



1

MARK DUNBAR OD: DISCLOSURE 2025-2026

Optometry Consultant/Advisory Board

▪ Carl Zeiss	▪ Topcon
▪ Tarsus	▪ B&L
▪ Orasis	▪ Visus
▪ Iveric	▪ Sydnexis
▪ Apellis	▪ Cloudbreak
▪ Azura	▪ Tenpoint
▪ Sun	▪ Stuart
▪ Heru	▪ Glaukos

2

A Case My Resident Presented To Me...

- A 56 y/o Hispanic Female presented with irritation and dry eye
- Med Hx: Significant for Sjogrens and SLE
 - Multiple medications including plaquenil
- Has tried artificial tears...doesn't really use them

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A Case My Resident Presented To Me...

- VA: Corrects to 20/20 OD/OS
- SLE:
 - Mild bleph
 - Diffuse injection
 - 1+ PEE and RB Staining on her cornea and bulbar conj
- She didn't do Schirmer's

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How would you have managed this patient?

5

• So What Do You Think?

6

OCULAR SURFACE DISEASE AND DRY EYE

- Often mistakenly considered synonymous
- OSD is a much broader term
 - Includes dry eye syndrome
 - But also refers to a number of other disorders that affect the surface of the eye
 - Can cause significant issues with vision and quality of life

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CAUSES OF OSD

- Decreased tear quality and/or production with age
- Sjogrens
- MGD
- Blepharitis
- Demodex
- Allergies
- Side effects of medical treatments or prescription medications
- Keratitis
- Contact Lens wear
- Chemical or thermal burns

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THERE ARE SO MANY THINGS NECESSARY TO MAINTAIN A HEALTHY OCULAR SURFACE

- Normal lid structure and function
- Normal meibomian glands and MG production/secretion
- Normal tear production
- Normal tear drainage
- Normal cornea feed back loop

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THE HEALTHY EYE

Normal tearing depends on a neuronal feedback loop

It functions as a single integrated unit

Secretomotor Nerve Impulses

Lacrimal Glands

Tears Support and Maintain Ocular Surface

Ocular Surface Neural Stimulation

Stem et al. Cornea. 1998;17:584

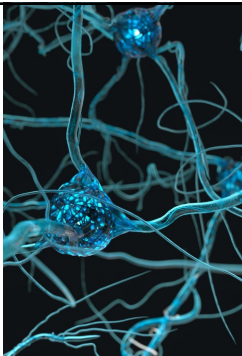
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NEURAL FEEDBACK LOOP

Controls tear and mucin production

Incites inflammation when there is an imbalance in the feedback loop

This leads to a change in quantity and quality of the normal tears

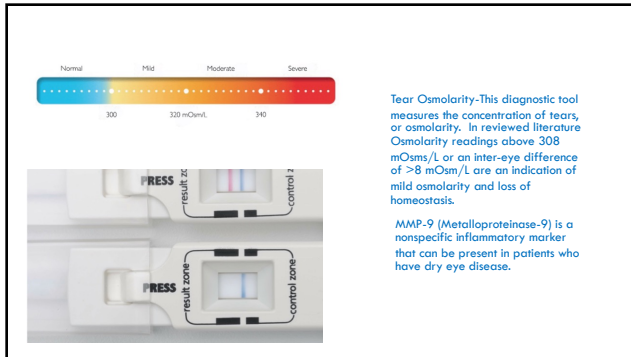


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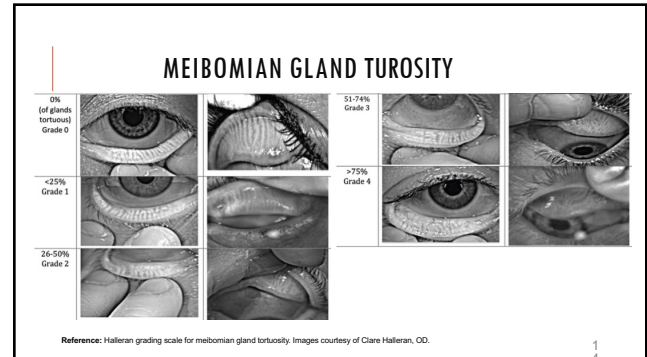
HOW DO YOU EVALUATE THE PATIENT WITH OSD?

