

UPDATE ON THE TREATMENT AND MANAGEMENT OF DRY EYE DISEASE

ASHLEY WALLACE-TUCKER, OD, FAAO, FSLs



DISCLOSURES

CooperVision

Bausch and Lomb

SynergEyes

Topcon



O V E R V I E W

Definition

Epidemiology

Risk Factors

Diagnostic Tests

Treatment Options



HAS THIS EVER HAPPENED TO YOU?

- 55 yo female
- What brings you in today?
 - Red eyes
 - Itchy eyes
 - Watery eyes
 - Burning eyes
 - Stinging eyes
 - Sticky eyes



HAS THIS EVER HAPPENED TO YOU?

- 55 yo female
- What brings you in today?
 - Red eyes
 - Itchy eyes
 - Watery eyes
 - Burning eyes
 - Stinging eyes
 - Sticky eyes
- What have you tried in the past?
 - ATs
 - Restasis
 - Xiidra
 - Serum Tears
 - Steroids



DRY EYE DISEASE (DED): DEFINED

“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.”

EPIDEMIOLOGY

- Assessment of large-scale DED prevalence and incidence has been hindered by inconsistencies in the definition and diagnostic criteria among prior studies.
- When the diagnosis is based on symptoms (with or without signs), meta-analysis yields prevalence values ranging from 5% to 50%
- When diagnosis is based on signs alone, the prevalence is as high as 75% in certain cohorts.



INTERESTING FACTS

~38 million people suffer from dry eye.

~17.2 million of those are under the care of an ECP.

75% of dry eye patients have never tried prescription therapy.

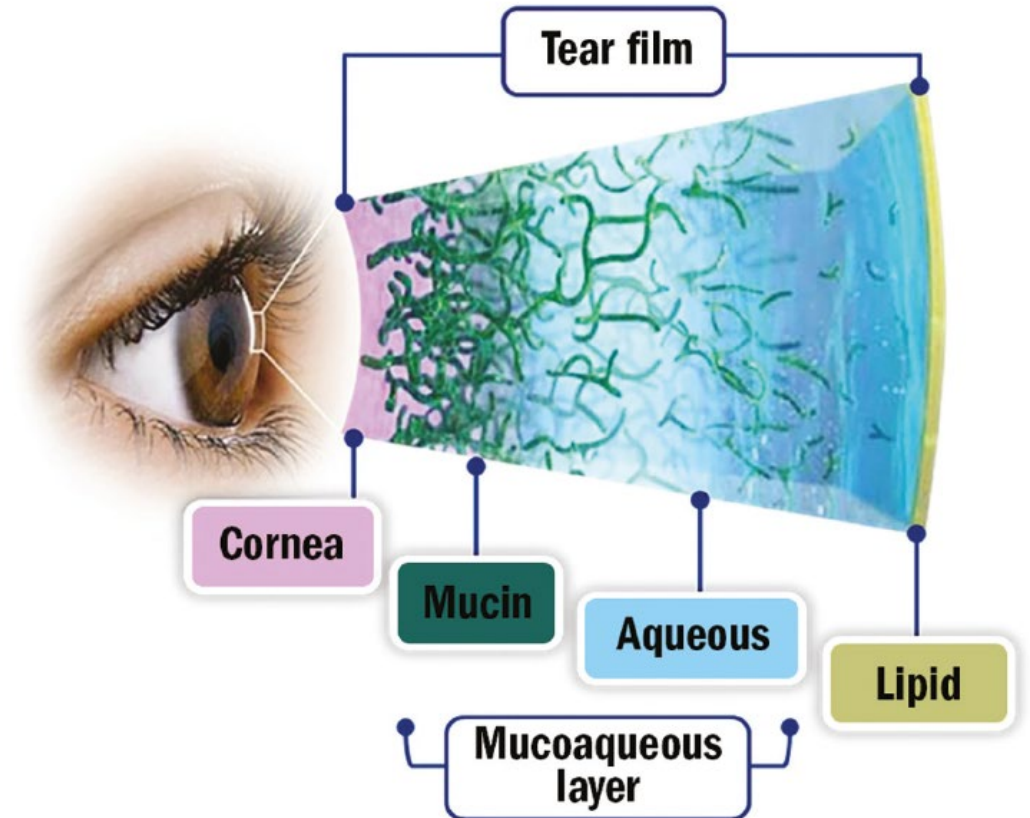
Only ~10% of dry eye patients are currently on Rx therapy.

~80% of patients currently on Rx therapy discontinue by 4 months.

**What does those statistics
mean to YOU?**

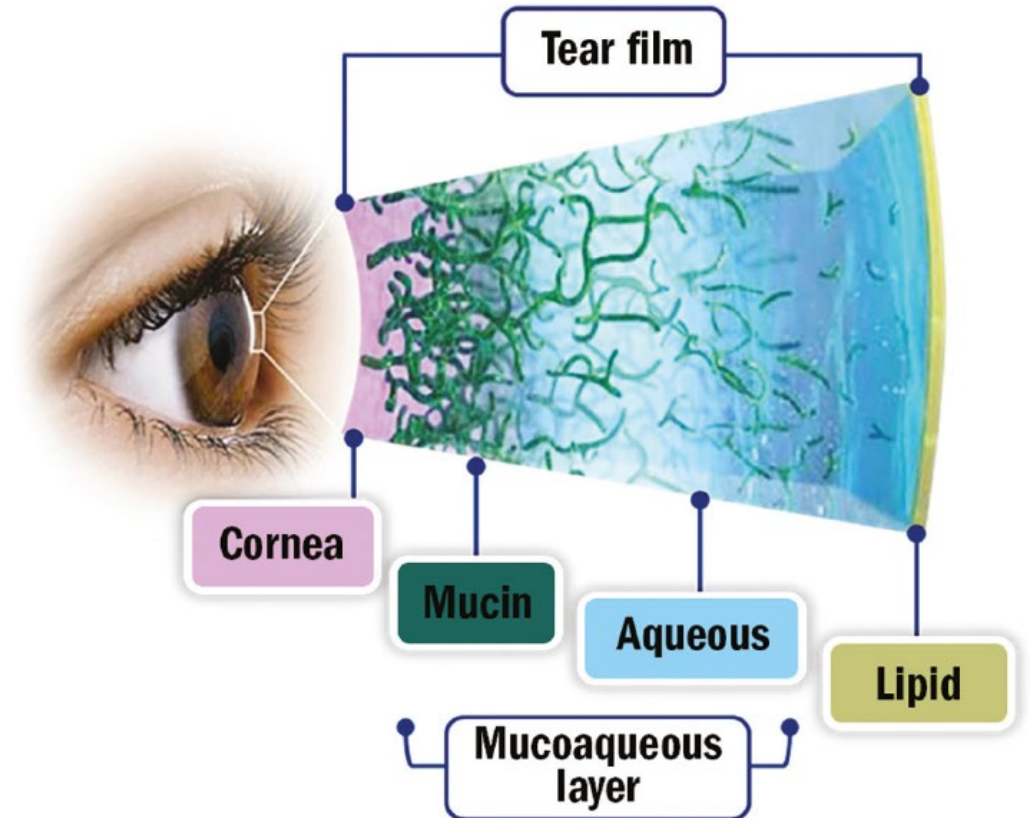
TEAR FILM

- The tear film has traditionally been described as a 3-layered structure consisting of a mucin layer, an aqueous layer, and a lipid layer.
- TFOS DEWS II depicts the tear film as a 2-layered interactive structure composed of a mucoaqueous layer and a lipid layer.



TEAR FILM

- The mucoaqueous layer serves to reduce friction and provide hydration to the ocular surface.
- The lipid layer serves to decrease surface tension and minimize evaporation and tear film instability.



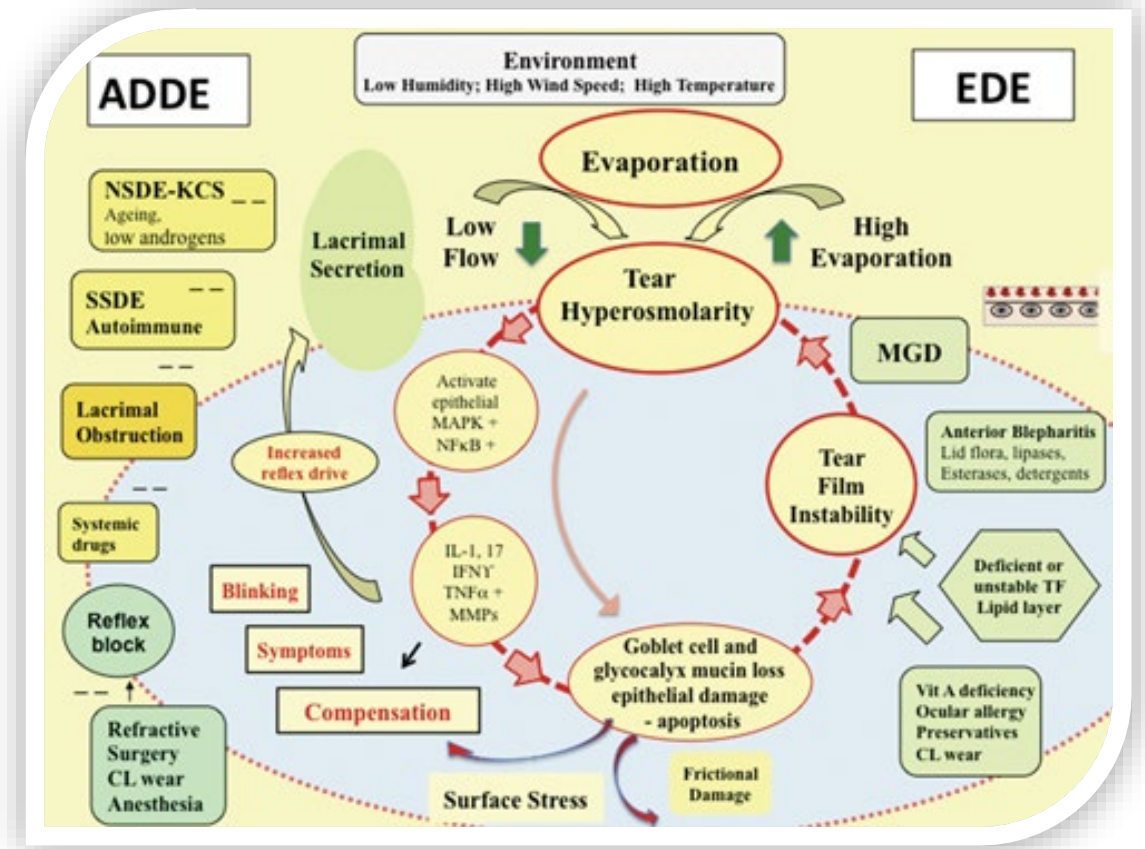
TEAR FILM

- Each blink drives capillary movement and upward drift of the lipid and mucoaqueous layers, which contribute to proper tear distribution across the corneal and conjunctival surfaces.

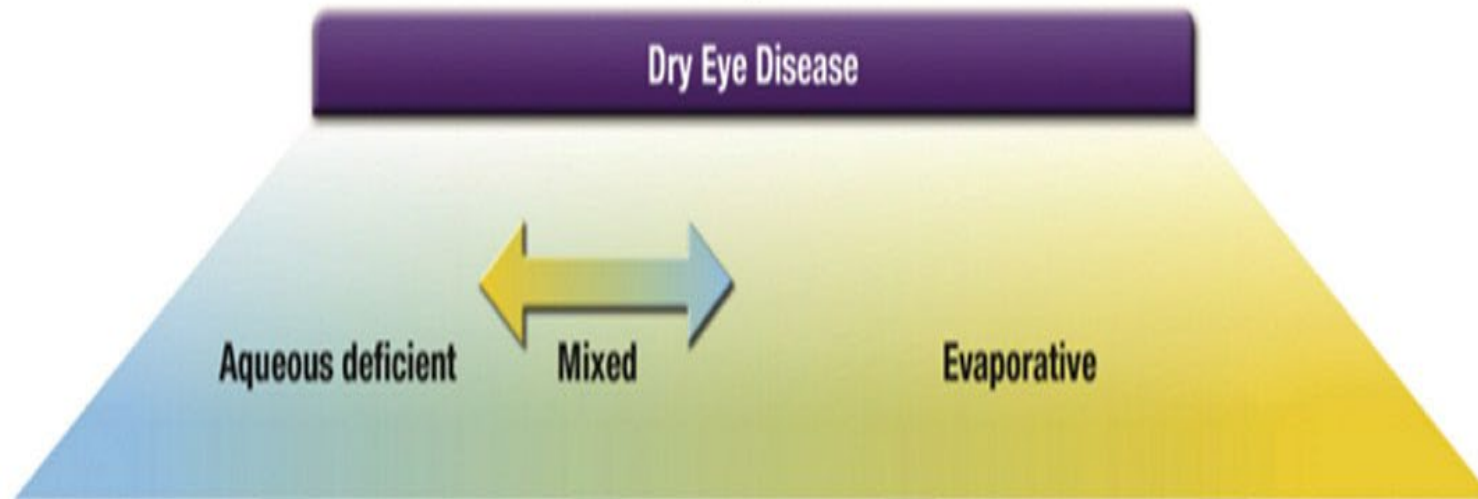


THE VICIOUS CYCLE

Hyperosmolarity at the ocular surface initiates an inflammatory sequence leading to damage of epithelial cells, goblet cells, and the glycocalyx, observed clinically as punctate epitheliopathy and tear film instability and breakup.



