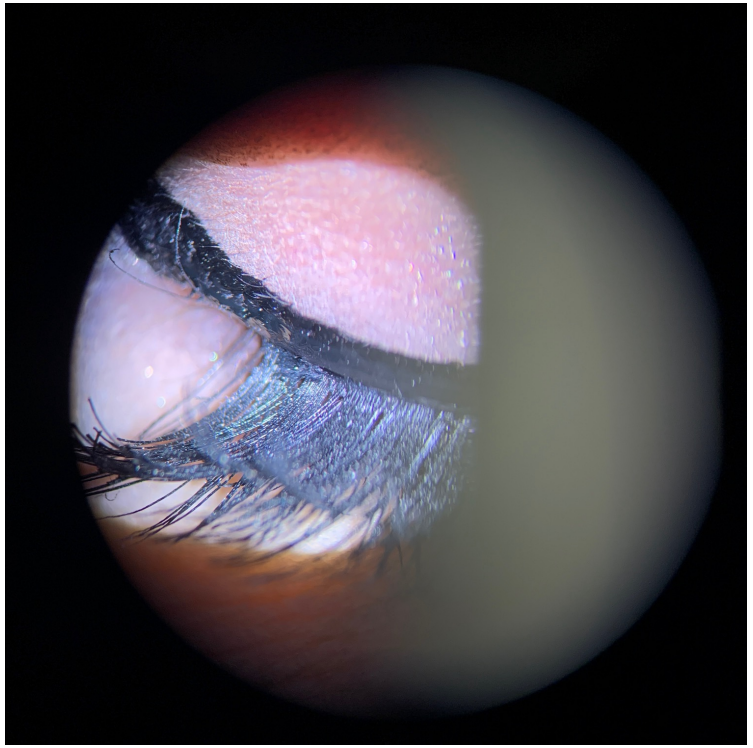
LID DISEASE IS EASILY MISSED

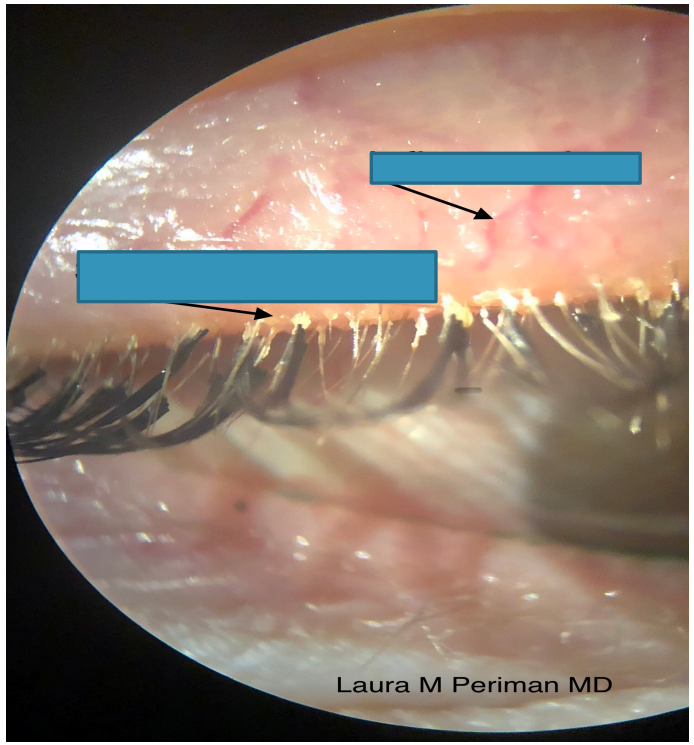
LOOK DOWN!!!!!

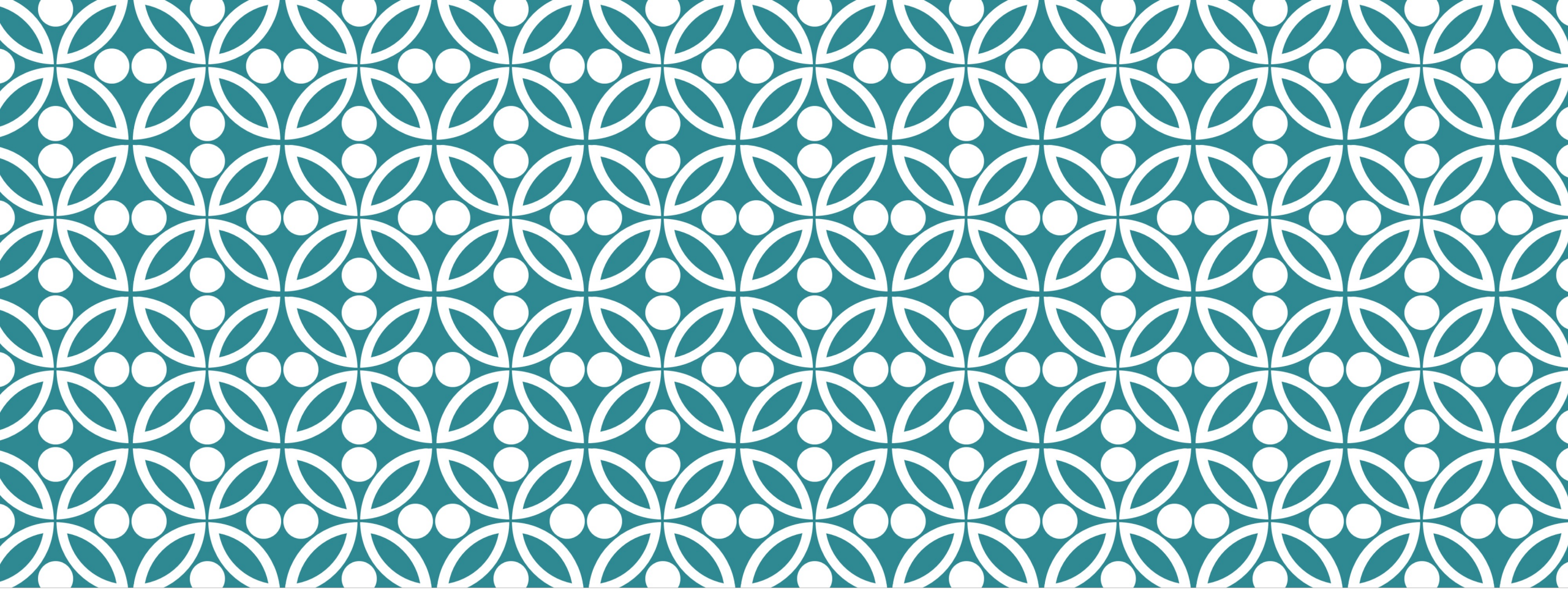


1. SRM photo

I SEE…







RADIOFREQUENCY

Can be done with and without micro needling

Key Aesthetic Trends

Key Trends:

- 74% patients are most bothered by lines and wrinkles around their eyes*
- Radiofrequency treatments among top 5 treatments consumers are considering*

These issues are on the rise:

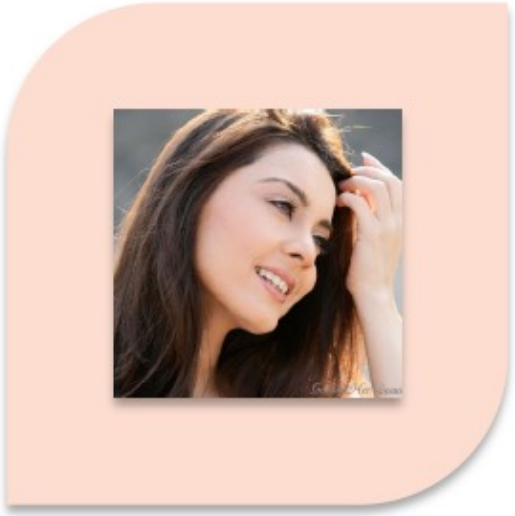
- Younger age due to increase in US screen time (6-10 hours a day)
- Zoom Boom Aesthetic trend (wrinkles around the eyes)
- Millennial age group interested in preventative treatments

*ASDS 2019 Consumer Survey

Market Demand for Radiofrequency

70% OF CONSUMERS CONSIDER UNDERGOING NON-INVASIVE TREATMENTS[3]

RADIOFREQUENCY TREATMENTS ARE THE **TOP 5 PROCEDURES CONSUMERS ARE CONSIDERING**[3]



74% OF PATIENTS ARE MOST BOTHERED BY LINES AND WRINKLES AROUND THE UNDER EYES[3]

[3]*American Society for Dermatology*

What is Radiofrequency?

- **Radiofrequency** (RF) is part of the **electromagnetic spectrum** characterized by a **specific frequency** measurable in Hertz (Hz).