- Case history
 - OSDI
 - SPEED
 - DEQ-5
- Vision
- SLE
- Meibography
- Point of Care Testing
 - Osmolarity
 - MMP-9

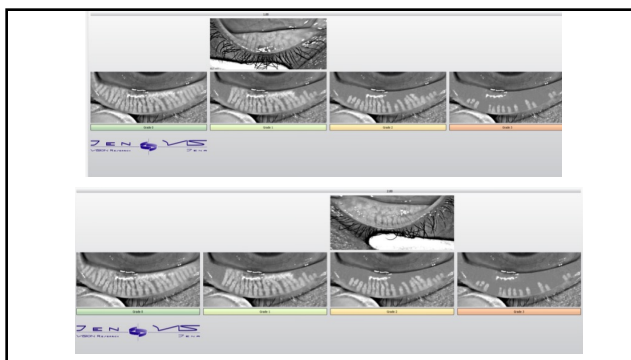
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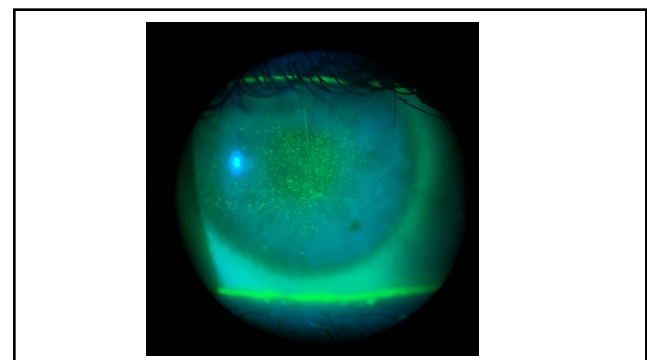
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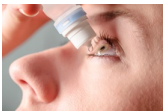


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HAVE WE MADE DRY EYE/OSD OVERLY COMPLICATED?

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SELF TREATING: ARTIFICIAL TEARS-LUBRICATING DROPS



Artificial tears aim to supplement tears to bathe the corneal surface as a means of providing short-term relief. They are available in low-viscosity and high-viscosity gels and ointments.

Ideal patients are already being treated and need a complementary component to their regimen. Both aqueous deficient and evaporative patients are candidates.

Preservative-free formulations are generally prescribed to preclude the patient from additional discomfort due to the long-term use of artificial tears that contain preservatives that can place the patient at risk for corneal toxicity.

Watch out: are using tears instead of uncovering what is really going on at/with the ocular surface. Don't use tears as a primary therapeutic approach, only use to support the main act of therapy. Recommend specific preservative free drops and carry them in the office, as the artificial tear aisle at the box stores is quite overwhelming for patients.

- ♦ HA
- ♦ Trehalose
- ♦ Preservative Free

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WHEN DO YOU PRESCRIBE A THERAPEUTIC?

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When do you prescribe a therapeutic?

- Not until after they have already tried an artificial tear
- If they are using artificial tear more than 2-3 times a day and are still symptomatic
- My initial visit if I feel their signs and symptoms are bad enough
- Never if they are on a vision plan

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FOR DRY EYE — WHAT IS YOUR 1ST LINE TRX?

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Anti-inflammatory Dry Eye Tx

- Cyclosporin
- Xiidra

Treating Evaporation

- Miebo (perfluorohexyloctane)

Increased Tear Production

- Truptyr (acoltremon)

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CYCLOSPORINE

Cyclosporine blocks T-cell activation, consequently inhibiting inflammatory cytokine production (selective inhibition of IL-1). Additionally, cyclosporine treatment has been shown to increase goblet cell density in the conjunctiva.

Ideal candidates are those that need a long-term strategy to treat inflammation and can be aqueous deficient or evaporative patients.

The drops begin to work immediately. However, the average life of a T-cell is approximately 90 days so the T-cells that are already activated have to die for full therapeutic target to be met. It is critical to teach patients the why of this drug so that they don't stop the drops on their own before experiencing full therapeutic relief.

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LIFITEGRAST

Lifitegrast is engineered to mimic ICAM-1's binding domain to LFA-1 and is believed to act as a competitive antagonist to block the binding between LFA-1 and ICAM-1, which results in the inhibition of T-cell migration into target tissues. This, in turn, reduces cytokine release and decreases further T-cell recruitment.

Both patient types, aqueous-deficient or evaporative can benefit. It is FDA approved for dry eye disease symptoms as well as signs.

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TOPICAL CORTICOSTEROIDS

Topical corticosteroids quell ocular inflammation.