TWO TYPES OF DRY EYE



Although the primary cause of DED may vary, all forms enter the final common vicious circle of inflammation leading to clinical signs and symptoms of DED.

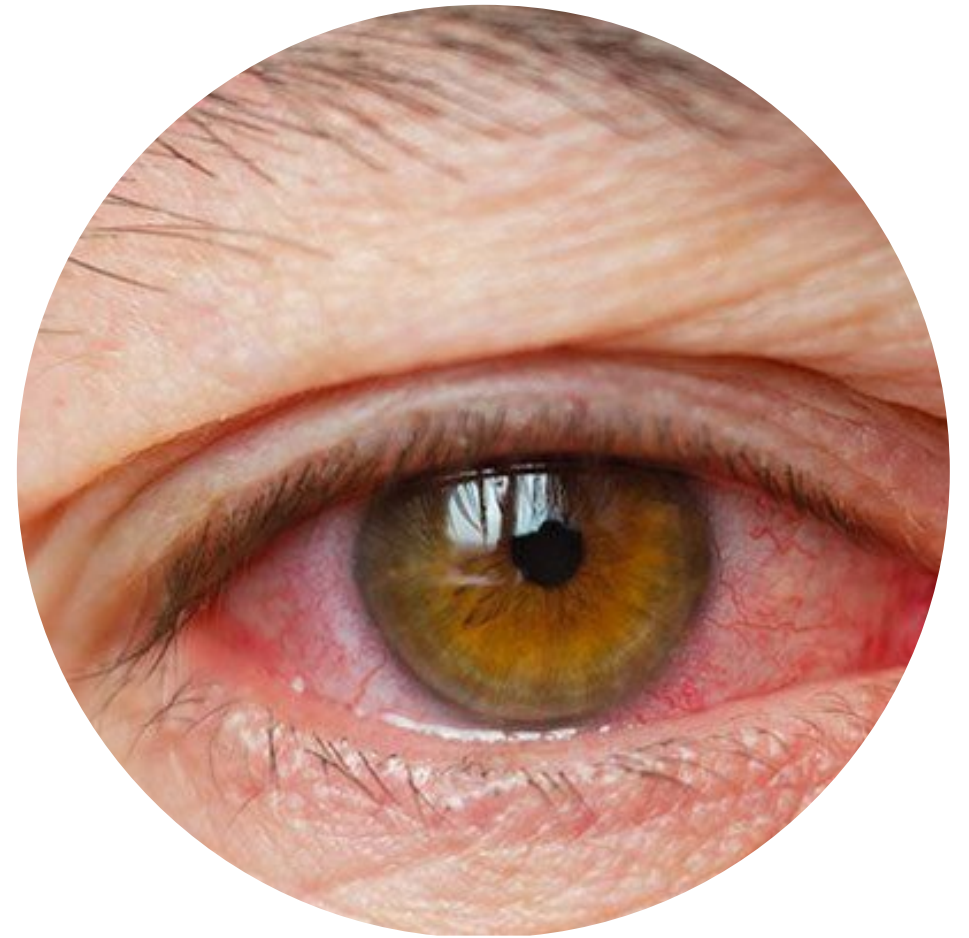
AQUEOUS DEFICIENT DRY EYE (ADDE)

Tear hyperosmolarity results when lacrimal secretion is reduced, in conditions of normal evaporation from the eye.



EVAPORATIVE DRY EYE (EDE)

Tear hyperosmolarity is caused by excessive evaporation from the exposed tear film in the presence of a normally functioning lacrimal gland.



THE KEY TO MANAGING DED:

DETERMINING THE PRIMARY CAUSE IN ORDER TO DEVELOP
AN EFFECTIVE TREATMENT PROTOCOL.



CAUSES OF ADDE

- Advanced age
- Systemic drug use (antihistamines, β -blockers, antispasmodics, diuretics and some psychotropic drugs)
- Sensory reflex block (topical anesthetics, trigeminal nerve damage and refractive surgery including LASIK)
- Inflammatory infiltration of the lacrimal gland (as in Sjögren's syndrome)
- Lacrimal duct obstruction observed in any form of cicatricial conjunctival disease

CAUSES OF EDE

- Major cause → Meibomian Gland Dysfunction (MGD)
- Increase in meibomian gland dropout, particularly after the age of 50 years
- Treatment of acne vulgaris with *cis*-retinoic acid may induce gland atrophy and MGD
- Anti-glaucoma drugs pilocarpine and timolol also have direct effects on meibomian gland epithelial cells that may influence their morphology, survival and/or proliferative capacity, and possibly promote MGD
- Certain skin disorders, such as acne rosacea, atopic dermatitis, seborrheic dermatitis and psoriasis are associated with non-cicatricial MGD
- Cicatricial conjunctival diseases such as trachoma, erythema multiforme and pemphigoid, lead to cicatricial MGD.

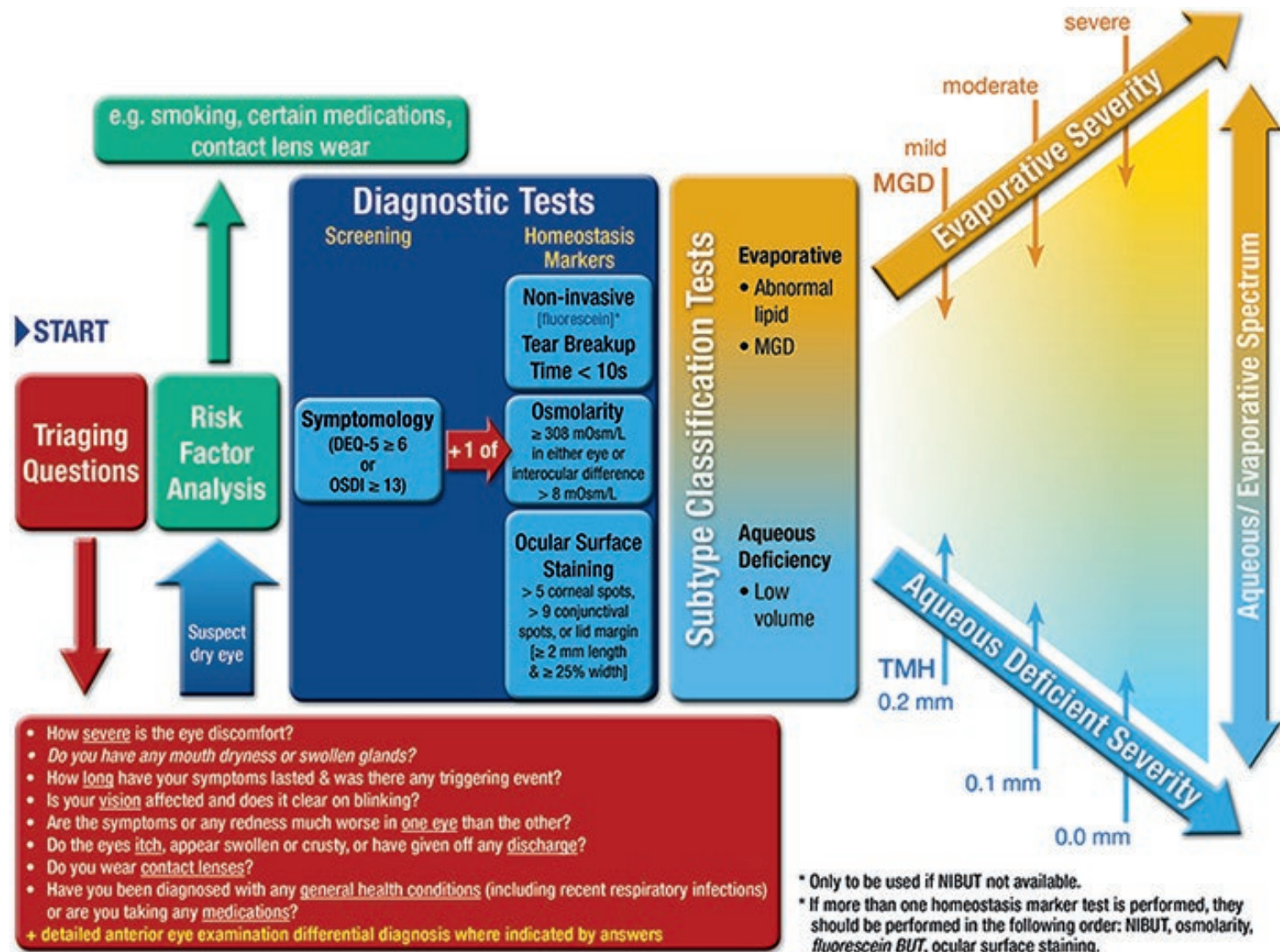
WHERE DO
WE START?



FIRST THINGS FIRST...

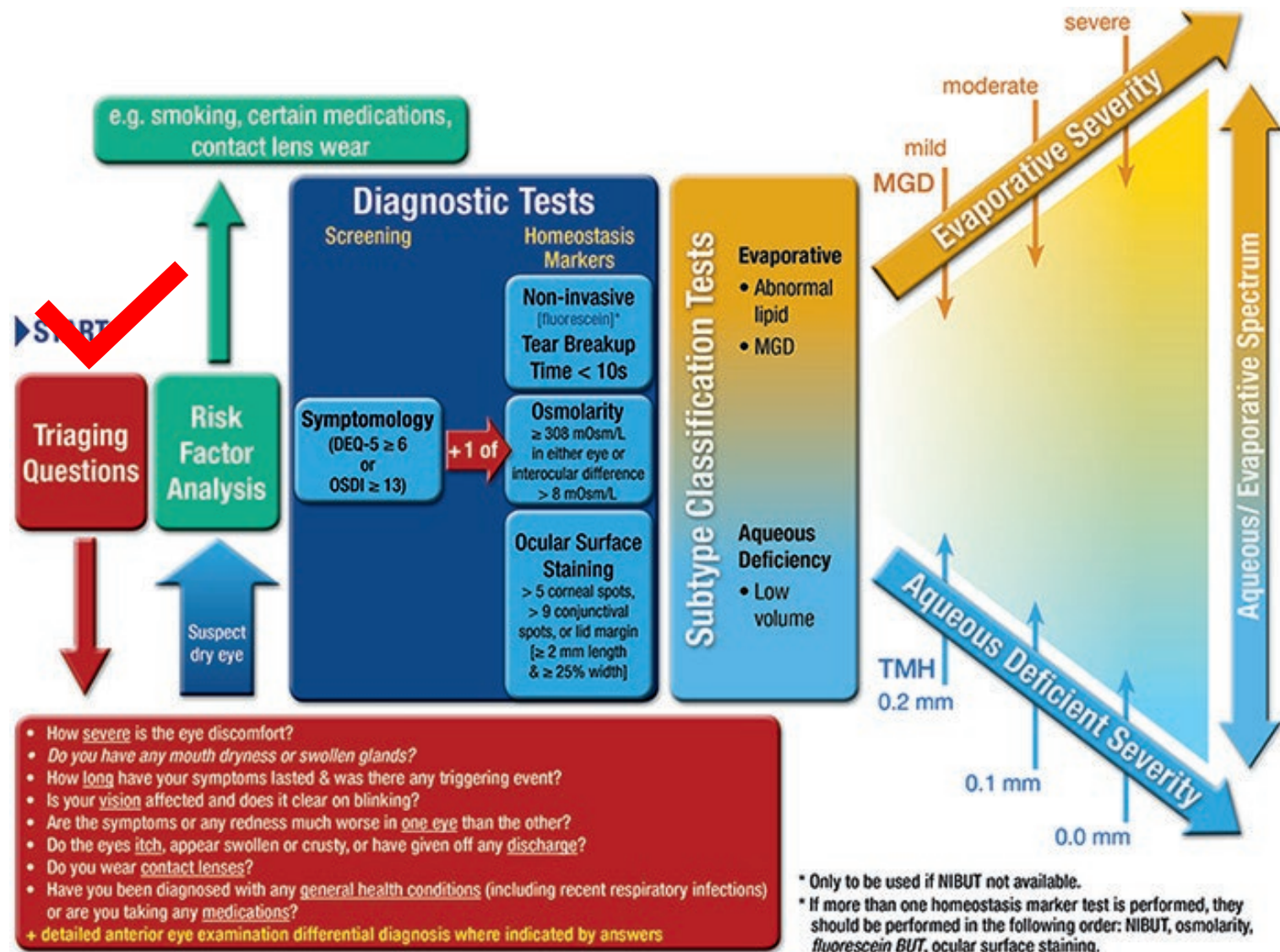
- Prior to diagnosis, it is important to exclude conditions that can mimic DED:
 - Conjunctivitis
 - Blepharitis
 - Infection
 - Demodex
 - Lid-related disease

But
FIRST
★ ★ ★



TRIAGING QUESTIONS

- How severe is the eye discomfort?
- Do you have any mouth dryness or swollen glands?
- How long have your symptoms lasted and was there any triggering event?
- Do you wear contact lenses?
- Is your vision affected and does it clear upon blinking?
- Are the symptoms or any redness much worse in one eye than the other?
- Do your eyes itch, appear swollen or crusty, or give off any discharge?
- Have you been diagnosed with any health conditions (including respiratory infections) or are you taking any medications?