- RF energy produces a **change in the electrical charges** of the treated skin creating an **electron movement.** The **resistance** (impedance) of the tissue to that electron movement **generates heat.**

- The amount of heat generated depends on these factors:
  - **Impedance** of the treated skin
  - **Intensity** of the current applied
  - Length of time of **exposure** to the RF energy

NON SURGICAL TREATMENT OF OCULAR ADNEXA

Prolongs Blepharoptosis Surgery

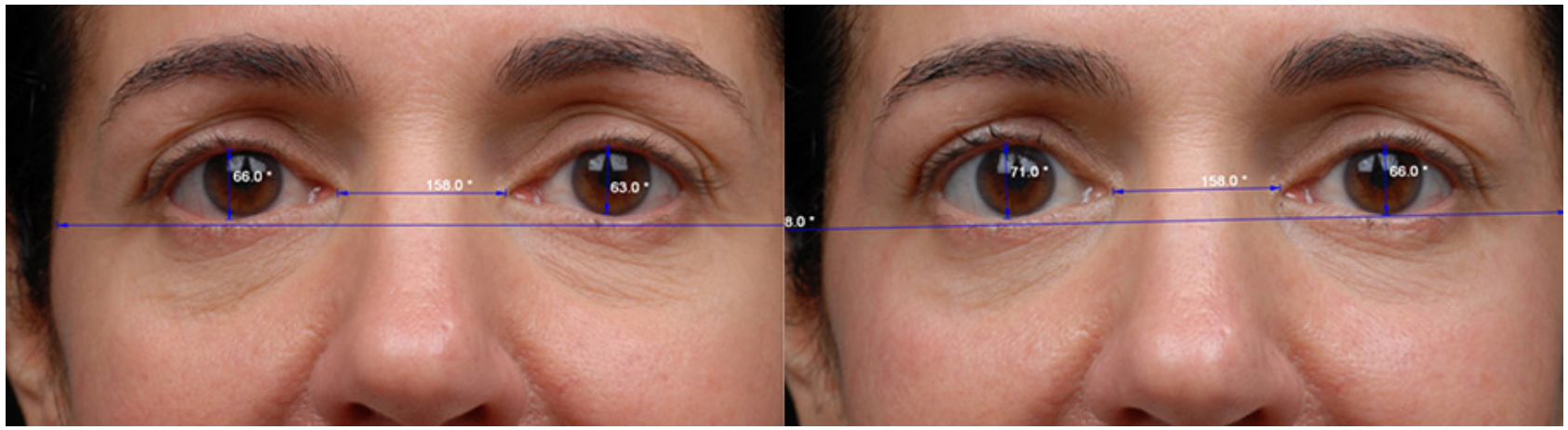
Treats Periorbital Fine Lines

Lateral Hooding

Dermatochalasis

Ectropion: tendon check technique, LLPP

MGD-off label



RADIO-FREQUENCY REJUVENATION

Periocular Indications

- Skin tightening with modest reduction in fine lines & wrinkles

How it works

- Elevation of dermal layer temperature (of at least 42°C) leads to a transient denaturation of structural collagen fibrils → followed by contraction / tightening of the skin 42°C → Dermal fibroblasts to elicit a heat shock response → net increase in collagen production in upon cooling 2-3 treatments 4 weeks apart are generally needed to see a clinically measurable response.

Narins, D.J. and Narins, R.S. (2003) Non-surgical radiofrequency facelift. J. Drugs Dermatol. 2:495–500.

HOW RF REMODELS COLLAGEN AND IMPROVES ELASTIN

The Wound Healing Response

- Heat is applied to the epidermis creating an Inflammatory Phase (1-3 days)
  - a. Early contraction of blood vessels (5-10 minutes)
  - b. Vasodilation in order to increase blood supply (multiple hours to 1-3 days)
  - c. Cells (macrophages, neutrophils,etc) infiltrate the damaged area to remove dead/damaged tissue and destroy bacteria

Proliferative Phase – 3 weeks

- Ongoing Process to repair tissue
  - Day 2-3 – Fibroblast activity is induced in damaged tissue. Fibroblasts multiply, sending mediators to stimulate repair, combining with damaged tissue
  - Day 5-7 – Fibroblasts begin synthesis of collagen (Day 7-21)
  - Day 7-21 – Old collagen is removed by collagenase

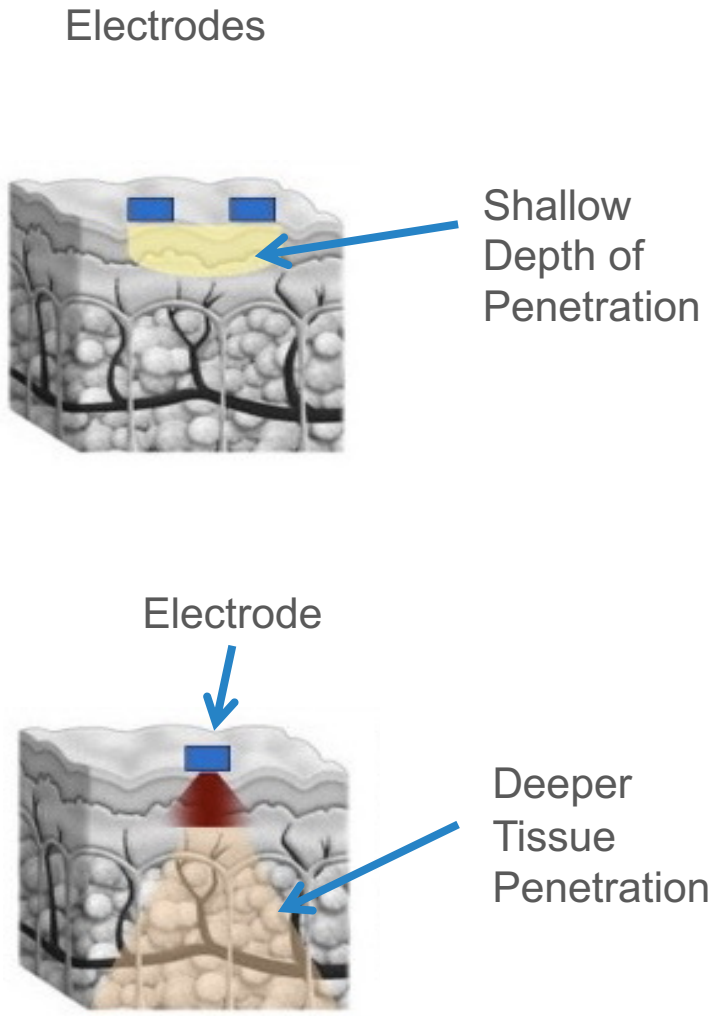
Maturation Phase – 3 weeks to 6 months and beyond

- New collagen is generated
- Elastin becomes more uniform and its quality is improved

Types of RF

- **Bipolar RF**
  - Current passes between 2 electrodes
  - Limits current to area between electrodes
  - Depth of penetration equals half the distance between electrodes
  - Shallow tissue heating

- **Monopolar RF**
  - Current between active treatment electrode and passive grounding electrode (Neutral Pad)
  - Lower energies - no pain, minimal adverse events
  - High penetration of the emitted current




NEUTRAL
MONOPOLAR 1
157%

TREATMENTS

- 3 – 5 treatments
- 2 – 4 weeks apart
- Patients may notice improvement after 2nd or 3rd treatment
- Skin will continue to improve over the next 6 -12 months post treatment
- Results will vary from patient to patient
- It is advised to photo document each treatment session

RECOMMENDED HANDPIECE ENERGY RANGE

Handpiece Size	Treatment Type	Recommended Energy Range*
Small 10mm	Envi Facial & eyeEnvi treatments	15-30

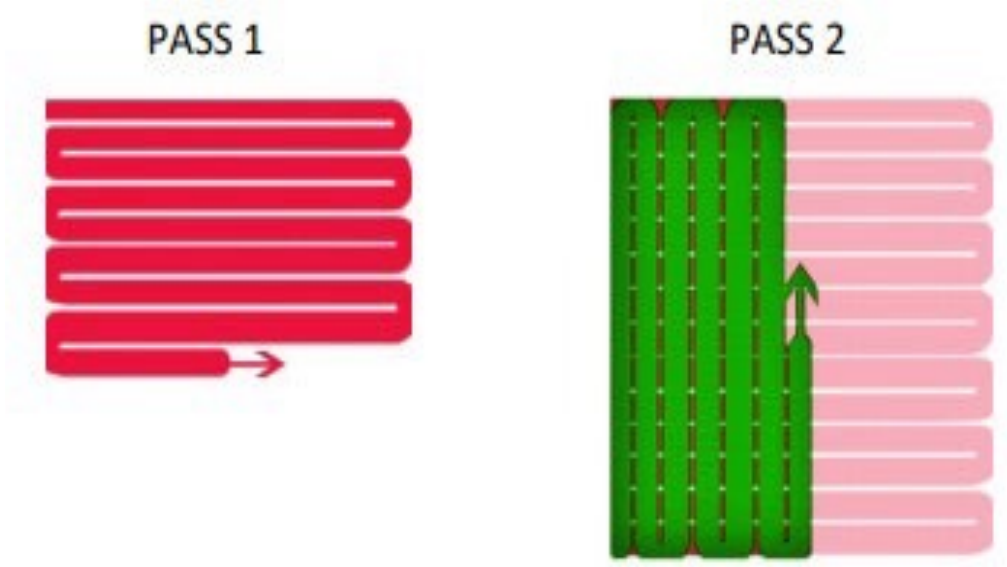
- Once treatment area has reached target temperature (up to 44°C), use of higher settings does not correlate to better treatment outcome and may result in undesired heating of the neutral pad.