The ideal patient for this treatment has symptoms of moderate to severe DED and specifically associated inflammation that can't be controlled via cyclosporine or lifitegrast alone.

Topical steroids can provide symptomatic relief, but due to long-term side effects, should only be used for short-pulsed duration typically 2-4 weeks with an appointment to always check IOP.

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MGD AND THE LIDS

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THE MAJORITY OF DED HAS AN EVAPORATIVE ETIOLOGY

MGD, the major contributor to the evaporative etiology of DED, is present in ≥86% of cases¹⁻⁴

14%
AQUEOUS DEFICIENT

36%
MIXED

50%
EVAPORATIVE

1. Evdson RA. Sci Rep. 2021;11:23412. 2. Lemp MA, et al. Cornea. 2013;31:472-478. 3. Wessman RM. Ocul. Antibiot. 2015;112(5):71-81. 4. Craig JP, et al. Ocul Surf. 2017;15:802-812. 5. Craig JP, et al. Ocul Surf. 2017;15:274-283. 6. Robson-Dunn DF, et al. Acta Ophthalmol. 2018;96:e707-711. | DED, dry eye disease; MGD, meibomian gland dysfunction.

27

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EXCESSIVE EVAPORATION TRIGGERS A VICIOUS CYCLE

When tear evaporation exceeds supply, loss of homeostasis follows^{1,2}



1. Rose AJ, et al. Ocul Surf. 2017;15(2):438-510. 2. McManus CW. Eye Vis (Basel). 2020;7(4). 3. Corio A, et al. Invest Ophthalmol Vis Sci. 2017;58(7):4793. 4. Jha R, et al. Am J Ophthalmol. 2016;161:253-257. 5. Akbarian S, et al. Clin Exp Ocul. 2020;48(4):447-473. 6. Kozmenko M, et al. Adv Ther. 2017;34(2):732-740. 7. Tsubota K, et al. Ocul Surf. 2017;15:45-74. 8. Wallstetter J, et al. Ocul Surf. 2021;21:158-63. 9. Wang MH, et al. Cont Lens Anterior Eye. 2021;44(4):101-109. 10. Akbarian S, et al. Clin Ophthalmol. 2021;15:3811-3820. 11. Pflugfelder SC, et al. Ophthalmology. 2017;124(1):152-153. 12. Zhang R, et al. Ocul Surf. 2021;21:145-159. | DED, dry eye disease.

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TOPICAL THERAPEUTIC FOR EVAPORATIVE DRY EYE

Miebo

Miebo
(perfluorohexyloctane
ophthalmic solution)

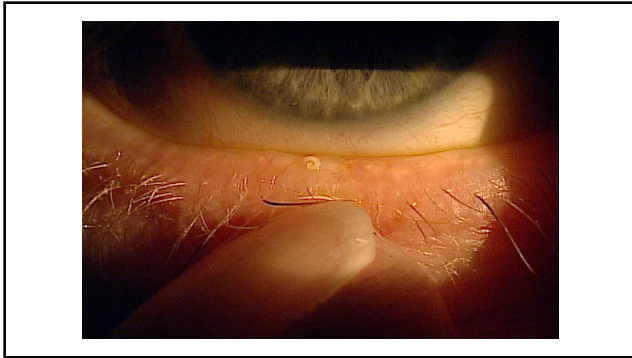


WHAT'S YOUR LID AND LASH STRATEGY?

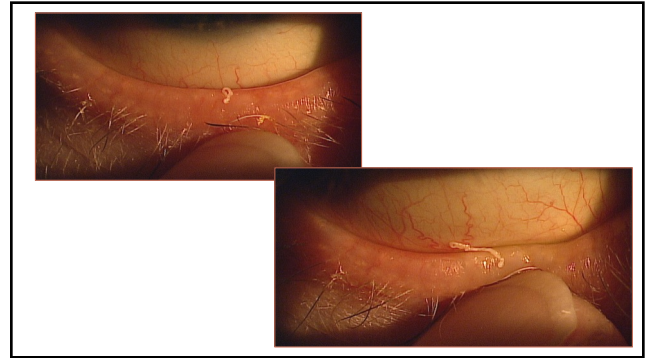
Do you have one?