CONSISTENT RISK FACTORS

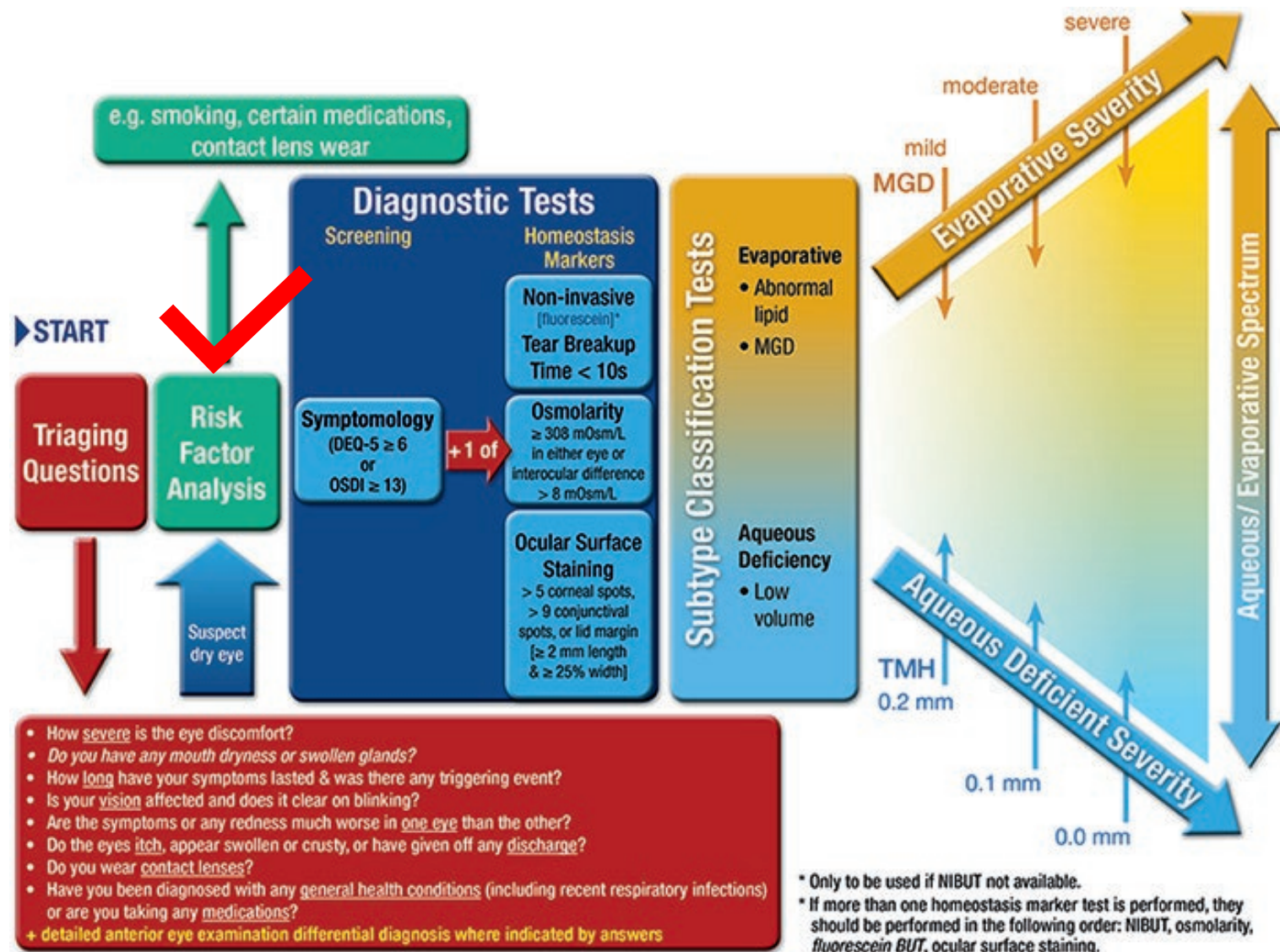
- age
- sex (female)
- Race (Asian)
- MGD
- connective tissue disease
- Sjögren syndrome
- androgen deficiency
- computer use
- contact lens wear
- estrogen replacement therapy
- hematopoietic stem cell transplantation
- environmental conditions (such as pollution, low humidity, and sick building syndrome)
- medication use

TABLE 1. SYSTEMIC MEDICATIONS THAT MAY CAUSE DRY MOUTH AND DRY EYES

| | | |
|------------------------|----------------------|-------------------------|
| Adjuncts to anesthesia | Antimuscarinics | Chelating agents |
| Analgesics | Antineoplastics | Decongestants |
| Antiandrogens | Antiparkinsonians | Diuretics |
| Antiarrhythmics | Antipsychotics | Neurotoxins |
| Anticholinergics | Antipyretic agents | Opioids |
| Antidepressants | Antirheumatic agents | Psychedelic agents |
| Antiemetics | Antispasmodics | Retinoids |
| Antihistamines | Antivirals | Sedatives and hypnotics |
| Antihypertensives | Anxiolytics | |
| Antileprosy agents | Bronchodilators | |

Fraunfelder FT, Sciubba JJ, Mathers WD. The role of medications in causing dry eye. *Jour Ophthalmol.*

2012;2012:285851



DOES THE
PATIENT
HAVE
SYMPTOMS
OF DED?

| | |
|-----|----|
| YES | NO |
|-----|----|



| Have you experienced any of the following <i>during the last week</i> ? | All of the time | Most of the time | Half of the time | Some of the time | None of the time |
|---|-----------------|------------------|------------------|------------------|------------------|
| 1. Eyes that are sensitive to light? . . . | 4 | 3 | 2 | 1 | 0 |
| 2. Eyes that feel gritty? | 4 | 3 | 2 | 1 | 0 |
| 3. Painful or sore eyes? | 4 | 3 | 2 | 1 | 0 |
| 4. Blurred vision? | 4 | 3 | 2 | 1 | 0 |
| 5. Poor vision? | 4 | 3 | 2 | 1 | 0 |

Subtotal score for answers 1 to 5

| Have problems with your eyes limited you in performing any of the following <i>during the last week</i> ? | All of the time | Most of the time | Half of the time | Some of the time | None of the time | |
|---|-----------------|------------------|------------------|------------------|------------------|-----|
| 6. Reading? | 4 | 3 | 2 | 1 | 0 | N/A |
| 7. Driving at night? | 4 | 3 | 2 | 1 | 0 | N/A |
| 8. Working with a computer or bank machine (ATM)? | 4 | 3 | 2 | 1 | 0 | N/A |
| 9. Watching TV? | 4 | 3 | 2 | 1 | 0 | N/A |

Subtotal score for answers 6 to 9

| Have your eyes felt uncomfortable in any of the following situations <i>during the last week</i> ? | All of the time | Most of the time | Half of the time | Some of the time | None of the time | |
|--|-----------------|------------------|------------------|------------------|------------------|-----|
| 10. Windy conditions? | 4 | 3 | 2 | 1 | 0 | N/A |
| 11. Places or areas with low humidity (very dry)? | 4 | 3 | 2 | 1 | 0 | N/A |
| 12. Areas that are air conditioned? . . . | 4 | 3 | 2 | 1 | 0 | N/A |

Subtotal score for answers 10 to 12

OSDI (Ocular Surface Disease Index)

- Patients rate their responses on a 0 to 4 scale with 0 corresponding to “none of the time” and 4 corresponding to “all of the time.” A final score is calculated which ranges from 0 to 100.
 - Normal: 0 to 12
 - Mild DED: 13 to 22
 - Moderate DED: 23 to 32
 - Severe DED: greater than 33

DRY EYE QUESTIONNAIRE (DEQ-5)

1. Questions about **EYE DISCOMFORT**:

a. During a typical day in the past month, **how often** did your eyes feel discomfort?

| NEVER | RARELY | SOMETIMES | FREQUENTLY | CONSTANTLY |
|-------|--------|-----------|------------|------------|
| 0 | 1 | 2 | 3 | 4 |

b. When your eyes felt discomfort, **how intense was this feeling of discomfort** at the end of the day, within two hours of going to bed?

| NEVER HAVE IT | NOT AT ALL INTENSE | | | | VERY INTENSE |
|---------------|--------------------|---|---|---|--------------|
| 0 | 1 | 2 | 3 | 4 | 5 |

2. Questions about **EYE DRYNESS**:

a. During a typical day in the past month, **how often** did your eyes feel dry?

| NEVER | RARELY | SOMETIMES | FREQUENTLY | CONSTANTLY |
|-------|--------|-----------|------------|------------|
| 0 | 1 | 2 | 3 | 4 |

b. When your eyes felt dry, **how intense was this feeling of dryness** at the end of the day, within two hours of going to bed?

| NEVER HAVE IT | NOT AT ALL INTENSE | | | | VERY INTENSE |
|---------------|--------------------|---|---|---|--------------|
| 0 | 1 | 2 | 3 | 4 | 5 |

3. Question about **WATERY EYES**:

During a typical day in the past month, **how often** did your eyes look or feel excessively watery?

| NEVER | RARELY | SOMETIMES | FREQUENTLY | CONSTANTLY |
|-------|--------|-----------|------------|------------|
| 0 | 1 | 2 | 3 | 4 |

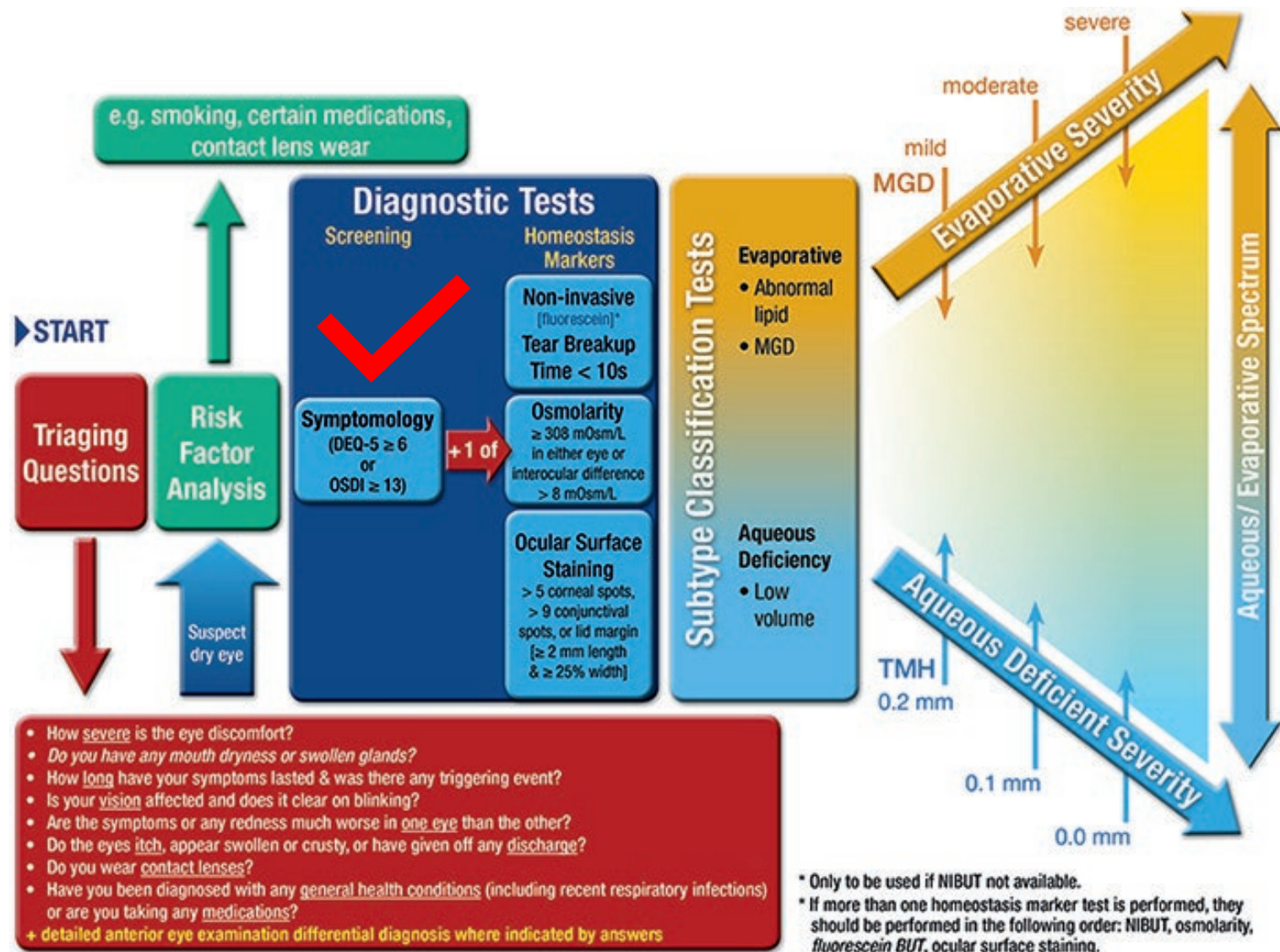
Score: $1a + 1b + 2a + 2b + 3 = \text{Total}$

| | | | | | | | | | | |
|----|---|----|---|----|---|----|---|---|---|-------|
| 1a | + | 1b | + | 2a | + | 2b | + | 3 | = | TOTAL |
| | | | | | | | | | | |