FACIAL TREATMENT TECHNIQUE & TIPS

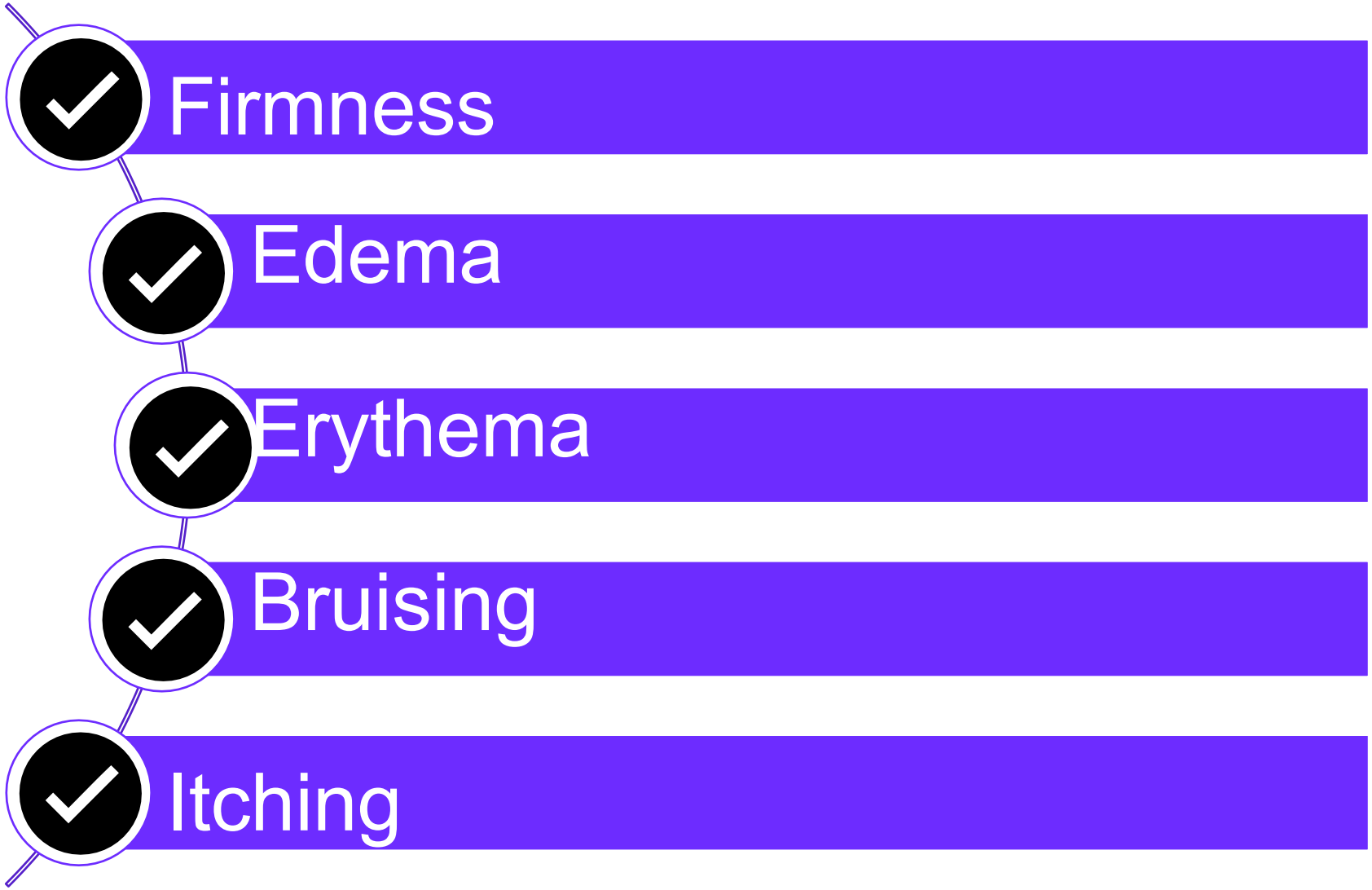
- When using the Small 10mm handpiece, treat in a tight circular motion to cover all the tissue within the zone.
- Warm the zone to 39˚C. Once 39˚C is reached, incrementally increase the temperature to 40°, 41° and 42°C, based upon the patient's tolerance. Treat vertically and horizontally using even, consecutive small circular motions. If the client feels too hot, speed up the motion, or stop and turn the energy level down by 1-2 levels.
- If treating smaller areas such as the upper lip, the 10mm handpiece or Small 10mm handpiece may be appropriate. Also, if the temperature of the tissue is not rising, consider using the Small 10mm handpiece at an energy range of approximately 25-30 to bring the tissue to 39°C and then switch to the 20mm handpiece and continue the treatment.
- The handpiece must be continuously moving to activate the energy. If the small 10mm handpiece is held stationary on the tissue the handpiece will not activate until movement is initiated by the user.

10MM SMALL TISSUE HEATING TREATMENT TECHNIQUE

- For tissue heating treatments, apply pressure when using the Small 10mm. Treatment areas may be as large as approximately 2.5" x 2.5" (6cm x 6cm) when using the Small 10mm for the purpose of tissue heating.
- Use a crosshatch pattern and apply pressure to the tissue while moving any sized handpiece, using wide, linear, non-overlapping strokes in a tight “U” shaped pattern. See Pass 1 and Pass 2 at right.
- Initiate energy setting at 20 and increase if needed
- Warm and treat the tissue
- Set the target temperature to 39°C and when reached, increase the temperature to 40°C, then incrementally increasing up to 42°C
- If the patient reports discomfort, speed up the motion or decrease the energy by 1 or 2 levels
- Non-overlapping “U” shaped strokes that follow a crosshatch pattern should be used for treatment



ANTICIPATED CLINICAL ENDPOINT



STANDARD NEUTRAL PADS

Standard Neutral Pad P/N IEC-NPD

For use with the following THPs only:

- **Small 10mm**
- **10mm**
- **15mm**
- **18mm**
- **20mm**

***Not compatible with the 25, 30, or 60mm THP's or FlexSure Applicators**

- The closer the Neutral Pad is to the treatment site, the less power required from the unit
- Consistency in location of the neutral pad will help maintain more consistent energy delivery
- The Single-Use neutral pad requires direct skin contact
- Make sure there are no wrinkles and that all skin is good contact with the adhesive backing

ANTICIPATED CLINICAL ENDPOINT

Dr. Selina McGee

Post eyeEnvi

Post eyeEnvi

RF

Selina R. McGee, OD, FAAO

Post EyeEnvi

Post EyeEnvi

CLINICAL ENDPOINT

Before TempSure Envi

3 months after 4th treatment (Courtesy of B. DiBernardo, MD)

EYE BEAUTY COMBINATION B&A

Dr. Raminder Saluja

Before

After 2 TempSure eyeEnvi / 1 Icon Max G

EYE BEAUTY COMBINATION B&A

Dr. Raminder Saluja

Before

After 4 TempSure eyeEnvi / 2 Icon Max G

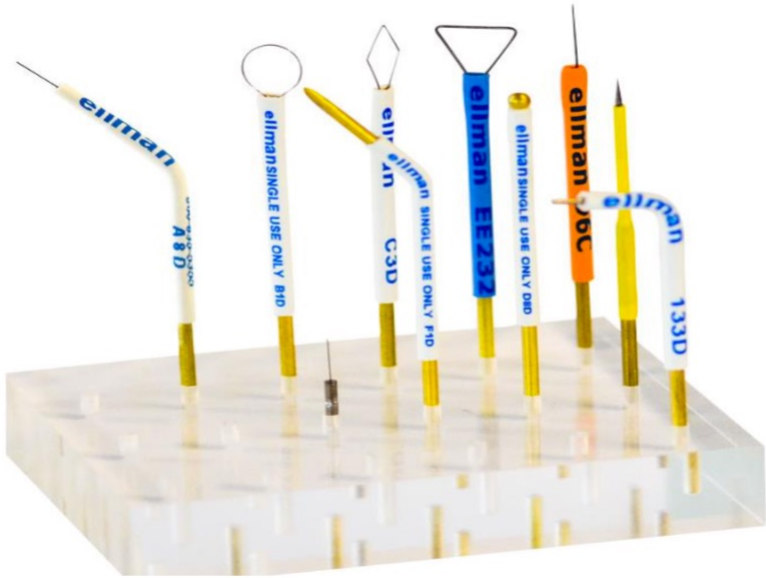
EYE BEAUTY COMBINATION B&A

Westford Clinic

Before

After 4 TempSure eyeEnvi / 2 Icon Max G

ELECTRODE SIZE



Assortment of sizes, shapes and lengths

Depends on tissue to be incised

Size proportional to power required

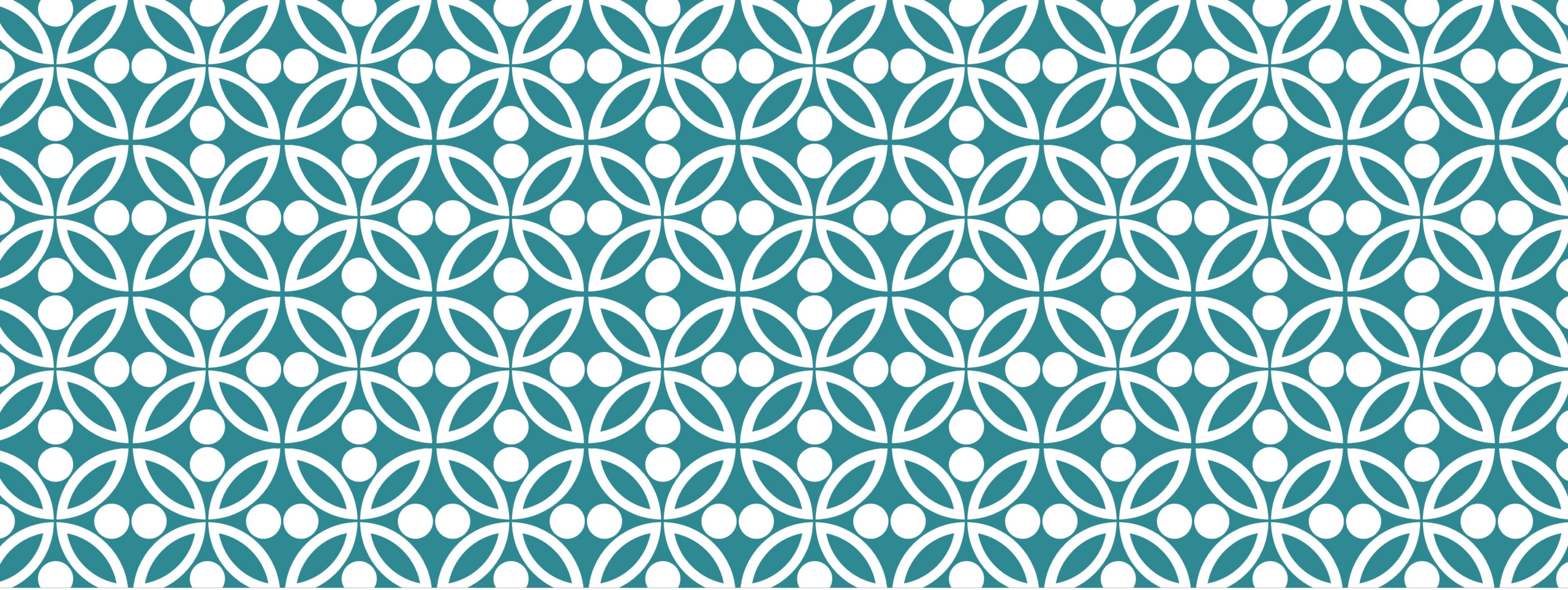
Smaller electrode

- Higher current concentration
- Lower Power
- Decreased lateral heat

Larger electrode, loop or triangular

- More power
- More scar tissue
- More lateral heat

VERRUCA



LASER RESURFACING

CASE 1

62 yof presented for her yearly comprehensive exam.