29

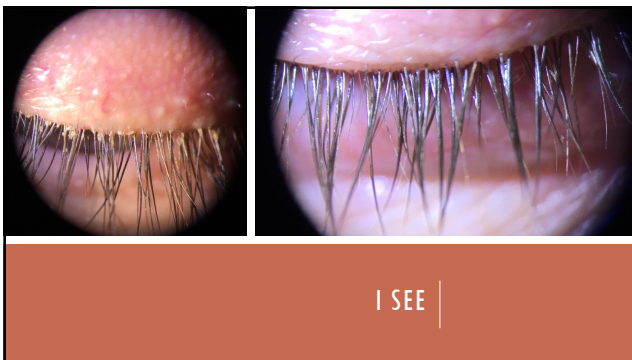
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HOW OFTEN TO YOU SEE DEMODEX BLEPHARITIS?

35

On Average How Often Do You Prescribe Xdemvy?

- Never
- Once a month
- Once a week
- Once a day
- Several times a day



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DEMODEX BLEPHARITIS CAN BE DIAGNOSED DURING SLIT LAMP EXAMINATION



Collarettes are hardened excretions around the base of the eyelashes visible during slit lamp examination¹⁻³



Collarettes can be identified when the base of lashes on the upper lid are exposed as the patient **looks down**⁴



Collarettes may be missed during a slit lamp exam even with a lid lift if a patient is looking straight ahead⁴



Images courtesy of Elizabeth Hsu, MD, used with permission¹



Asking a patient to look down during a slit lamp examination can reveal diffuse collarettes and misdirected or missing lashes that are strong signs of **Demodex blepharitis**

1. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 2. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 3. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 4. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10.

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COLLARETTES ARE A PATHOGNOMONIC SIGN OF DEMODEX BLEPHARITIS

Collarettes, or cylindrical dandruff, are composed of mite waste products and eggs¹

- Collarettes are translucent, solidified exudative excretions that form a cylindrical collar that cuffs around the base of the eyelash follicle¹⁻³
- Collarettes are displaced along the shaft of the lash as it grows, and they are also displaced due to bacterial overgrowth⁴
- Collarettes are composed of regurgitated undigested mite waste combined with epithelial cells, keratin, mite eggs, and secreted proteases and lipases that cause irritation³
- **100%** of patients with collarettes have *Demodex* blepharitis^{2,5}



Images courtesy of Elizabeth Hsu, MD, used with permission¹

1. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 2. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 3. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 4. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 5. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10.

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DEMODEX BLEPHARITIS | A PERVERSIVE AND DAMAGING EYE DISEASE

- Blepharitis is the **inflammation** of the eyelids causing irritation and redness
- **69%** of blepharitis cases are due to *Demodex* infestation leading to *Demodex* blepharitis¹⁻⁴
 - *Demodex* mites are implicated in other diseases of the lid and lid margin, including blepharitis and meibomian gland dysfunction^{2,3}
 - *Demodex* mites are associated with acne vulgaris, folliculitis, rosacea, seborrheic dermatitis, perioral and scalp hair loss, and basal cell carcinoma^{1,3}
- *Demodex folliculorum* and *Demodex brevis* are the only 2 species found in humans⁵
 - The life cycle of the *Demodex* mite is approximately 14 to 18 days from the egg to the larval stage followed by the adult stage⁶
 - The life span of the mite is limited outside the living body; direct contact is required for transinfestation⁵

D. folliculorum

0.3-0.4 mm length
Colonizes the base of the lash follicle⁷



D. brevis

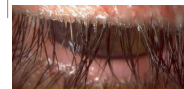
0.1 mm length
Colonizes the meibomian gland⁷



1. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 2. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 3. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 4. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 5. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 6. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 7. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10.

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DEMODEX BLEPHARITIS | MECHANISMS OF DISEASE



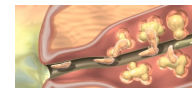
MECHANICAL

- Lash distension occurs as *Demodex* mites attach to follicles²⁻⁴
- *Demodex* mites deposit debris and digestive enzymes, causing further irritation to the eyelid margin^{4,5}



BACTERIAL

- *Demodex* mites can contribute to blepharitis by carrying bacteria on their exterior surface that may elicit immune responses^{3,6-7}



CHEMICAL

- *Demodex* mites have been associated with altered meibum composition⁸
- Debris from *Demodex* mites can potentially lead to chronic inflammation and degeneration of conjunctival tissue⁹

1. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 2. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 3. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 4. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 5. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 6. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 7. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 8. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10. 9. Hsu E. Demodex blepharitis. In: Hsu E, ed. *Demodex blepharitis*. London: Elsevier; 2018. p. 1-10.