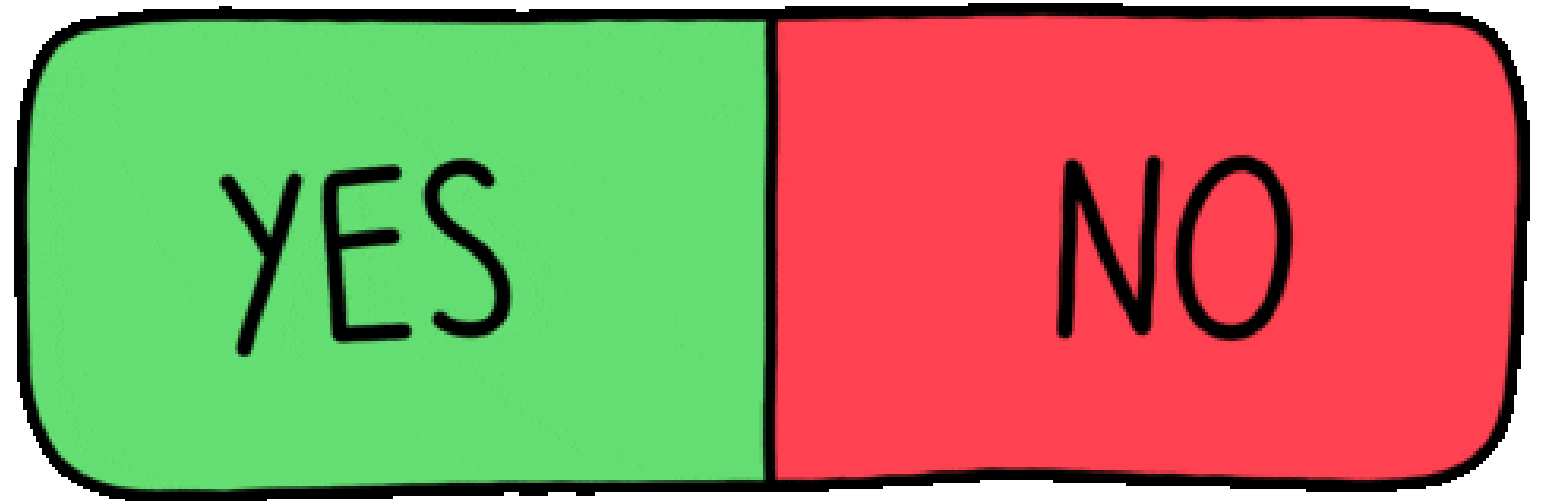
Proposed Screening criteria for the DEQ5 is >6 for Dry Eye

Dry Eye Questionnaire

- One unique advantage of the DEQ-5 is its ability to differentiate between Sjögren's syndrome and non-Sjögren's dry eye.
 - A score above 6 suggests DED
 - A score ≥ 12 suggests Sjögren's syndrome



DOES THE
PATIENT
HAVE
SIGNS OF
DED?



S I G N S O F D E D

- In addition to symptoms, the clinical protocol for DED diagnosis requires the presence of at least **one** abnormal homeostatic marker.
- Positive markers include:
 - Decreased tear breakup time (TBUT)
 - Tear film hyperosmolarity
 - Ocular surface staining (corneal or conjunctival, as demonstrated with lissamine green or fluorescein)

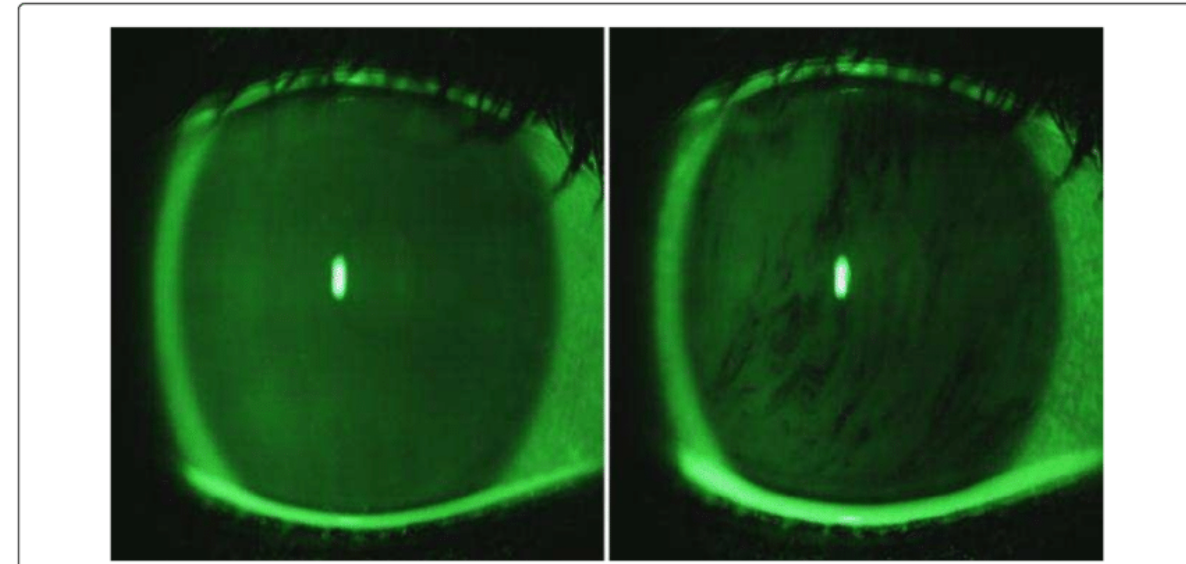
T B U T : T E A R B R E A K - U P T I M E

In normal eyes, TBUT values range from 10s to 35s, with an average of 27s.

TBUT less than 10s suggests an abnormal tear film

Values of 5s to 10s considered marginal

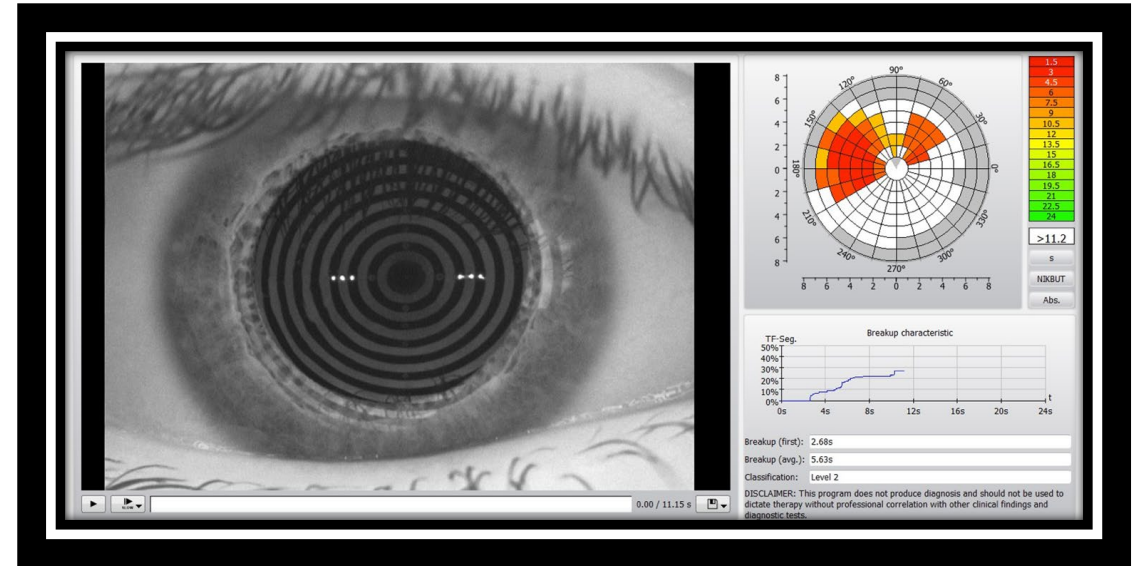
Less than 5s indicative of dry eye



8s appears to be the magic number!

NONINVASIVE TBUT

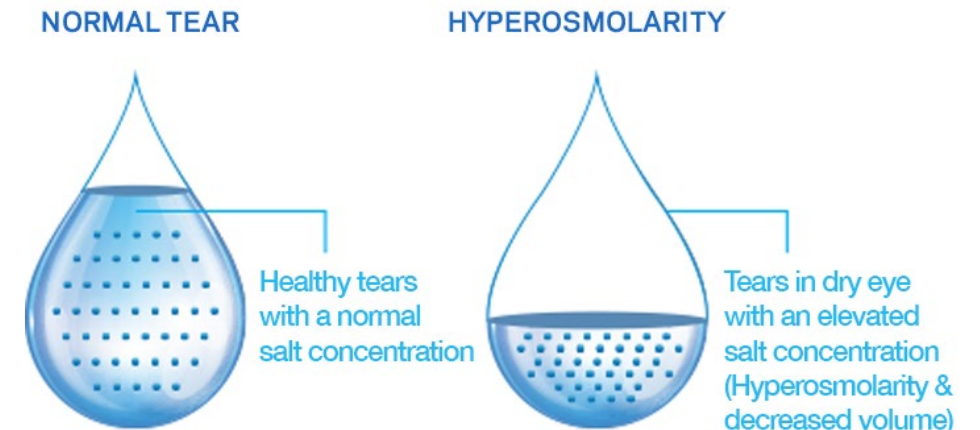
- A grid or concentric ring pattern is projected onto the cornea and the patient is asked to blink.
- The rings will appear distorted when the cornea becomes dry.



12s appears to be the magic number!

TEAR FILM HYPEROSMOLARITY

- Tear hyperosmolarity is one of the central events in the vicious circle of DED and refers to **a state in which the osmolarity of the tear exceeds that of the epithelial cell, leading to reduced cell volume and increased concentration of solutes.**



TEAR FILM HYPEROSMOLARITY

- Normal tear osmolarity ranges between 275mOsm/L and 307mOsm/L
- A reading of 308mOsm/L in one or both eyes or a difference greater than 8mOsm/L between the eyes is noted as abnormal.
- Mild: 300 to 320
- Moderate 320 to 340
- Severe above 340



CORNEAL/CONJUNCTIVAL STAINING

Lissamine Green

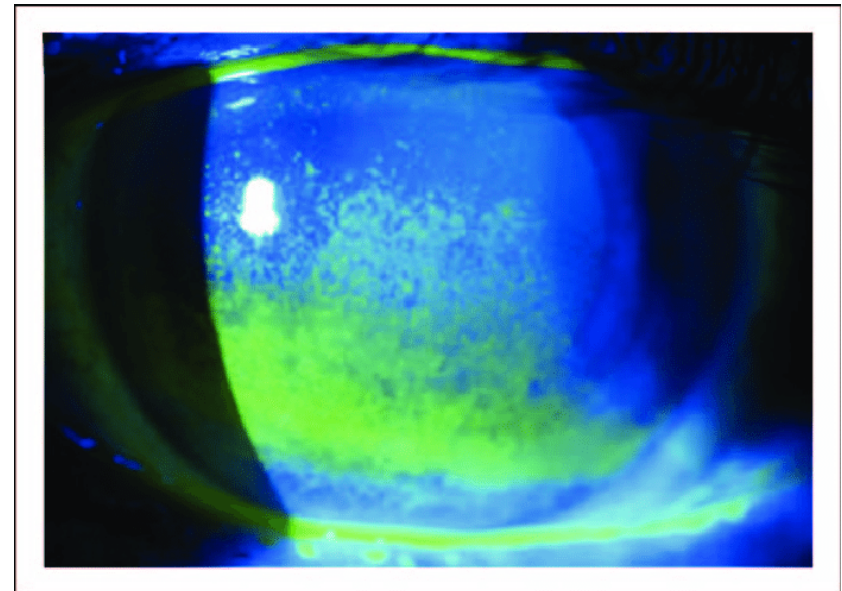
- Most diagnostic for early to moderate dry eye.
- When evaluating the interpalpebral conjunctiva, positive staining with lissamine green helps to detect the earliest signs of the disease prior to corneal staining.
- Vital dye of choice used in symptomatic patients who have not yet started to show corneal fluorescein staining.



CORNEAL/CONJUNCTIVAL STAINING

Sodium Fluorescein

- NaFl staining is the most commonly used stain in dry eye evaluation due to its wide availability.
- It is important to remember that NaFl only sufficiently stains the cornea and only in moderate to severe dry eye.
- When it comes to diagnosing dry eye, it is critically important to identify DED patients earlier in the disease state.