HPI: Patient denied changes in vision, doing well with her MF CL's.

SPEED: 2/28

VAcc OU distance 20/20 and near 20/20. OD: 20/20, OS: 20/25

PERRLA-APD

EOM's: Full and FDT: No deficits OU

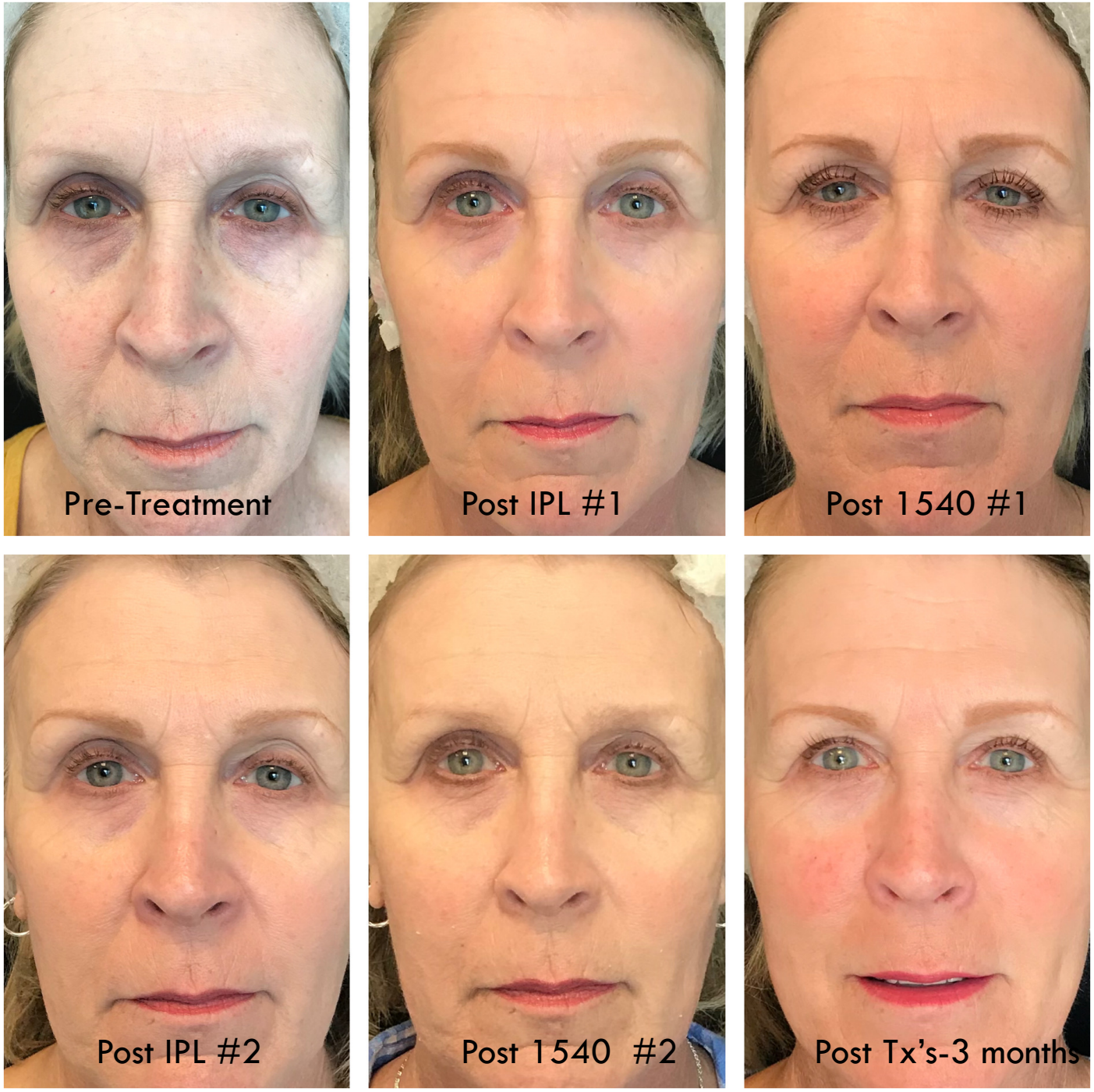
IOP: 17, 16

Cornea: Clear OU

Lens: Trace NSC OU

Posterior Segment: Unremarkable

WHAT ABOUT THESE DARK CIRCLES-CAN YOU HELP?


Pre-Treatment
Post IPL #1
Post 1540 #1
Post IPL #2
Post 1540 #2
Post Tx's-3 months

Pre-Treatment

Post Treatments-3 months

WHAT ABOUT THESE CIRCLES?

Dark Circles
Etiology and Management Options

Daniel P. Friedmann, MD[a,*], Mitchel P. Goldman, MD[b,c]

Type	Mechanism	Treatment Option
Hollowing/ shadowing	Age-related infraorbital skin laxity and volume loss SOOF pseudoherniation Orbicularis oculi muscle hypertrophy	Hyaluronic acid filler Fractional ablative CO_2 laser resurfacing
Excessive pigmentation	Periorbital melanosis ("constitutional type", may be an extension of pigmentary demarcation lines)[10] Postinflammatory hyperpigmentation (allergic contact dermatitis, atopic dermatitis) Melasma Oculodermal melanocytoses (bilateral nevus of Ota-like macules) Rare: Acanthosis nigricans, fixed drug eruptions, and erythema dyschromium perstans	IPL Q-switched laser Nonablative fractionated resurfacing
Prominent vasculature	Thin, translucent skin Excess subcutaneous vascularity Venous stasis	Long-pulsed laser IPL Hyaluronic acid filler Fractional ablative CO_2 laser resurfacing
Exogenous	Penicillamine-induced periorbital pigmentation Bimatoprost-induced periorbital hollowing and hyperpigmentation	Hyaluronic acid filler Fractional ablative CO_2 laser resurfacing IPL

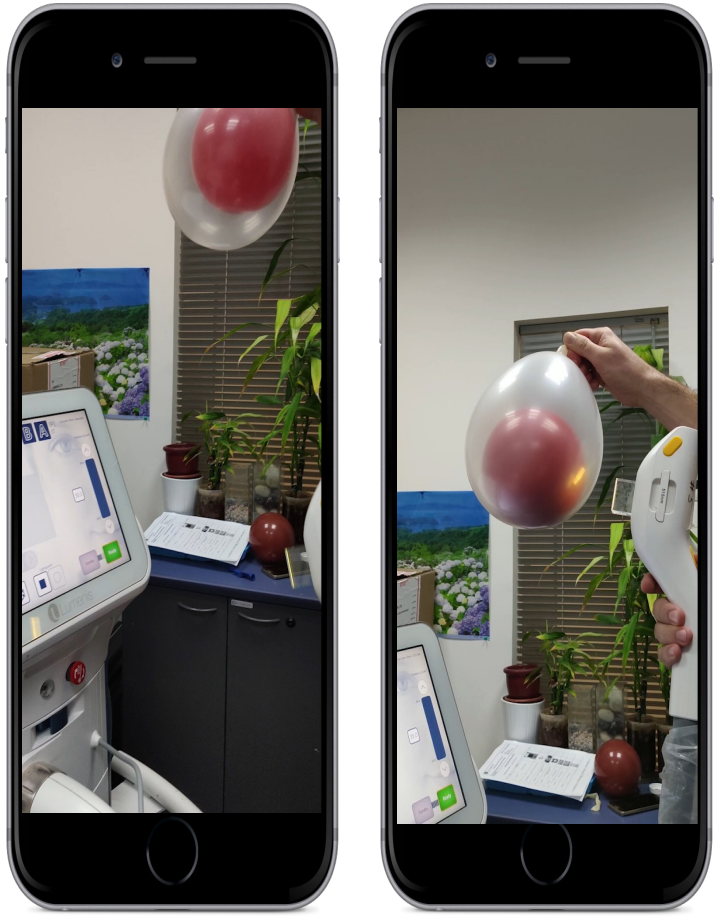
PATHOGENESIS, EVALUATION AND TREATMENT

IVAN VRCEK, OMAR OZGUR,[1] AND TANUJ NAKRA

Before and after examples of patients with infraorbital dark circles who underwent treatment with: Volume enhancement with hyaluronic gel injection (a). Volume enhancement with autologous fat transfer (b). Laser skin resurfacing (c). Lower eyelid blepharoplasty with inferior orbit fat transposition (d) (adapted from Nakra, 2015)

ENERGY BLENDS TO TREAT CHROMOPHORES

IPL safely and effectively targets oxyhemoglobin while leaving skin intact



MOST POPULAR COSMETIC SKIN PROCEDURES PERFORMED

Photofacial

- #1 Cosmetic procedure performed in the United States
- 80 million Americans have some kind of venous disorder (80% of those are cosmetic)
  - Rosacea represents 16 million alone
- Hyperpigmentation is the 2nd largest skin disorder in the US (Acne #1)

- Chang AL, Bitter PH Jr, Qu K, Lin M, Rapicavoli NA, Chang HY. Rejuvenation of gene expression pattern of aged human skin by broadband light treatment: a pilot study [published correction appears in J Invest Dermatol. 2013 Jun;133(6):1691]. *J Invest Dermatol*. 2013;133(2):394–402. doi:10.1038/jid.2012.287

American Academy of Dermatology

IPL AND "THE LITERATURE"

- Lei Y, Peng J, Liu J, Zhong J. Intense pulsed light (IPL) therapy for meibomian gland dysfunction (MGD)-related dry eye disease (DED): a systematic review and meta-analysis. Lasers Med Sci. 2022 Dec 19;38(1):1. doi: 10.1007/s10103-022-03690-1. PMID: 36534219.