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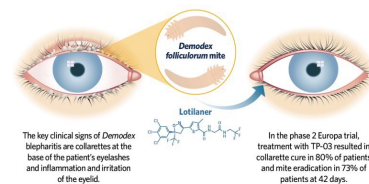
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TREATMENTS OF DEMODEX BLEPHARITIS

Lotilaner (Tarsus)

- FDA-approved ophthalmic formulation

TP-03 is a novel investigational therapeutic designed to treat *Demodex* blepharitis by targeting *Demodex* mites in the patient's eyelash follicles.



The key clinical signs of *Demodex* blepharitis are collarettes at the base of the patient's eyelashes and inflammation and irritation of the eyelid.

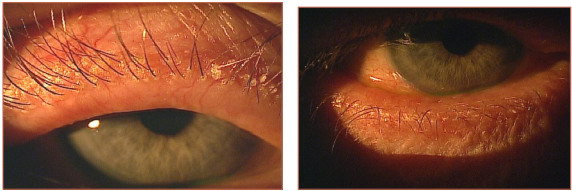
In the phase 2 Europa trial, treatment with TP-03 resulted in collarette cure in 80% of patients and mite eradication in 78% of patients at 42 days.

Reference: Tarsus takes on *Demodex* blepharitis with TP-03: a first-in-class, anti-parasitic, investigational therapy (2022)
Nature news. Available at: <https://www.nature.com/articles/s41571-021-00500-4> (Accessed: 06 November 2023).

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57 Y/O HISPANIC FEMALE

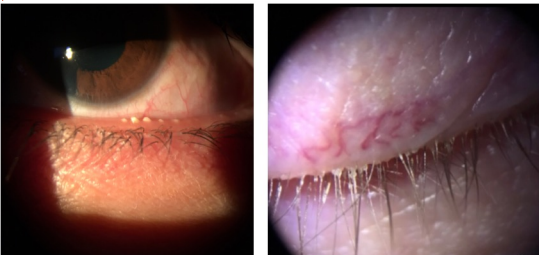
Chronic red eyes and irritation for several yrs



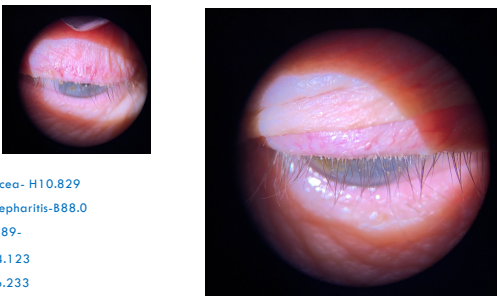
Burning in the am

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OCULAR ROSACEA



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Ocular Rosacea- H10.829
Demodex Blepharitis-B88.0
MGD-H02.889-
Dry Eye H04.123
K. Sicca H16.233

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TREATMENTS OF MGD



Warm Compresses

- First line recommendation for MGD¹
- Temperature matters^{2,3}
 - The physiological melting point of the meibum is 32 °C, but in patients with MGD, it is reported to increase up to 45 °C because of the alteration of its chemical composition
- Duration matters
 - More time is needed for moderate to advanced MGD

Reference: 1. O'Dell L, et al. Presented at AAO 2023; Oct 12, 2023; New Orleans, LA. 2. Bron AJ, et al. Experimental eye research. 2004 Mar 1;79(3):347-60. 3. Pulli H, et al. Optometry and Vision Science. 2012 Jul 1;89(7):1035-41.

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TREATMENTS OF MGD



- Secondary treatment option for MGD = anti-inflammatory topical or oral medications¹
- Artificial Tears, and to a greater extent nano emulsion eye drops, quantifiably improved tear film stability in a rabbit MGD model²

Reference: 1. O'Dell L, et al. Presented at AAO 2023; Oct 12, 2023; New Orleans, LA. 2. Gallis-Bernos A C, et al. (2023) Investigative Ophthalmology & Visual Science. Available at: <https://iovs.arvojournals.org/article.aspx?articleid=2786231> (Accessed: 04 November 2023).

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47

TREATMENTS OF MGD



Moisture Chambers

- Maintain consistent temperature control and simultaneously supply moisture

Reference: Thela I Blephasteam, the essential for your ocular health (2023) Blephasteam. Available at: <https://www.blephasteam.com/en-us/> (Accessed: 04 November 2023).