THE PROPER ORDER

NI-TBUT

Osmolarity

NaFI

TBUT

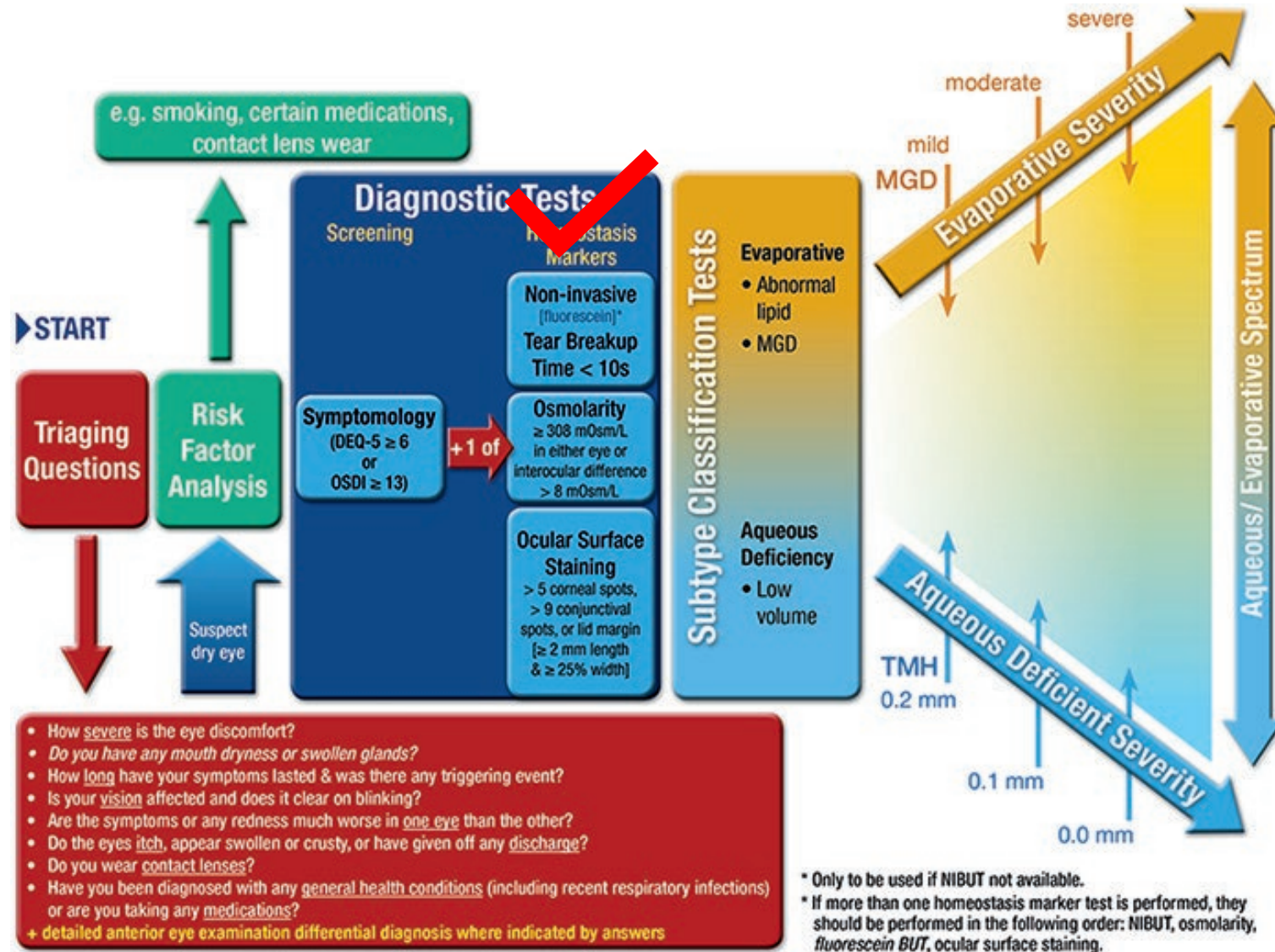
Lissamine Green

THE FORMULA

Triaging questions + the risk factor assessment + abnormal findings on one of two surveys + an abnormal finding on one of three tests

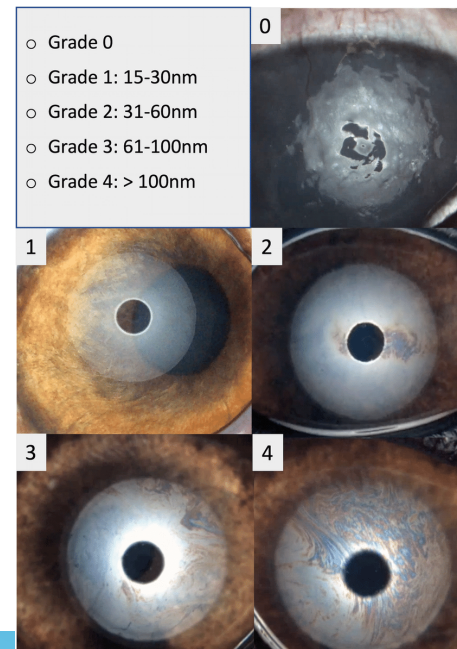
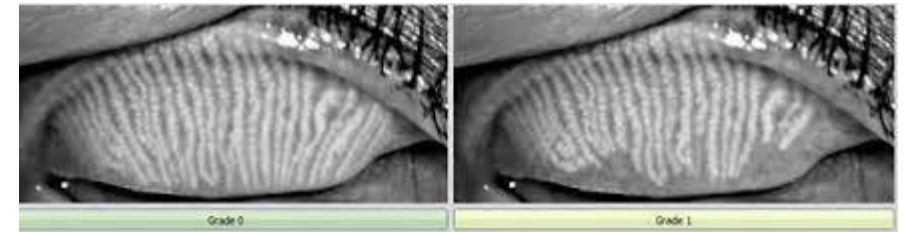


DRY EYE



ONE STEP FURTHER...

- Subtype classification tests such as meibography, lipid interferometry and tear volume measurement could be conducted to determine:
 - Where the DED falls on the spectrum between ADDE and EDE.
 - Severity of DED in order to guide treatment.



| STEP | TFOS DEWS II recommendations for the staged management and treatment of DED | |
|------|--|--|
| 1 | <ul style="list-style-type: none"> • Education regarding the condition, its management, treatment and prognosis • Modification of local environment • Education regarding potential dietary modifications (including oral essential fatty acid supplementation) | <ul style="list-style-type: none"> • Identification and potential modification/elimination of offending systemic and topical medications • Ocular lubricants of various types (if MGD is present, then consider lipid-containing supplements) • Lid hygiene and warm compresses of various types |
| 2 | <p>If above options are inadequate consider:</p> <ul style="list-style-type: none"> • Non-preserved ocular lubricants to minimize preservative-induced toxicity • Tea tree oil treatment for Demodex (if present) • Tear conservation <ul style="list-style-type: none"> ◦ Punctal occlusion ◦ Moisture chamber spectacles/goggles • Overnight treatments (such as ointment or moisture chamber devices) • In-office, physical heating and expression of the meibomian glands (including device-assisted therapies) | <ul style="list-style-type: none"> • In-office intense pulsed light therapy for MGD • Prescription drugs to manage DED <ul style="list-style-type: none"> ◦ Topical antibiotic or antibiotic/steroid combination applied to the lid margins for anterior blepharitis ◦ Topical corticosteroid (limited-duration) ◦ Topical secretagogues ◦ Topical non-glucocorticoid immunomodulatory drugs ◦ Topical lymphocyte function-associated antigen-1 antagonist drugs ◦ Oral macrolide or tetracycline antibiotics |
| 3 | <p>If above options are inadequate consider:</p> <ul style="list-style-type: none"> • Oral secretagogues • Autologous/allogeneic serum eye drops | <ul style="list-style-type: none"> • Therapeutic contact lens options <ul style="list-style-type: none"> ◦ Soft bandage lenses ◦ Rigid scleral lenses |
| 4 | <p>If above options are inadequate consider:</p> <ul style="list-style-type: none"> • Topical corticosteroid for longer duration • Amniotic membrane grafts • Surgical punctal occlusion | <ul style="list-style-type: none"> • Other surgical approaches (eg tarsorrhaphy, salivary gland transplantation) |

OMEGA-3 SUPPLEMENTS

- **1,000mg to 3,000mg per day**
- OMEGA-3 SUPPLEMENTS TAILORED TO TREAT DED
 - EZ Tears eye vitamin, EyePromise
 - NutriTear supplement, Lipotriad
 - DE Dry Eye Omega Liquid with Vitamin D3, PRN
 - DE3 Omega Benefits, PRN
 - HydroEye, ScienceBased Health
 - Eye Nutrition 1200mg Omega-3 Supplement, TheraTears



FDA
APPROVED
DRY EYE
MEDICATIONS

Restasis

Cequa

Xiidra

Tyrvaya

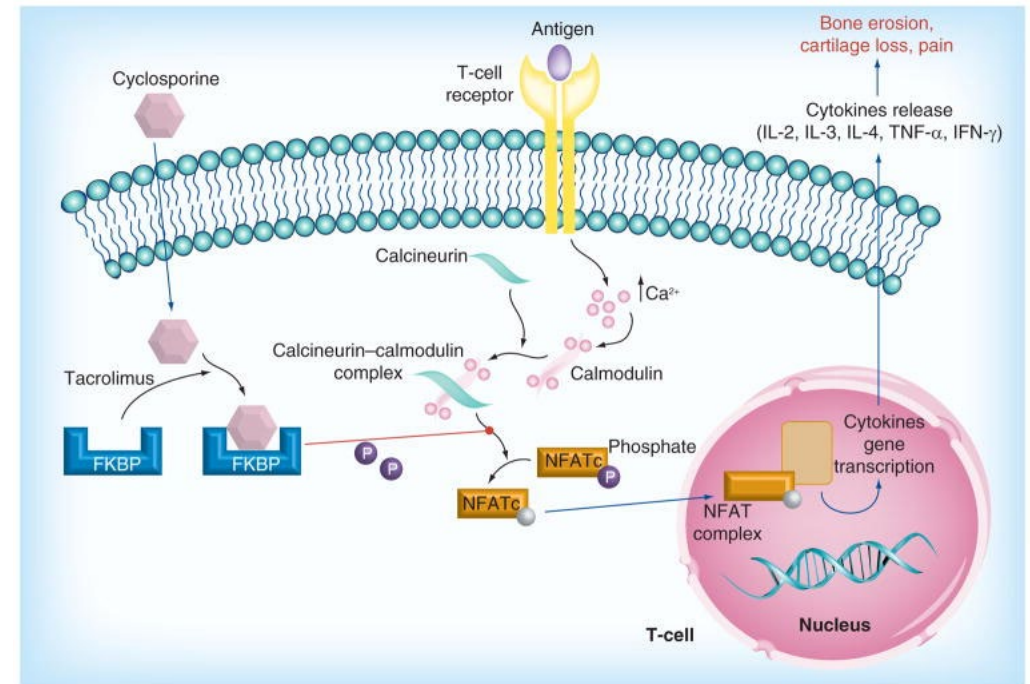
Eysuvis

Vevye

Miebo

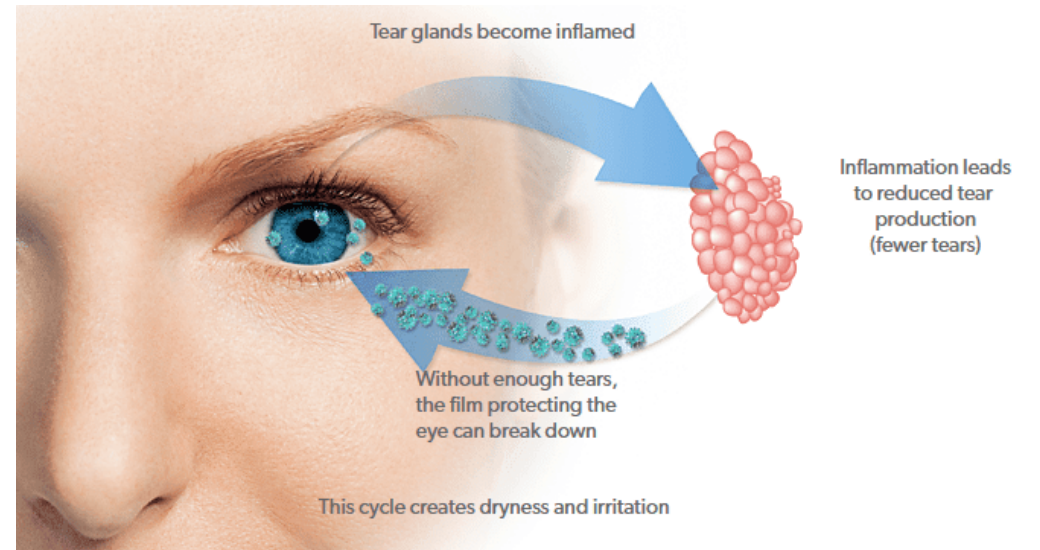
RESTASIS

- cyclosporine A 0.05% emulsion (2003)
- First medication FDA approved for DED
- Lipophilic molecule that acts as an immunosuppressant by inhibiting T-cell-mediated inflammation and cytokines in the conjunctiva
- Stimulates natural tear production and increases goblet cell density
- Four clinical studies demonstrated a significant increase in Schirmer wetting and a decrease in ocular staining versus vehicle at six months.



RESTASIS

- Dosed at one drop, twice a day in both eyes - 12 hours apart
- Available in vials and preservative-free multidose bottle
- Most common side effect is burning (17%)
- Less than 5% of patients complained of blurred vision, epiphora, conjunctival hyperemia, redness, or discharge



FEBRUARY 2022 – GENERIC RESTASIS
0.05% BECAME AVAILABLE IN SINGLE
USE VIALS.

WAIT...IS THIS GOOD NEWS?

PROS

- Less expensive
- If a patient fails on the generic, insurers who would not previously cover Restasis may be forced to do so.
- Having a generic option could potentially drive down the cost of Restasis, and as a result Xiidra and Cequa as well.

CONS

- Inactive ingredients used by different generic manufacturers can vary which may lead to unpredictability in side effects and efficacy
- Insurance companies may demand the generic be tried first before brand-name Restasis can be prescribed.