ORIGINAL ARTICLE

Intense pulsed light (IPL) therapy for meibomian gland dysfunction (MGD)–related dry eye disease (DED): a systematic review and meta-analysis

Yahui Lei[1] · Jing Peng[2] · Jiayan Liu[1] · Jingxiang Zhong[1,3]

Received: 29 August 2022 / Accepted: 3 December 2022

HOW DOES IPL ACTUALLY WORK? WHAT IS IT DOING TO THE TISSUES?
THINK BEISTO

- Photocoagulation
- Photoimmunomodulation
- Photomodulation
- Photothermolysis
- Photosanitization

Emerging strategies for the diagnosis and treatment of MGD: Proceedings of the OCEAN group meeting. *Ocular Surface* 2017 15, 179-192

SKIN ASSESSMENT

Fitzpatrick Skin Type

Amounts of Target Chromophore and Competing Chromophore

- What's a Chromophore?
  - Water, Pigment, Oxyhemaglobin

Any active sun or lamp exposure

Ethnicity

Thickness of skin

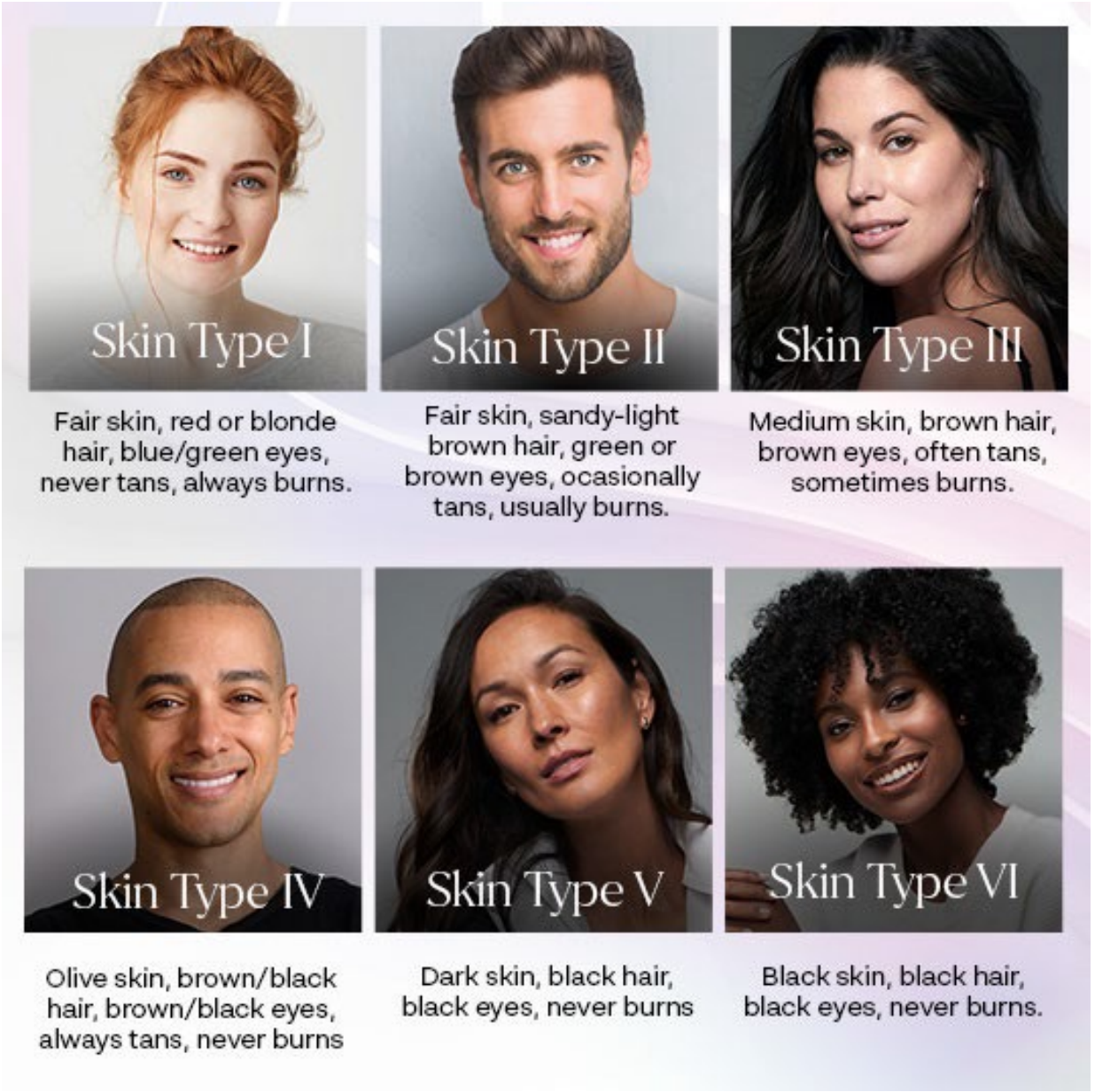
Overall skin health

Medical history

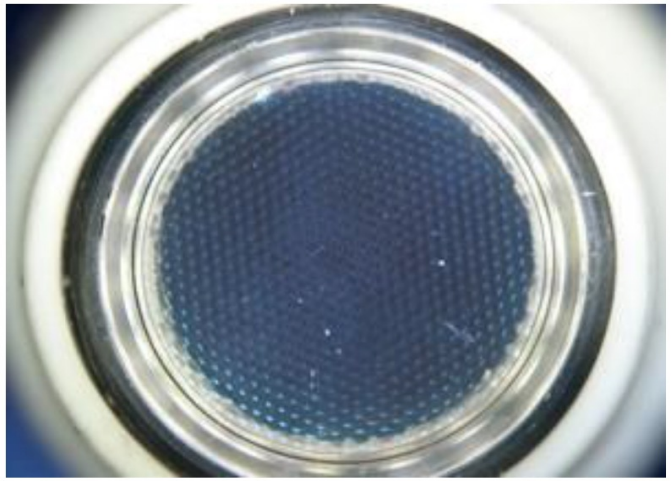
Medication Review

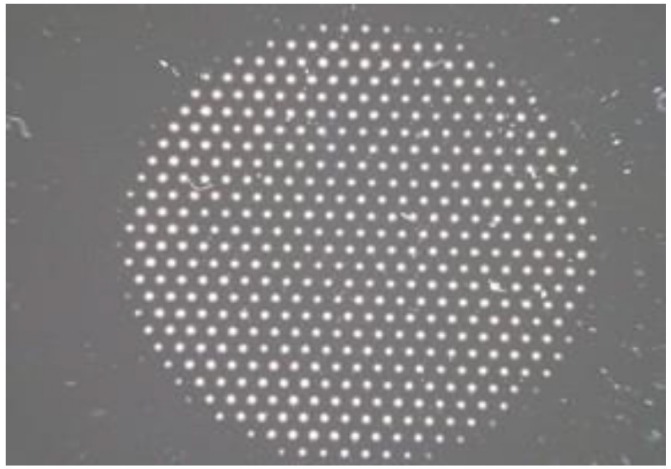
THIS NEEDS TO BE DONE BEFORE EVERY TREATMENT

FITZPATRICK SCALE

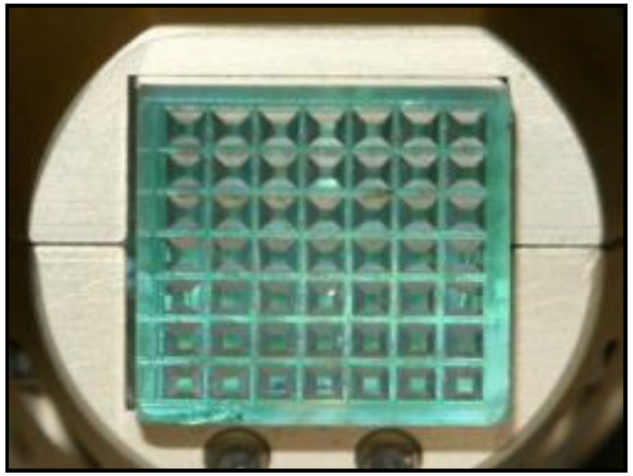


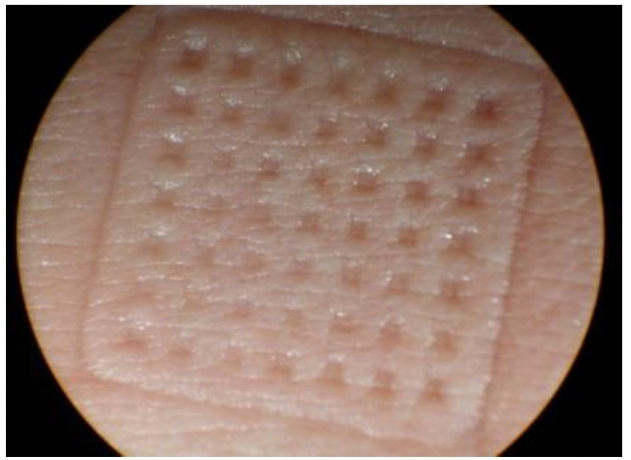
15mm, 320 mB/cm^2 &
XF Microlens 115mB/cm^2