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TREATMENTS OF MGD



Lid Hygiene

- Lid Scrubber
- Cleansing wipes
 - Surfactants
 - Hypochlorous acid
- Tea tree oil
- Mechanical stimulation of the lid margins

Eyelid hygiene is the cornerstone of the treatment of MGD & associated diseases¹

Reference: 1. Geerling G, et al. Investigative ophthalmology & visual science. 2011 Mar 1;52(4):2050-64.

140

49

TREATMENTS OF MGD

Only 55% of patients are compliant with warm compresses and hygiene after 6 weeks of use¹

Reference: 1. Chuckpaibong V, et al. Clinical Ophthalmology. 2022 Apr 19:1173-82.

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TREATMENTS OF MGD

In-Office Procedures



- Microblepharoexfoliation
- Meibomian Gland Probing
- Thermal Treatments
- Light-Based Treatments
- Quantum Molecular Resonance



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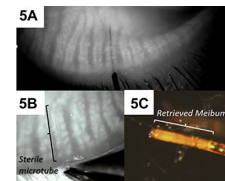
51

TREATMENTS OF MGD



Meibomian Gland Probing

- Improved subjective and objective measures including SANDE, OSDI, SPEED, DEQS, visual acuity, TBUT, fluorescein stain, meibum quality and expressibility¹



Reference: 1. Warren NA, Maskin SL. Clinical Ophthalmology. 2023 Dec 31:457-514.

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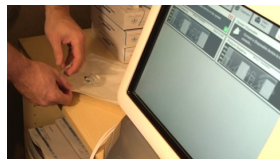
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TREATMENTS OF MGD



Automated Vectored Thermal Pulsation

- Increased contact lens wear time¹
- Improved symptoms significantly more effectively than 3-month daily course of oral doxycycline²
- Treatment before cataract surgery significantly reduced patient-reports of halos compared to control group³



Video courtesy of Doug Devries, OD, and Marc Bloomstein, OD, FAAO

Reference: 1. Blackie CA, et al. Clin Ophthalmol. 2018;doi:10.2147/OPTH.S153297

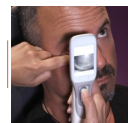
2. Nguyen KB, et al. Clinical Ophthalmology. 2018 Jan 17:161-6.

3. Hu, J.G. et al. (2021) ASCRS. Available at: <https://ascrs.confex.com/ascrs/21am/meetingapp.cgi/Paper/73402> (Accessed: 04 November 2023).

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TREATMENTS OF MGD



Semi-Automated Thermal Pulsation

- Increase meibomian gland function by 300% at 4 weeks post-treatment, compared to baseline¹
- Single treatment reduces DED signs and symptoms and is as effective as daily lid hygiene.²



Video courtesy of Doug Devries, OD, and Marc Bloomstein, OD, FAAO

Reference: 1. Tauber J, Owen J, Bloomstein M, et al. Clinical Ophthalmology (Auckland, NZ). 2020;14:405.

2. Craig, J.P. et al. (2023) Investigative Ophthalmology & Visual Science. Available at: <https://iovs.arvojournals.org/article.aspx?articleid=2788775> (Accessed: 04 November 2023).

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TREATMENTS OF MGD

Intelligent Heat and Manual Expression

- Significant improvements in signs and symptoms of DED within 1-week of treatment¹
- Statistically significant improvement in corneal staining and MGD-related symptom questionnaires²



Reference: 1. Karpecki P, et al. Clinical Ophthalmology (Auckland, NZ). 2020;14:4551. 2. Gupta PK, et al. Cornea. 2021;41(4):417-426.

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TREATMENTS OF MGD

Intense Pulsed Light

- Significant decreases in OSDI, SPEED, and SANDE symptomology score, MG capping and growth of *Corynebacterium macginleyi* with both four and five-flash IPL therapy¹

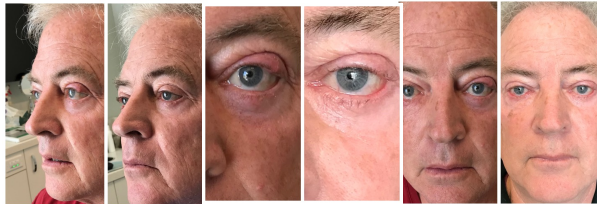


Reference: 1. Xue AL, et al. The Ocular Surface. 2020 Apr 1;18(2):286-97.

