Alcon

Dry Eye Disease – Simplifying the Complicated

Megan Zabell, B.Optom

Professional Affairs Associate, Alcon Vision Care

ANZ-DEOH-1900018

Learning objectives

At the end of this presentation you should:

- Understand normal tear physiology
- Be aware of the impact dry eye has on patients
- Understand the pathophysiology of dry eye
- Understand the differences between different classes of drops

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.

CRAIG ET AL. DEWS II DEFINITION AND CLASSIFICATION REPORT *THE OCULAR SURFACE* 2017; 15(3): 276-283

AEA™
ALCON EXPERIENCE ACADEMY

Redness

Foreign Body Sensation

Irritation

Eye Fatigue

Stinging

Blurriness

Sandy or
Gritty Feeling

Sensitivity to Light

Burning

Excessive Tearing or Watering

Alcon

72%

of Australians report at
least one symptom of DRY EYE[1]

1.Market Research conducted by Ipsos on behalf of Alcon Laboratories Australia Pty Ltd in 2016. n =836

Up to

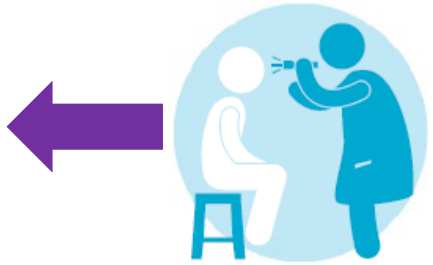
82%

of consumers attribute the causes of symptoms/eye problems to lie within their environment or lifestyle[1]