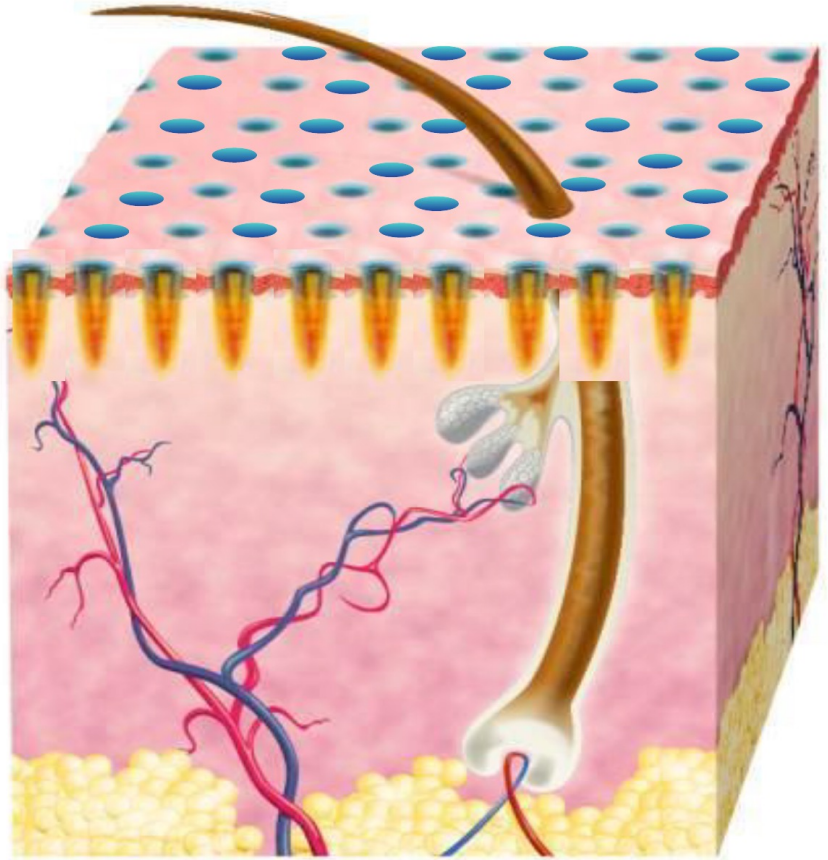




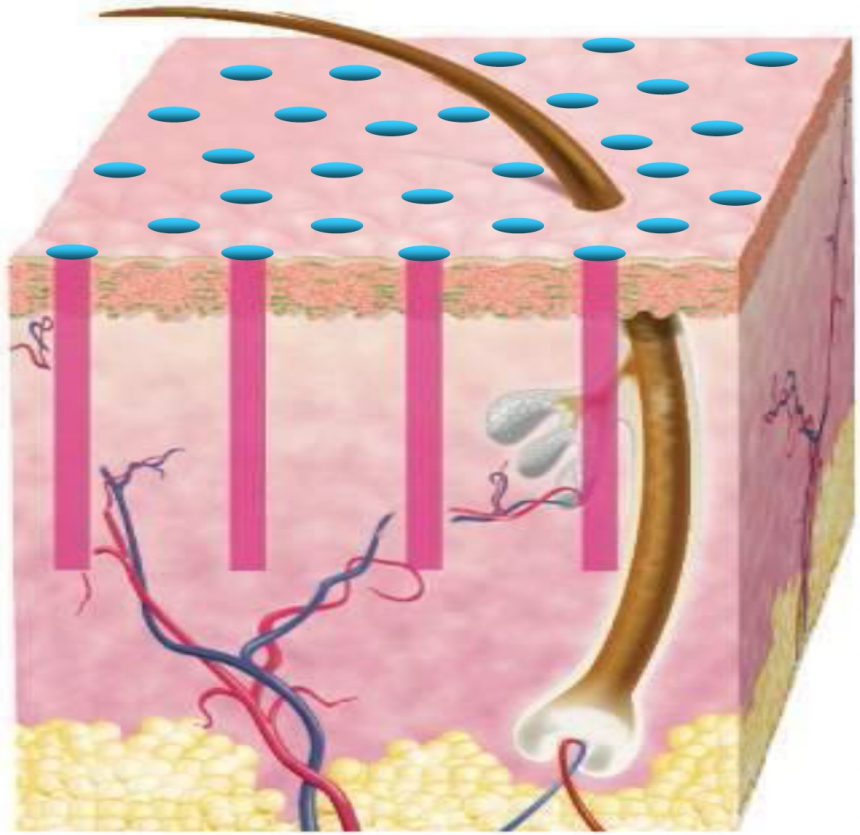
12mm x 12mm XD
25mB/cm^2



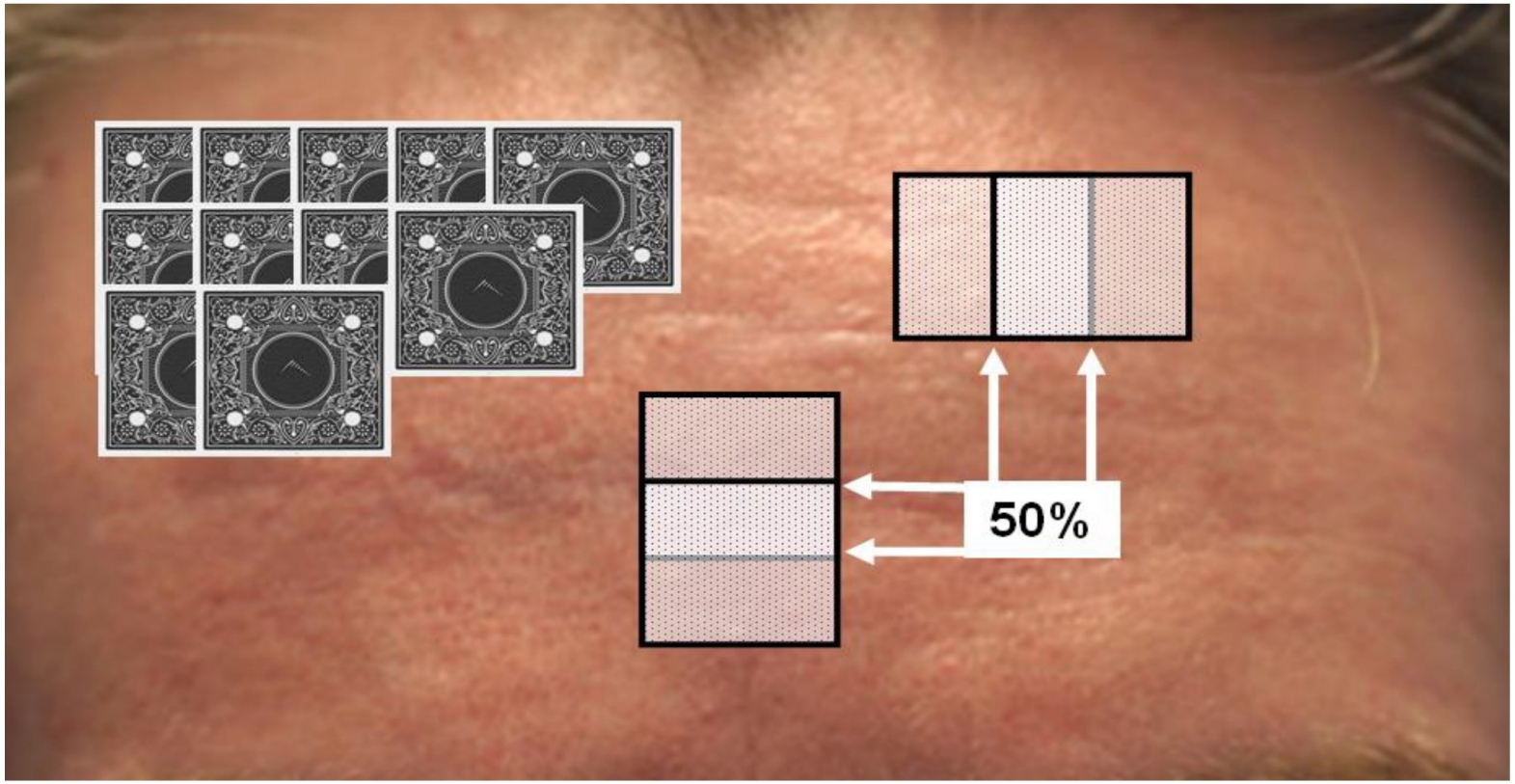




XF / 115mB/cm^2

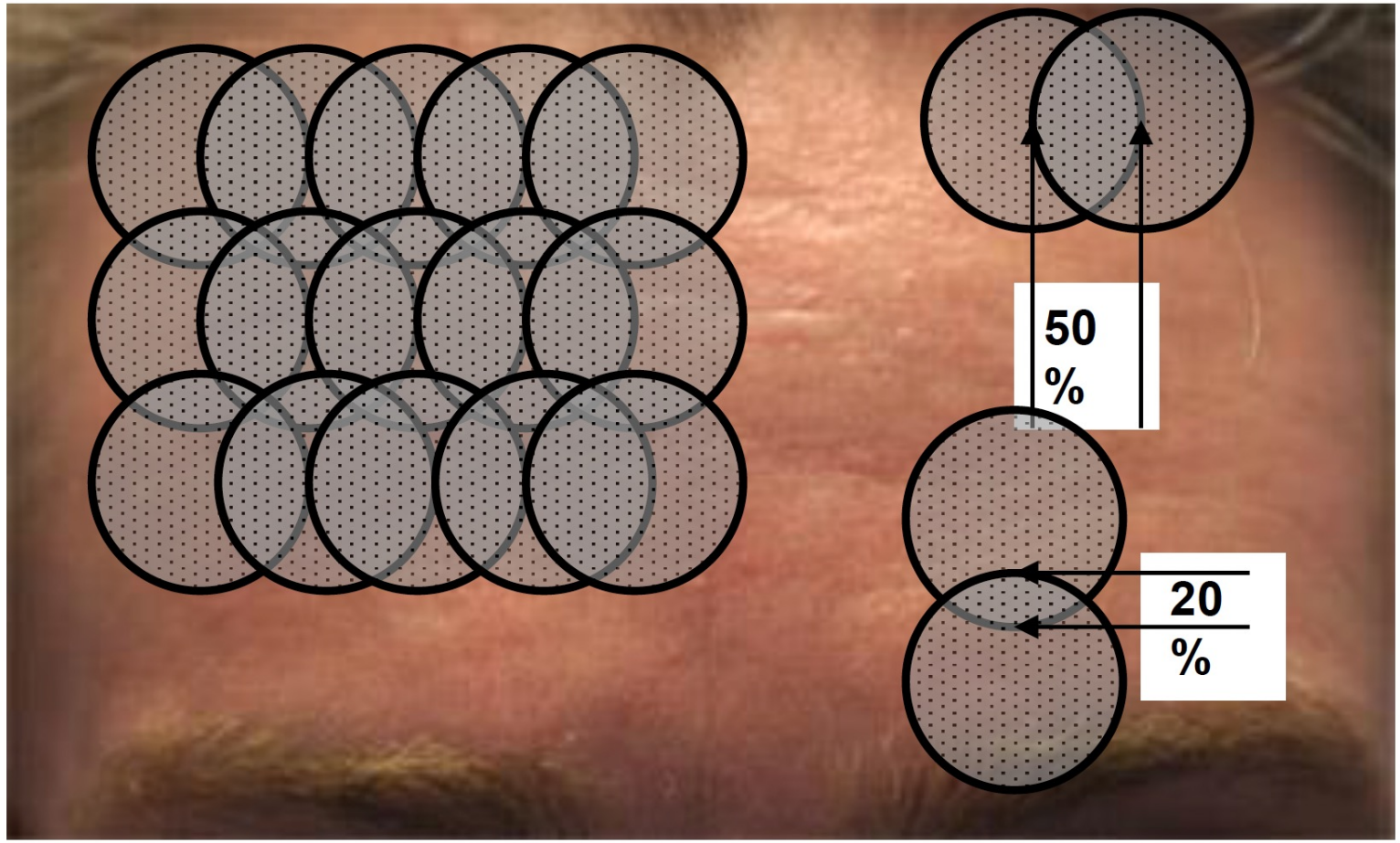


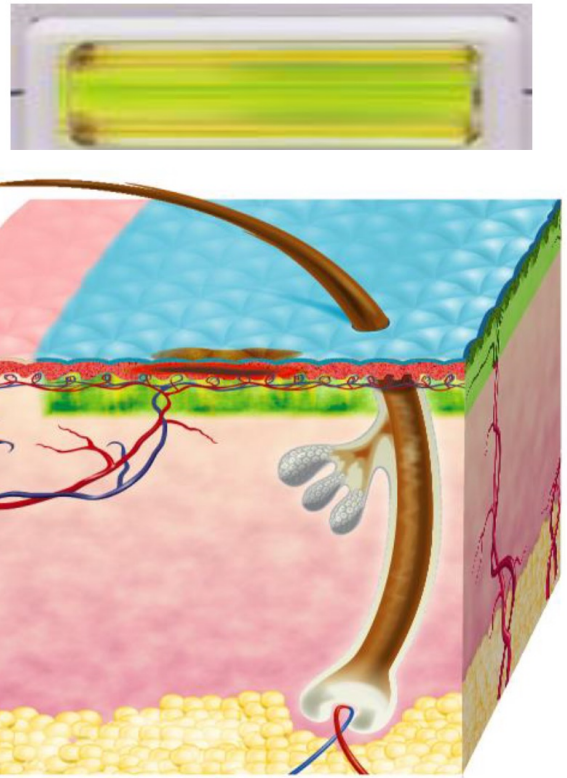
XD / 25mB/cm^2



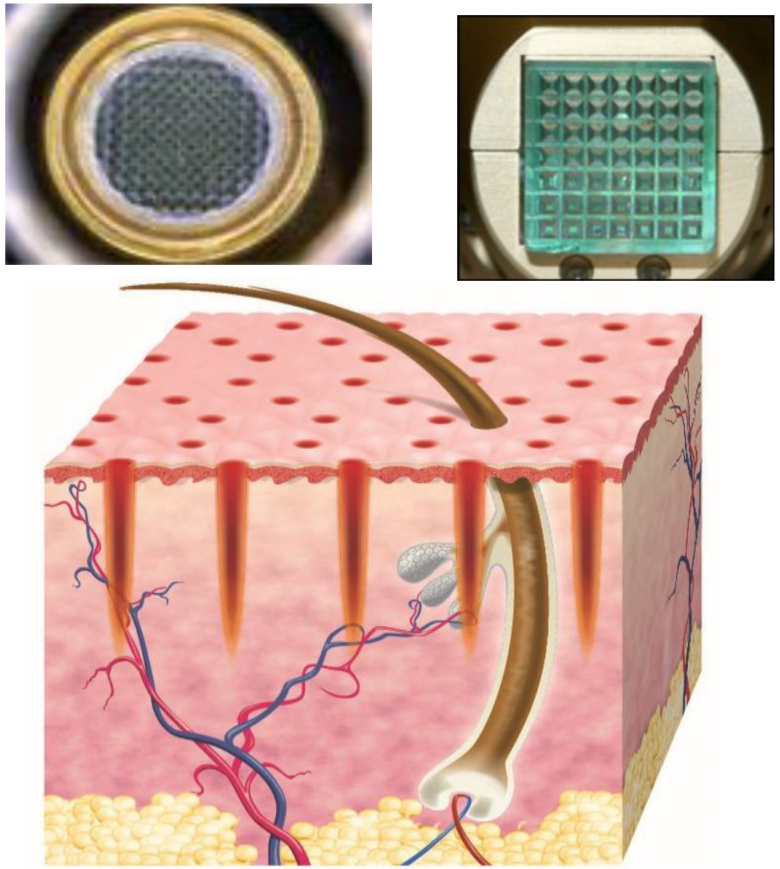
Overlap in both directions

- *50% / 50% overlap for XD*


50
%
20
%

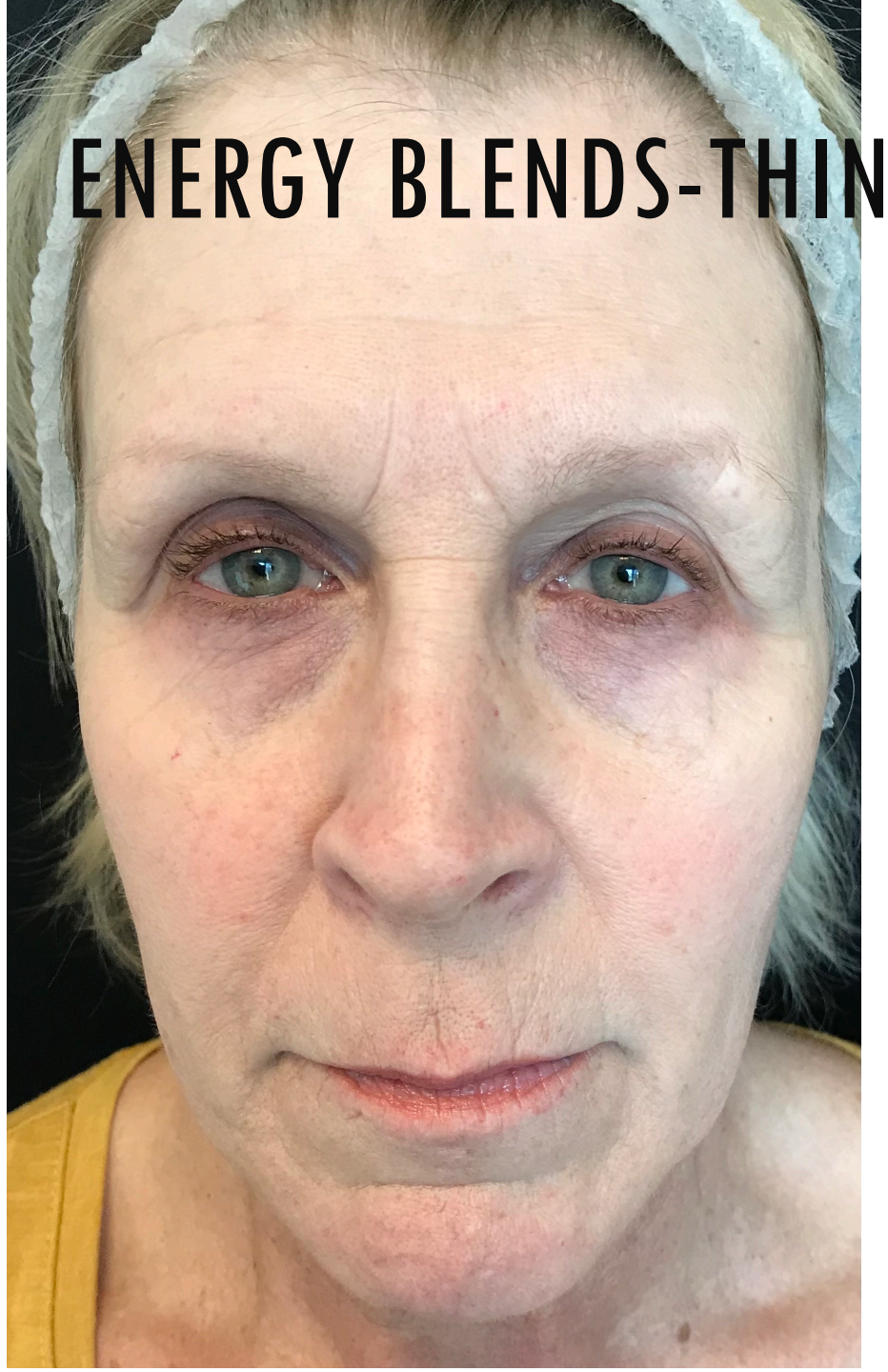


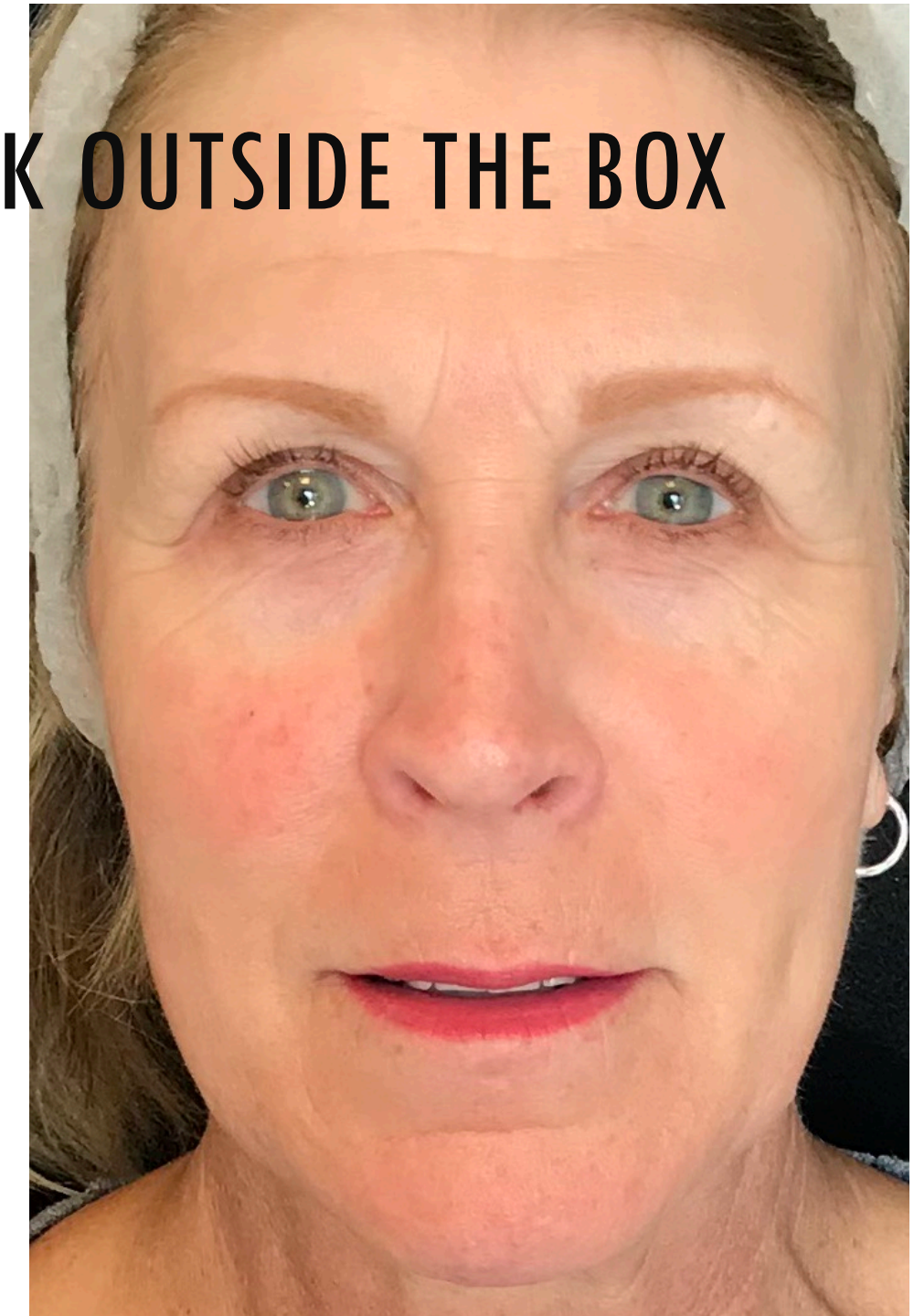
MaxG



1540nm

ENERGY BLENDS-THINK OUTSIDE THE BOX





1540 NON-ABLATIVE LASER

ASK & LOOK, LOOK & ASK

Are my Eyes Comfortable & Is My Vision Optimized?

Please check all symptoms experienced:

☐Dry Eyes
☐Blurry Vision
☐Redness
☐Burning
☐Itching
☐Light Sensitivity
☐Excessive tearing/watery eyes
☐Tired eyes/eye fatigue
☐Stringy mucus in or around the eyes
☐Foreign Body Sensation/Gritty Scratchy, feeling of sand or grit in eye

Have you used eye drops in the last 2 hours?
Yes☐No☐