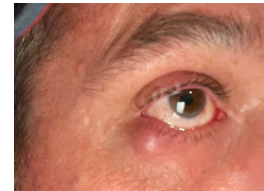
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CHALAZIA TREATMENT-INCISION FREE, INJECTION FREE, SCAR FREE MANAGEMENT-

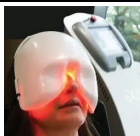


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TREATMENTS OF MGD



Low Level Light Therapy, Quantum Molecular Resonance, & Radiofrequency Technology

- Significant improvement in upper lid meibography in LLLT group compared to baseline¹
- Quantum molecular resonance improved symptoms, tear stability, and meibomian gland function²
- There are no peer-reviewed literature indexed on PubMed examining radiofrequency and their efficacy in treating MGD in a clinical setting

References: 1. Park Y, et al. Scientific Reports. 2022 Mar 4;12(1):3575. 2. Ferrari G, et al. Cornea. 2019;38(11):1424-1429.

150

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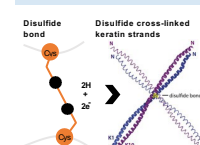
TREATMENTS OF MGD

Pipeline

Selenium Sulfide Keratolytic Ointment (Azura)

- Aberrant disulfide bond formation results in hyperkeratinization at the orifice and meibum alteration¹

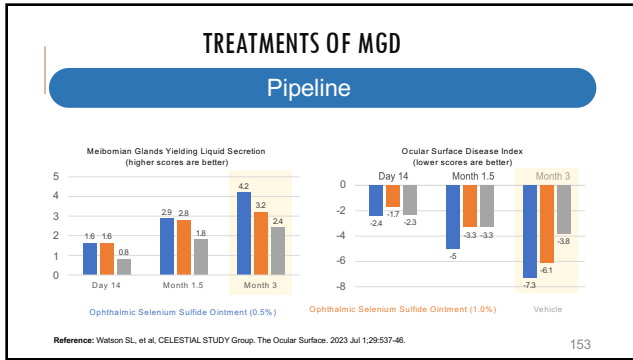
Excess formation of disulfide bonds



Reference: Ibrahim OM, et al. PLoS One. 2014;9(7):e99328.

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IN OTHER WORDS: MGD IS SUPPORTED BY THE BEISTO

- B**ugs: Bacteria, Demodex
- E**nzymes: lipases, esterases, transferases, cytokine effects on pKs of meibum biochem, sphingolipid composition, etc
- I**nflammation
- S**tasis of meibum
- T**emperature: increased melting temp of meibum
- O**bstuction/hyperkeratinization

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"TREAT THE BEISTO"

		CsA L/G	Thermal Pulsation	IPL	Hypochlorous acid	Omega 3/6	TP-03
B	Bacterial burden/ Demodex load			★	★		★
E	Enzymatic meibum biochem, lipases, gene expression	★		★	★	★	★
I	Inflammation- cytokines, T-cells	★	★	★	★	★	★
S	Stasis		★	★		★	★
T	Temperature	★	★	★			
O	Obstruction/ hyperkeratinization	★	★	★			★

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INTERVENTIONAL DRY EYE

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NEUROSTIMULATION

Lacrimal Functional Unit Regulates Tear Secretion¹

1. Corneal nerves sense dryness
2. Brainstem is activated
3. Parasympathetic activity to gland
- Nasal nerves also critical in maintaining normal tear film

Naso-Lacrimal Reflex Critical to Normal Tear Production

- Normal nasal breathing activates trigeminal nerve²
- Nasal breathing drives 34% of basal tear production³
- Plufegder lab showed in controlled trial by administering nasal anesthesia

¹ Quatt DA, Prog Retin Eye Res 2008;28:155-77. ² From City Eye and Ocular Surface Disorders. New York, 2008, pp 11-20. ³ Quatt DA, et al. Invest Ophthalmol Vis Sci 2012;53:1071-1076. ⁴ Plufegder DA, et al. Ocul Surf 2012;10:100-108.

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AMNIOTIC MEMBRANES

Available in cryopreserved or dehydrated form, amniotic membranes act as therapeutic bandages, restoring the health of the ocular surface.

Patients that have central corneal staining are good candidates and can benefit from the therapeutic benefits of amniotic membranes, whether if their disease has aqueous-deficient or evaporative components.

It really depends on the patients' disease on how long they wear them, it can be as little as 3 days but typically is 5-7 days.