CEQUA

- cyclosporine 0.09% ophthalmic solution (2018)
- The formula for Cequa encapsulates cyclosporine within nanomicelles (NCELL) to improve the delivery and penetration of cyclosporine to ocular tissues.
- Compared to other cyclosporine emulsions, this formulation provides 3x more penetration into the ocular tissue, and 1.6x more conjunctival absorption



CEQUA

- Dosed BID – 12 hours apart
- Available in vials only
- Increase in Schirmer score after 12 weeks, and corneal and conjunctival staining after four weeks.
- Most common adverse reactions were instillation site pain (22%) and conjunctival hyperemia (6%)



VEVYE

- cyclosporine 0.1% ophthalmic solution (January 2024)
- First and only cyclosporine-based product indicated for the signs and symptoms of dry eye disease (DED)
- Free from preservatives, oils, and surfactants
- The most common side effects include eye irritation (8%) and temporary blurred vision (3%)
- Studies report improvement in symptoms as soon as 4 weeks
- Dosed BID

X I I D R A

- lifitegrast 5%, (2016)
- Blocks the interaction between lymphocyte function-associated antigen 1 (LFA-1) and intercellular adhesion molecule 1 (ICAM-1)
- Blocking this interaction of LFA-1 on T-cells and ICAM-1 reduces T-cell activation and migration from the blood vessel to the ocular surface, as well as the secretion of multiple pro-inflammatory cytokines (e.g., IL-1, TNF- α , IFN- γ), reducing inflammation.

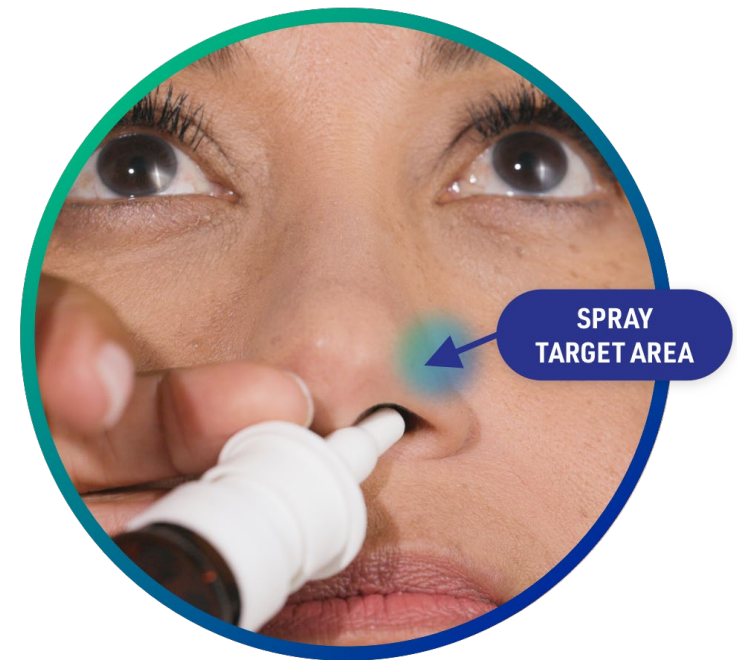


XIIDRA

- Dosed one drop BID OU – 12 hours apart
- Available in vials only
- Most common side effects (5-25%) of patients include site irritation, reduced visual acuity, and an unusual taste sensation (dysgeusia).
- Xiidra reduced symptoms of eye dryness at two weeks in two out of the four studies, and at six and 12 weeks in all four studies.
- It also improved signs of inferior corneal staining at 12 weeks in three of those studies.

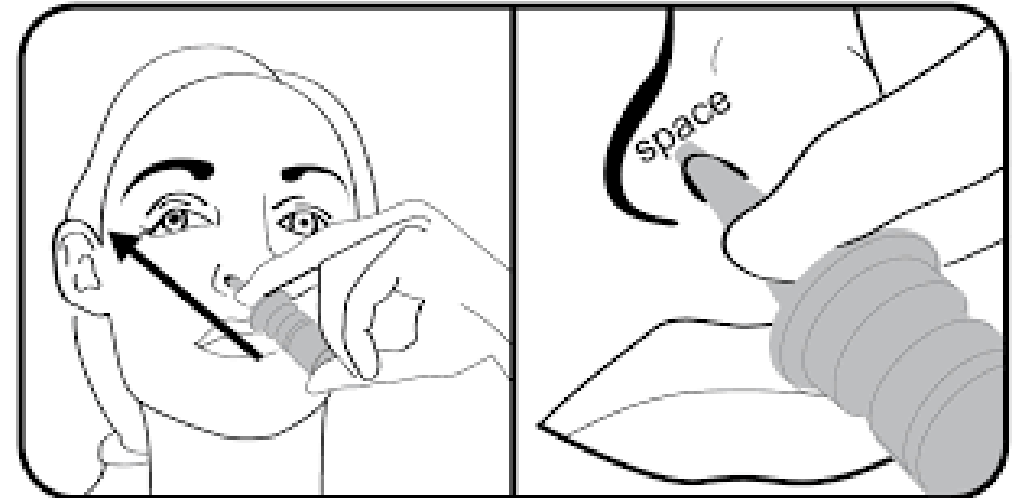
TYRVAYA

- varenicline solution 0.03mg, October 2021
- Triggers basal tear production by way of nasal stimulation of the trigeminal parasympathetic pathway
- After 4 weeks, half of patients using the treatment demonstrated 10mm or more improvement in Schirmer's scores.



TYRVAYA

- Dosed BID – 12 hours apart
- Packaged in a carton containing two multidose bottles, each with enough medication for 15 days
- Sneezing was reported in 82% of patients.
- Cough, throat irritation, and nose irritation were reported in 5% to 16% of patients.



Before using a new bottle of Tyrvaya, you'll need to prime it. Priming means getting the nasal spray bottle ready to use for the first time. Please note: Your bottle might look slightly different than the bottle in the guide below.



1 **Remove the bottle's cap and clip.** Do not throw them away – you'll put them back on after each use.



2 **Hold Tyrvaya upright and away from your face.** Place one finger on each side of the base of the nasal spray applicator, and place your thumb underneath the bottle.



3 **Press and release the nasal applicator 7 times with your thumb and fingers.** You may not see a spray released each time you press and release the nasal applicator. Spray away from yourself and others. Tyrvaya is now primed for use.

If you haven't used Tyrvaya for more than 5 days, you'll need to re-prime the nasal spray bottle with 1 spray before use. Avoid priming Tyrvaya more than needed, as it will reduce the amount of medicine in the nasal spray bottle.

Use one spray of Tyrvaya in each nostril, twice per day, about 12 hours apart. Repeat steps 1-8 each time you use Tyrvaya. If you miss a dose of Tyrvaya, skip that dose and take your next dose at your regular scheduled time. Do not take an extra dose to make up for a missed dose.



1

Blow your nose to clear your nostrils, if needed.



2

If the cap and clip are on your bottle, **remove them**. Do not throw them away.



3

Hold Tyrvaya upright. Place one finger on each side of the base of the nasal spray applicator, and place your thumb underneath the bottle.



4

Tilt your head back slightly without lying down.



5

Insert the nasal spray just past the nasal opening. Aim the tip out towards your ear on the same side you're spraying into. Do not press the tip against the wall of your nose. **Do not spray too deep and avoid spraying into your sinuses.**



6

Press your tongue to the roof of your mouth and breathe gently as you press and release the applicator 1 time, just misting the inside of your nostril. **Avoid inhaling deeply**. Repeat steps 5 and 6 to deliver a second spray in the other nostril. The medication will absorb into the wall of the nose, where the nerve you are aiming for is located.



7

Wipe the nasal applicator with a clean tissue.



8

Put the clip and cap back on the nasal spray bottle.

VISIT
TYRVAYA.COM TO SEE
AN INSTRUCTIONAL VIDEO.

EYSUVIS

- loteprednol etabonate 0.25%
- First steroid to be FDA-approved for dry eye flare-ups, January 2021
- Ophthalmic nanosuspension that delivers loteprednol to the anterior eye using mucus-penetrating particles (MPPs)
- Breaks down rapidly after administration to the ocular surface tissues and reduces the risks associated with other topical steroids, as well as potentially decreases harmful side effects such as elevated IOP and cataract formation



EYSUVIS

- Dosed QID OU for up to 2 weeks
- Small risk of increased IOP
- Most common side effect is pain on insertion
- Patients using EYSUVIS showed significant reduction in the symptoms of dry eye (ocular discomfort) as early as Day 4 after starting treatment. Symptoms continued to improve up to the end of the treatment period (Day 15). Patients taking EYSUVIS also showed significant reduction in signs of dry eye (eye redness) at Day 15.



WHO ARE THE BEST CANDIDATES FOR EYSUVIS?

- 1. In chronic dry eye patients.**
- 2. DED patients who don't want to remain on long-term therapy.**
- 3. Patients with milder forms of episodic dry eye who need rapid resolution of signs and symptoms.**
- 4. As induction therapy.**
- 5. Dry eye patients scheduled for cataract or refractive surgery.**

M I E B O

- perfluorohexyloctane ophthalmic solution, September 2023
- First and only FDA-approved treatment for DED that directly targets tear evaporation instead of tear formation.
- Perfluorohexyloctane ophthalmic solution is designed to mimic a key function of natural meibum by reducing tear evaporation.
- EyeSol technology is unique in that it allows the drop to stay on the eye for up to 240 minutes, as opposed to traditional water-based drops on the market, which only last about 3 to 5 minutes.
- Water-free and preservative-free
- Dosed QID OU



R E M E M B E R ...

**MGD is the most common cause
of evaporative DED.**

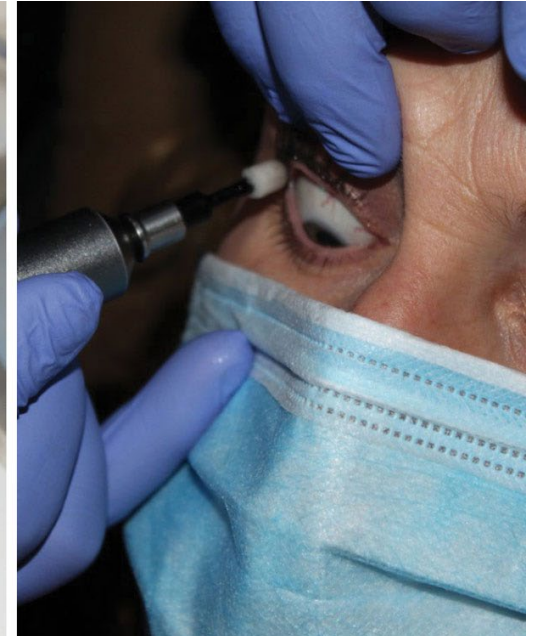
TRADITIONAL TREATMENT FOR MGD

- Eyelid hygiene is the mainstay treatment of MGD, in addition to at-home warm compresses.
- Heat therapy softens the meibum in the meibomian glands, thereby facilitating the replenishment of the lipid layer of the tear film and assisting in lubricating the ocular surface and stabilizing the tear film



BLEPHAROEXFOLIATION (BLEPHEX)

- Painless procedure performed in-office
- Cleans the eyelid margins, removing bacteria and biofilm
- BlephEx has been shown to improve eyelid health: increasing TBUT, reducing inflammation and enhancing meibomian gland function.



THERMAL PULSATION DEVICES

- Warm compress care at home can be challenging for patients to keep the glands heated up for a sufficient amount of time and at the right temperature.
- Wearable eyelid paddles provide targeted and adjustable thermal energy and pressure to the meibomian glands.



THERMAL PULSATION DEVICES



| | Both eyes | Adjustable temperature | Automated Heat Application | Automated Pressure Application | Easily Portable | Consumables | Anesthesia Required |
|-----------------|------------------|-------------------------------|-----------------------------------|---------------------------------------|------------------------|--------------------|----------------------------|
| Lipiflow | X | | X | X | | X | X |
| TearCare | | X | X | | X | X | X |
| iLux | | X | X | | X | X | X |
| Mibo | X | X | X | | X | | |
| Thermal 1-Touch | X | X | X | | X | | |

INTENSE PULSE LIGHT (IPL)

- Used in dermatology for several years as a treatment for rosacea
- Light energy from IPL warms the meibomian glands, thereby facilitating expression of meibum.
- There is evidence that IPL helps restore the function and morphology of the meibomian glands.