Does your vision change throughout the day?
Yes☐No☐

Can you wear your contacts comfortably as long as you'd like?
Yes ☐No☐

Am I at risk for a stroke?

Do you wake up in the morning with a headache?

Yes ☐ ☐No

Do you find it necessary to take a nap in the afternoon?

Yes☐No☐

Do you snore?

Yes☐No☐

Ocular Rosacea

Does your face flush or have redness easily, eating spicy foods, alcohol, or hot showers?

Yes☐ No☐

Do you have bloating with certain foods?

Yes☐No ☐

If so, which ones?

Am I at Risk for AMD?

Please check all that applied since last visit:

☐Light colored eyes/and or skin
☐Cardiovascular disease
☐Difficulties driving at night
☐Difficulty distinguishing an object from a similar color background (dark car on a dimly lit street)
☐Family history of AMD or taken a genetic test (23 & Me) and tested for an AMD risk
☐Outdoor occupation or excessive computer use (2+ hours per day)
☐Bright light sensitivity
☐Current or former smoker
☐Low vegetable intake (< 5 servings/day)
☐Scanner score_____

Am I putting my best face forward?

In a perfect world, what would I want to change about my eye appearance? Check any or all that apply

Would you like your eyes to be more open?

Red eyes?

Fewer wrinkles-forehead, frown lines, crow's feet?

Tighter skin around lids?

Less sun damage?

Glowing skin?

NON SURGICAL TREATMENT OF OCULAR ADNEXA-RADIOFREQUENCY

Prolongs Blepharoptosis Surgery

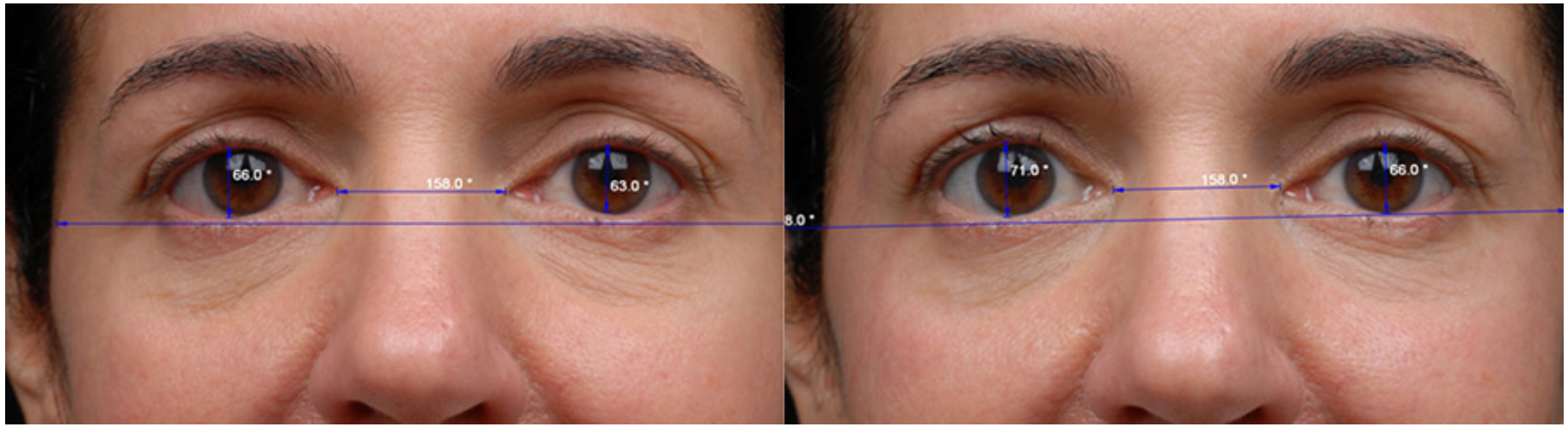
Treats Periorbital Fine Lines

Lateral Hooding

Dermatochalasis

Ectropian

MGD-off label



Pre-Treatment

Post Treatments-3 months

WHAT ABOUT THESE CIRCLES?

Dark Circles
Etiology and Management Options

Daniel P. Friedmann, MD[a,*], Mitchel P. Goldman, MD[b,c]

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IVAN VRCEK, OMAR OZGUR,[1] AND TANUJ NAKRA

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THANK YOU!

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Selina R. McGee, OD, FAAO