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AUTOLOGOUS SERUM

Autologous serum, or the use of a patient's own blood with the red blood cells and clotting factors removed as eye drops, contains many important growth factors and nutrients normally found in healthy tears. Therefore, optometrists prescribe the sterile, preservative-free solution to DED patients.

These drops are typically reserved for the moderate to severe patient. I usually start with 20% but they can be reconstituted to 35% or 40%.

As there are many regulations in place when patients blood is involved it's become harder to obtain this for patients. However, Vital Tears, has been excellent in helping patients obtain this formulation.



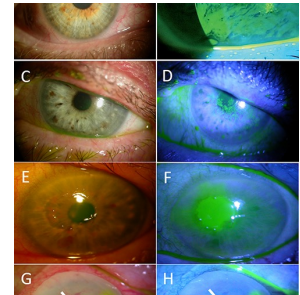
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CENGERMIN-WHEN IT'S NOT JUST DED!

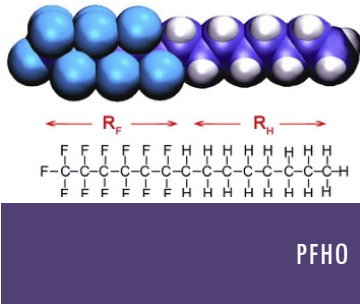
Known commercially as Oxervate (Dampar), this 0.002% topical solution contains a recombinant form of human nerve growth factor, a protein made by the human body, that acts through specific high-affinity and low-affinity nerve growth factor receptors in the anterior segment of the eye to support corneal innervation and integrity.

It is prescribed for patients who have neurotrophic keratitis, also known as neurotrophic keratopathy, a rare disease that can progress to corneal scarring and vision loss, and is dosed 6 x a day for 8 weeks.

It is exciting to have an option for these patients, as it can be quite visually devastating. Historically it was quite expensive costing as much as 90K, but now can be very affordable.



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Water free, preservative free^{1,2}

Long-lasting lubricant. Remains in tears for up to 8 hours (based on rabbit model)³

Potent inhibitor of evaporation. 4x more effective at inhibiting evaporation compared with methyl lipid⁴

Low surface tension. Forms a monolayer at the air-tear interface^{5,6}

May reduce friction⁷

Approved in the United States in May 2023 for the treatment of DED⁸

Both patient types, aqueous deficient or evaporative can benefit. It is FDA approved for dry eye disease symptoms as well as signs

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PUNCTAL PLUGS

Punctal plugs allow tears to stay in the eye longer instead of draining through the canaliculus into the nasolacrimal system.

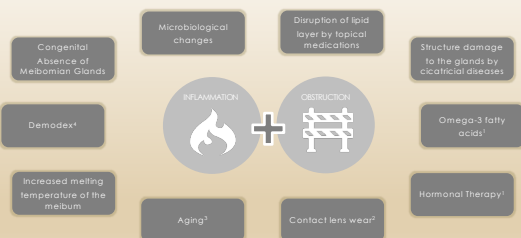
Truly aqueous deficient patients benefit the most, like patients with Sjogren's. When considering plugs, optometrists should make sure the inflammation has been treated first, as not treating it creates more inflammatory factors present on the front surface of the eye, which can exacerbate DED symptoms.



Cross-linked hyaluronic acid gel that allows patient's eyes to be bathed in their own natural tears

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Ultimately Action Plan Should Address Both...



1. Sullivan D. IOVS. 2003; 2. Arita R. Ophthalmology. 2009; 3. Obodo H. Cornea. 2002; 4. Yu J. Curr Opin Allergy and Clin Immunol. 2010.

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STEP BY STEP APPROACH

- ❖ Ask the right questions
- ❖ Review Medical history and Medications-Autoimmune or Sleep Apnea
- ❖ CL wearer
- ❖ Skin Health/Telangiectasias
- ❖ Blink reflex
- ❖ Lid Seal
- ❖ Snap Test
- ❖ Products/make-up
- ❖ Lash Serums
- ❖ Meibography/Meiboscere
- ❖ TearLab
- ❖ MMP-9
- ❖ Tear Meniscus Height
- ❖ LWE
- ❖ Lissamine Staining
- ❖ Line of Marx
- ❖ NaFI
- ❖ TBUT
- ❖ Botox
- ❖ Filler
- ❖ Eyelid Structure

Pause and ask yourself, "What Did I Miss?"

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THANK YOU!