Universal IPL with OPT™ – Facial Rosacea and Dry Eye

Dry eye symptoms, computer fatigue and redness approximately 60% better without the hassle of daily drops



Baseline

After 1st IPL treatment

After 2nd IPL treatment

After 3rd IPL treatment

Photos and treatments performed by Dr. Shilpi Pradhan

INTENSE PULSE LIGHT (IPL)

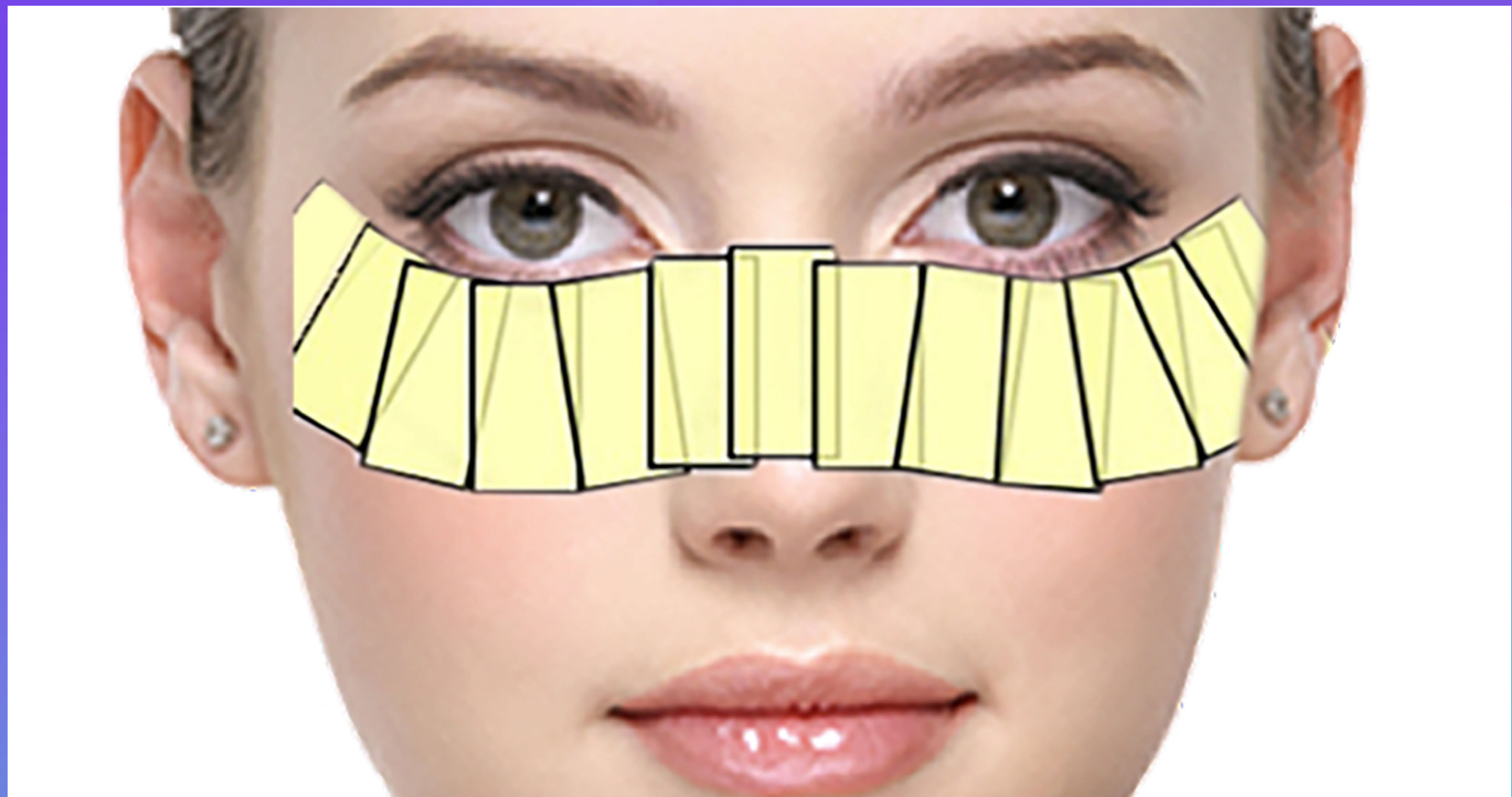


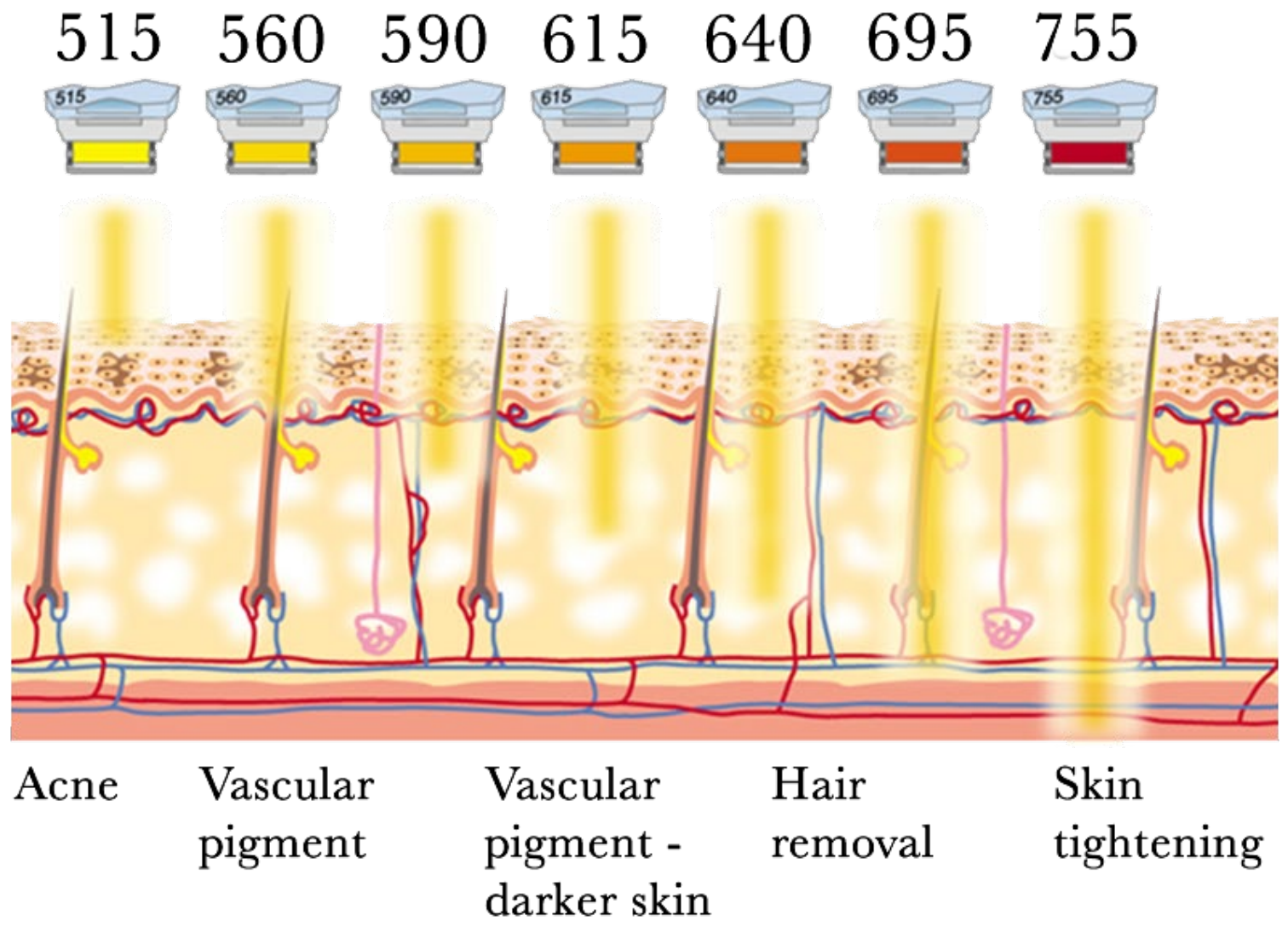
- The wavelength of light used in IPL is selectively absorbed by telangiectatic blood vessels, which coagulates them. This has a dual outcome, both destroying blood vessels that perpetuate inflammation and decreasing the levels of pro-inflammatory mediators that contribute to dry eye.
- IPL reduces the load of demodex mites that stimulate infection.
- As an additional note, IPL treatment also indirectly interrupts the dry eye inflammation cycle by reducing the osmolarity of the tear film to normal levels

IPL TREATMENTS ARE PERFORMED
WITH 500NM TO 700 NM LIGHT
PULSES FOR 20 TO 30 MINUTES.

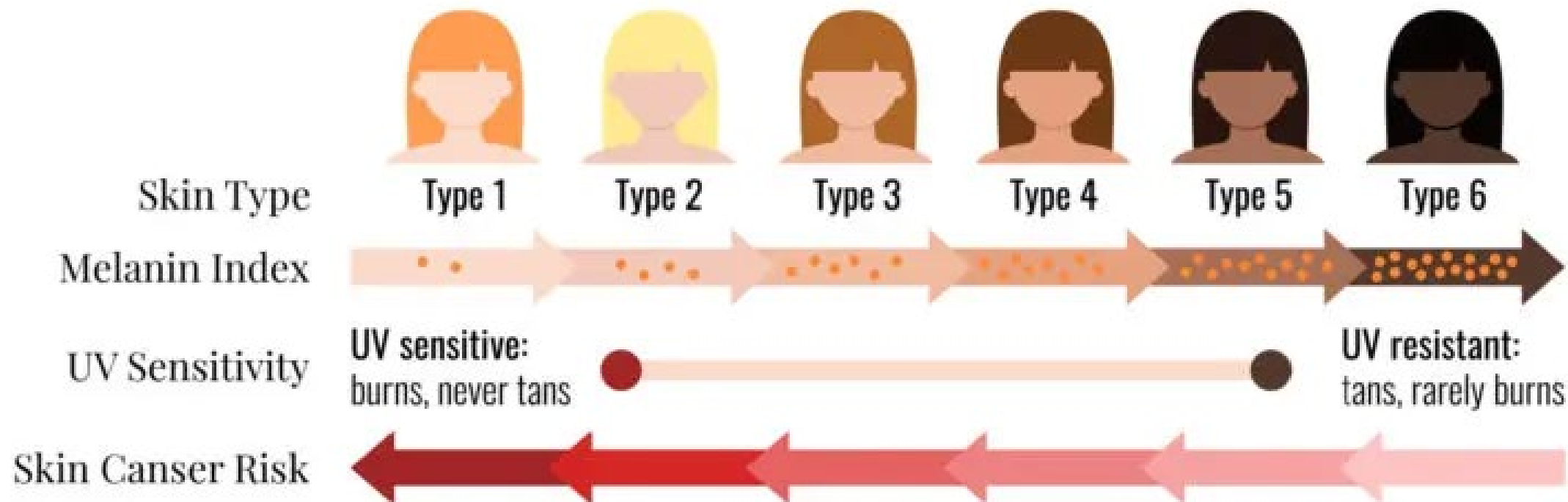
CAN BE REPEATED EVERY TWO TO
FOUR WEEKS.





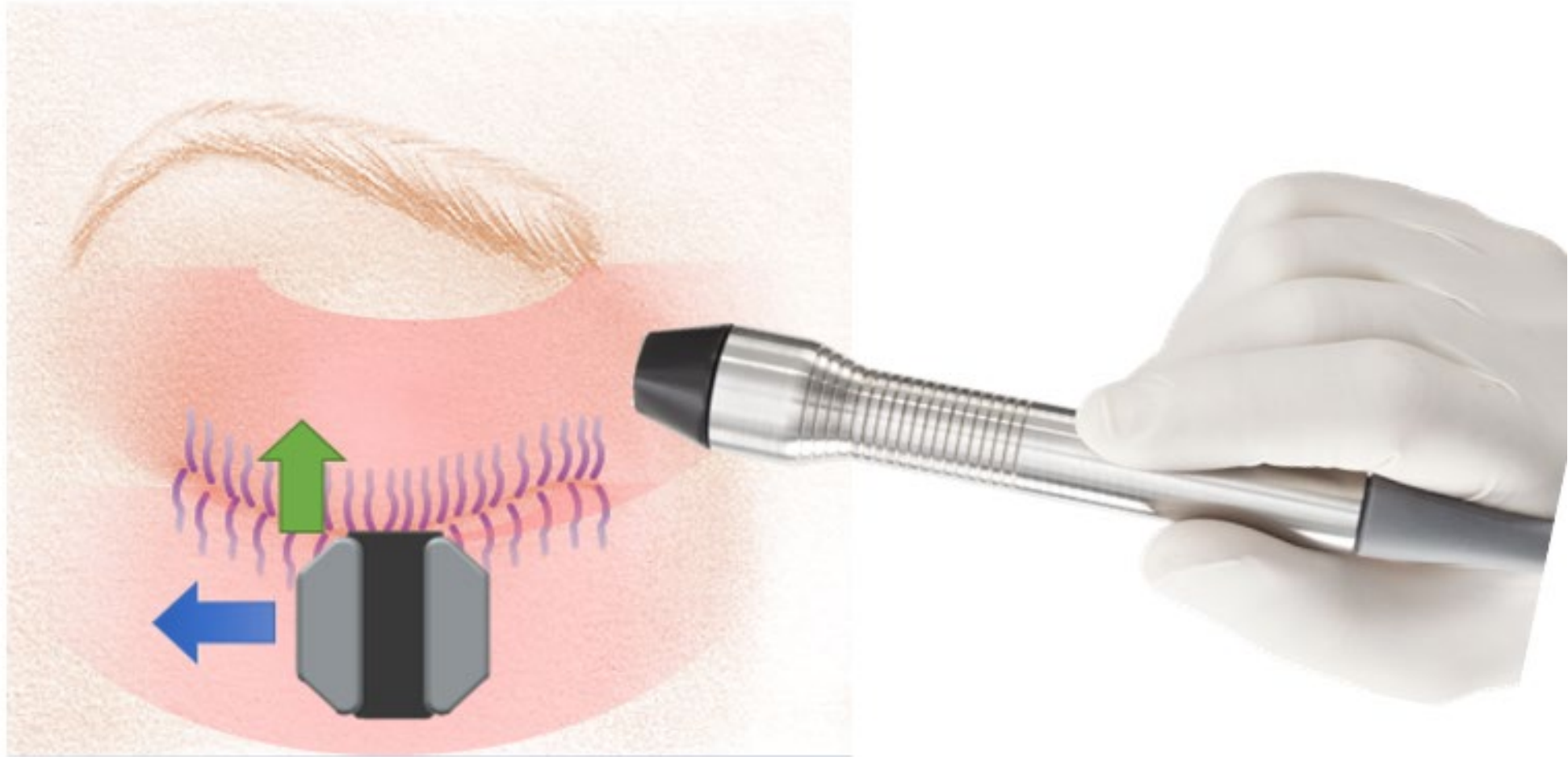


FITZPATRICK SCALE



RADIO FREQUENCY (RF)

- RF devices are essentially bulk heating devices that safely deliver high-frequency oscillating electrical currents.
- When radiofrequency is applied to the skin near the eyes, it has the ability to provide uniform heating at an optimal temperature to treat MGD.
- The RF energy is delivered to obstructed meibomian glands, where the higher energy heat melts the thick oil secretions obstructing the meibomian glands and decreases the harmful bacterial community, allowing for improved oil production, improving oil flow into the tears, and restabilizing the tear film.



Optimal results are typically noticed after 3-4 treatments that are commonly spread out over 2 to 4 weeks.

LOW LEVEL LIGHT THERAPY (LLLT)

- Specially designed LED light gently apply periorbital heat to the eyelids to treat MGD, blepharitis, chalazia and Demodex.
- Treatment consists of four consecutive applications, which last 15 minutes
- Sessions are separated by 48 to 72 hours.
- Can be used alone or in combination with IPL



| STEP | TFOS DEWS II recommendations for the staged management and treatment of DED | |
|------|--|--|
| 1 | <ul style="list-style-type: none"> • Education regarding the condition, its management, treatment and prognosis • Modification of local environment • Education regarding potential dietary modifications (including oral essential fatty acid supplementation) | <ul style="list-style-type: none"> • Identification and potential modification/elimination of offending systemic and topical medications • Ocular lubricants of various types (if MGD is present, then consider lipid-containing supplements) • Lid hygiene and warm compresses of various types |
| 2 | <p>If above options are inadequate consider:</p> <ul style="list-style-type: none"> • Non-preserved ocular lubricants to minimize preservative-induced toxicity • Tea tree oil treatment for Demodex (if present) • Tear conservation <ul style="list-style-type: none"> ◦ Punctal occlusion ◦ Moisture chamber spectacles/goggles • Overnight treatments (such as ointment or moisture chamber devices) • In-office, physical heating and expression of the meibomian glands (including device-assisted therapies) | <ul style="list-style-type: none"> • In-office intense pulsed light therapy for MGD • Prescription drugs to manage DED <ul style="list-style-type: none"> ◦ Topical antibiotic or antibiotic/steroid combination applied to the lid margins for anterior blepharitis ◦ Topical corticosteroid (limited-duration) ◦ Topical secretagogues ◦ Topical non-glucocorticoid immunomodulatory drugs ◦ Topical lymphocyte function-associated antigen-1 antagonist drugs ◦ Oral macrolide or tetracycline antibiotics |
| 3 | <p>If above options are inadequate consider:</p> <ul style="list-style-type: none"> • Oral secretagogues • Autologous/allogeneic serum eye drops | <ul style="list-style-type: none"> • Therapeutic contact lens options <ul style="list-style-type: none"> ◦ Soft bandage lenses ◦ Rigid scleral lenses |
| 4 | <p>If above options are inadequate consider:</p> <ul style="list-style-type: none"> • Topical corticosteroid for longer duration • Amniotic membrane grafts • Surgical punctal occlusion | <ul style="list-style-type: none"> • Other surgical approaches (eg tarsorrhaphy, salivary gland transplantation) |

AUTOLOGOUS SERUM TEARS

- There are biochemical similarities between an individual's serum and natural tears
- Preservative free
- Innately non-allergenic



1. Blood collection



Collect about 20ml blood.

2. Centrifugation



Separate and extract platelet including a lot of growth factors.

3. Serum Collection



Collect only serum in the Blood separated from serum.

4. Making eye drop



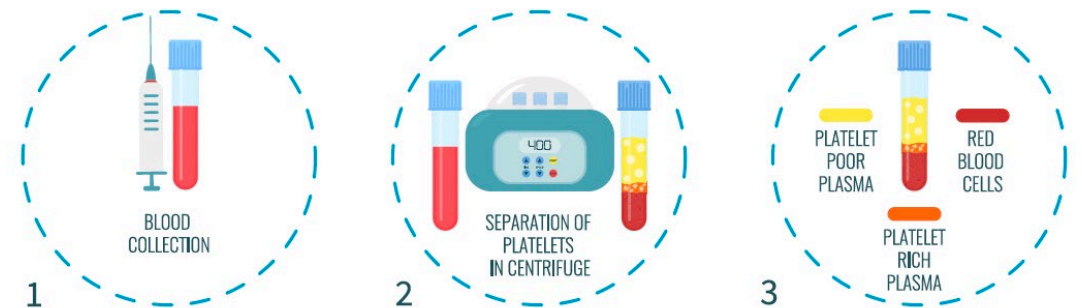
Make eye drop with collected serum.

AUTOLOGOUS SERUM TEARS

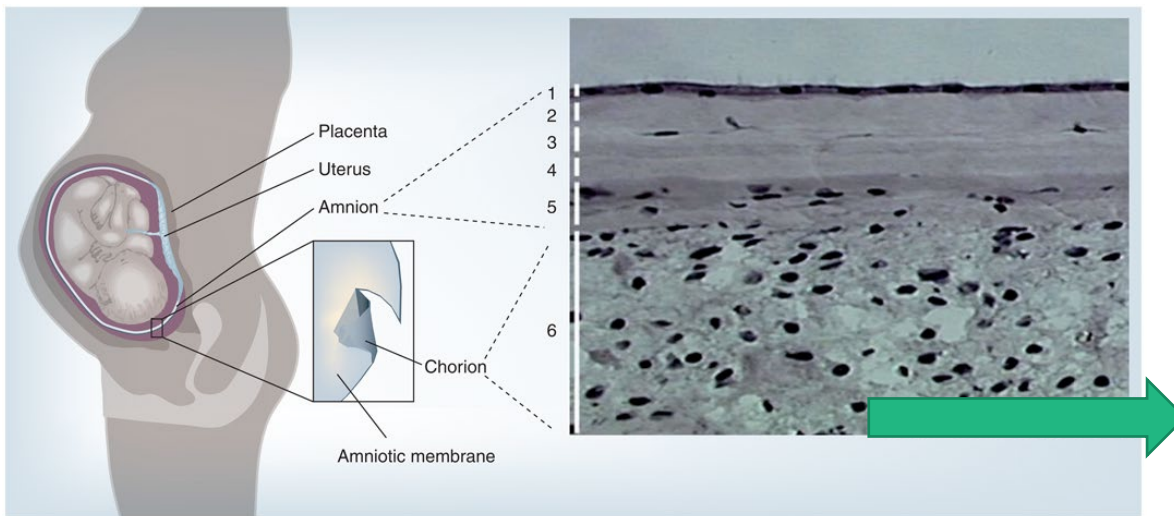
AUTOLOGOUS SERUM VS. PLATELET RICH PLASMA

- Although autologous serum and PRP are both blood-based products, PRP is superior to autologous serum because of PRPs richer concentration of growth factors and other platelet-derived factors.
- The crucial difference between the two products is that autologous serum does not contain platelets because they are eliminated during the process of making autologous serum.
- Platelets function like tiny power houses for healing because they contain the growth factors needed for tissue recovery.

The PRP Process



AMNIOTIC MEMBRANES: MECHANISMS OF ACTION



Mechanical

Promotion of epithelialization

Anti-fibrotic

Anti-inflammatory

Anti-angiogenic

Anti-microbial

KERATO CONJUNCTIVITIS SICCA

[Clin Ophthalmol](#). 2018; 12: 677–681.

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PMCID: PMC5898584

PMID: [29670328](#)

Treatment outcomes in the DRy Eye Amniotic Membrane (DREAM) study

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Abstract

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Purpose

To evaluate the efficacy of cryopreserved amniotic membrane (CAM) in reducing signs and symptoms of dry eye disease (DED) in a large patient population.

Methods

A retrospective chart review at 10 clinical sites was done of patients with refractory DED who received CAM and completed at least 3 months of follow-up. Data collected were demographics; medical history including previous and current ocular treatment, diagnosis, clinical presentations, comorbidity, duration and frequency of treatment with CAM; and concomitant medications. The primary outcome was the change in dry eye workshop (DEWS) score after treatment.

Results

A total of 97 eyes of 84 patients exhibited severe dry eye despite maximal medical treatments including topical artificial tears, cyclosporine-A, serum, antibiotics, and steroids. Patients manifested with superficial

- Dry Eye and Amniotic Membrane (DREAM) Study
- 97 eyes of 84 patients who exhibited severe DED despite maximal medical treatments including topical artificial tears, cyclosporine-A, serum, antibiotics, and steroids.
- Study participants exhibited superficial punctate keratitis, filamentary keratitis, exposure keratitis, neurotrophic keratitis, and corneal epithelial defect.
- After 5.4 days of CHAM treatment, 88% of patients demonstrated an improved ocular surface along with a notable reduction of the severity of their overall Dry Eye Workshop (DEWS) score
- Ten eyes (10%) required repeated treatment to complete healing.
- Apart from discomfort during CHAM placement, there were no adverse events.

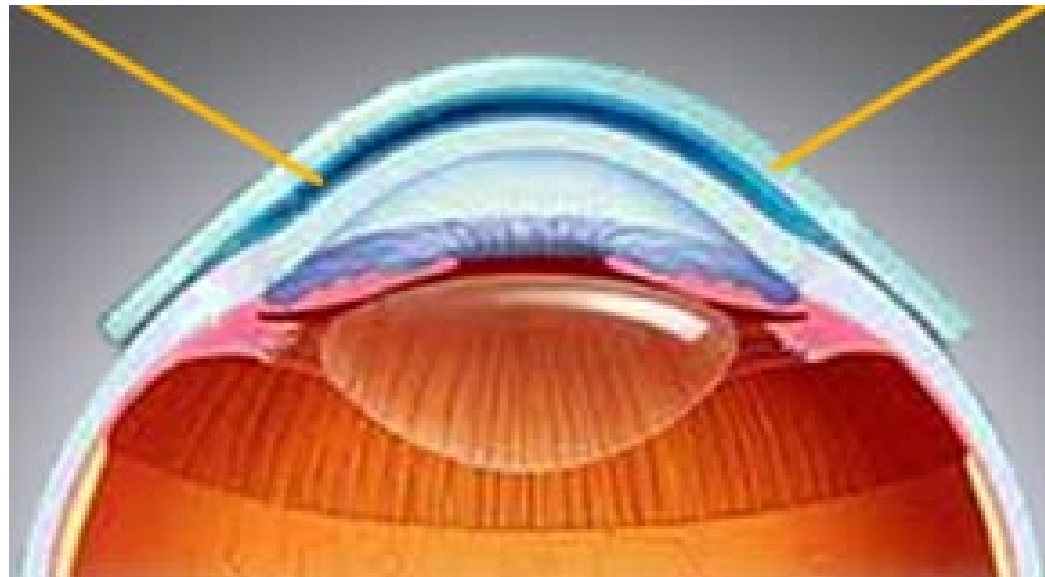
KERATOCONJUNCTIVITIS SICCA

- Three benefits of using an AM:
 - Acts as a therapeutic BCL that keeps the eye moist by retaining tears and protects the ocular surface from the surrounding environment
 - Controls ocular surface inflammation since it is well established that inflammation in DED is triggered by both innate and adaptive immune responses
 - Regenerate corneal nerves which may explain the lasting effect



WHAT IF MY DRY EYE PATIENT
REALLY WANTS TO WEAR CONTACT
LENSES!?

SCLERAL LENSES



SCLERAL CONTACT LENSES

- A lens fitted to vault over the entire cornea, including the limbus and land on the conjunctiva overlying the sclera.
- Fluid reservoir can be filled with a variety of fluids:
 - PF saline
 - Serum Tears
 - PF ATs
 - Viscous solutions



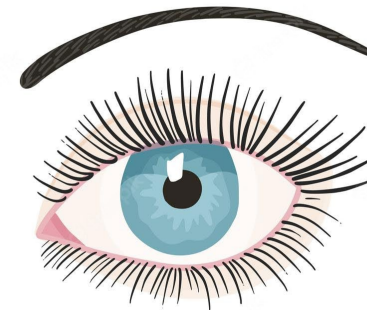
THE HARDEST PART ABOUT
TREATING DED...

**The expectation that it
will be a quick AND easy
fix!**

KEY TAKEAWAYS

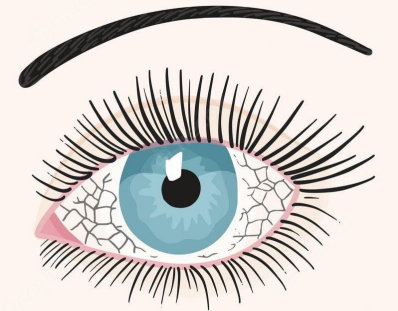
- Don't wait until the condition becomes severe, as this makes it much more challenging and frustrating for you and your patients.
- Start with a few treatment options and get your patient into a routine. Then, reassess their new daily symptoms and see what needs to be added or removed.
- Not every treatment works for everyone—don't be afraid to change it up.
- DED is never “cured” forever; you are managing symptoms and preventing them from becoming more severe.

HEALTHY



EYE

DRY EYE



SYNDROME



THANK YOU!!
ASHLEY.W.TUCKER@GMAIL.COM