1. Market Research conducted by Ipsos on behalf of Alcon Laboratories Australia Pty Ltd in 2016. Sample size = 300

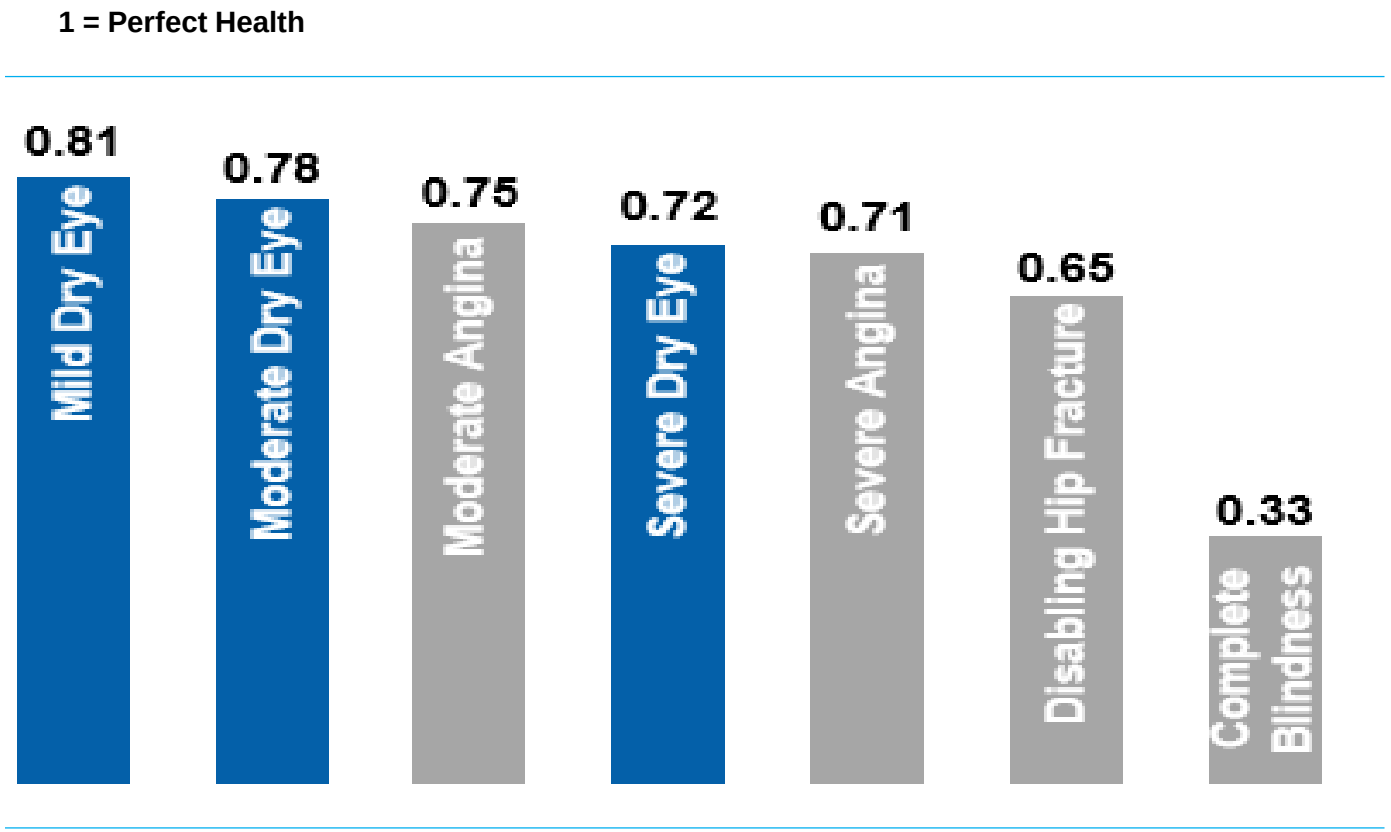

Google
Google Search
I'm Feeling Lucky

Optometrists Drive Recommendation



Ref: Market Research conducted by GfK on behalf of Novartis Australia Pty Ltd in 2016. Sample size = 202

Dry Eye & Quality of Life



Adapted from Schiffman[2]

Dry eye affects daily activities[1]

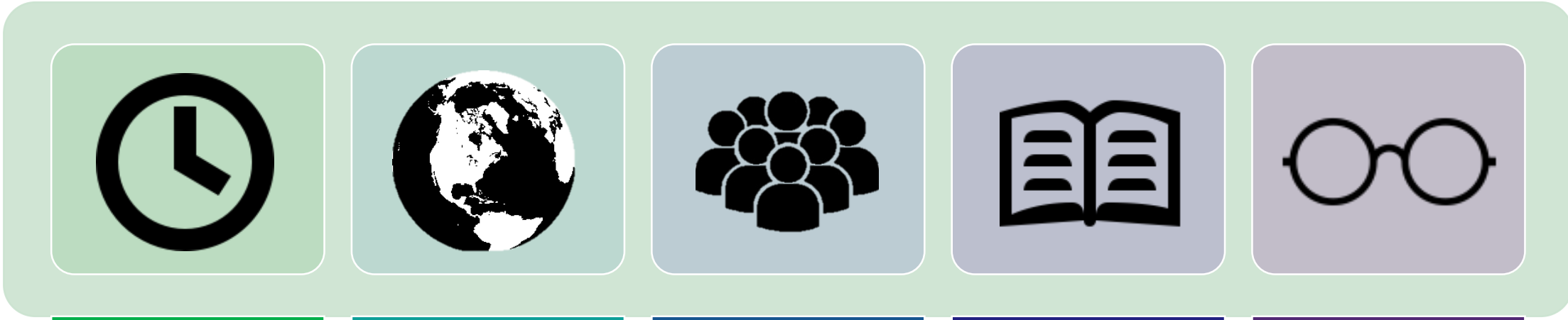
Watching TV/Computer

Reading

Driving at night

1. Hirsch JD. Considerations in the pharmacoeconomics of dry eye. Manag Care. 2003;12(12 suppl):33-38
2. Schiffman RM, Walt JG, Jacobsen G, et al. Utility assessment among patients with dry eye disease. Ophthalmology. 2003;110:1412–1419

TFOS DEWS II Report (2017)[1]



Two years for assembly

- 10 years since TFOS DEWS published

150 Experts From 23 Countries

12 Sub-Committees

11 Reports

650 Pages

1. Website: Dry Eye Defined: TFOS DEWS II Report. Available: http://www.tfosdewsreport.org Accessed: 24/10/2019

The Tear Film & Dry Eye

Alcon

Tear Film[1]

Layer of lubricating substances that keeps corneal epithelium moist

Three components (2 layers):

- Lipid: prevents tear evaporation
- Aqueous: largest portion of the tear film's volume that contains oxygen supply
- Mucin: helps to spread tears and stabilise tear film

Tear film functions: maintains health of ocular surface; preserves clear vision; is the primary source of nutrition, waste removal, and antibacterial action

1. Willcox MDP, et al. TFOS DEWSII Tear Film Report The Ocular Surface 2017;15:366-403

Glycocalyx & Epithelial Cells[1]

Corneal epithelial cell surface is hydrophobic

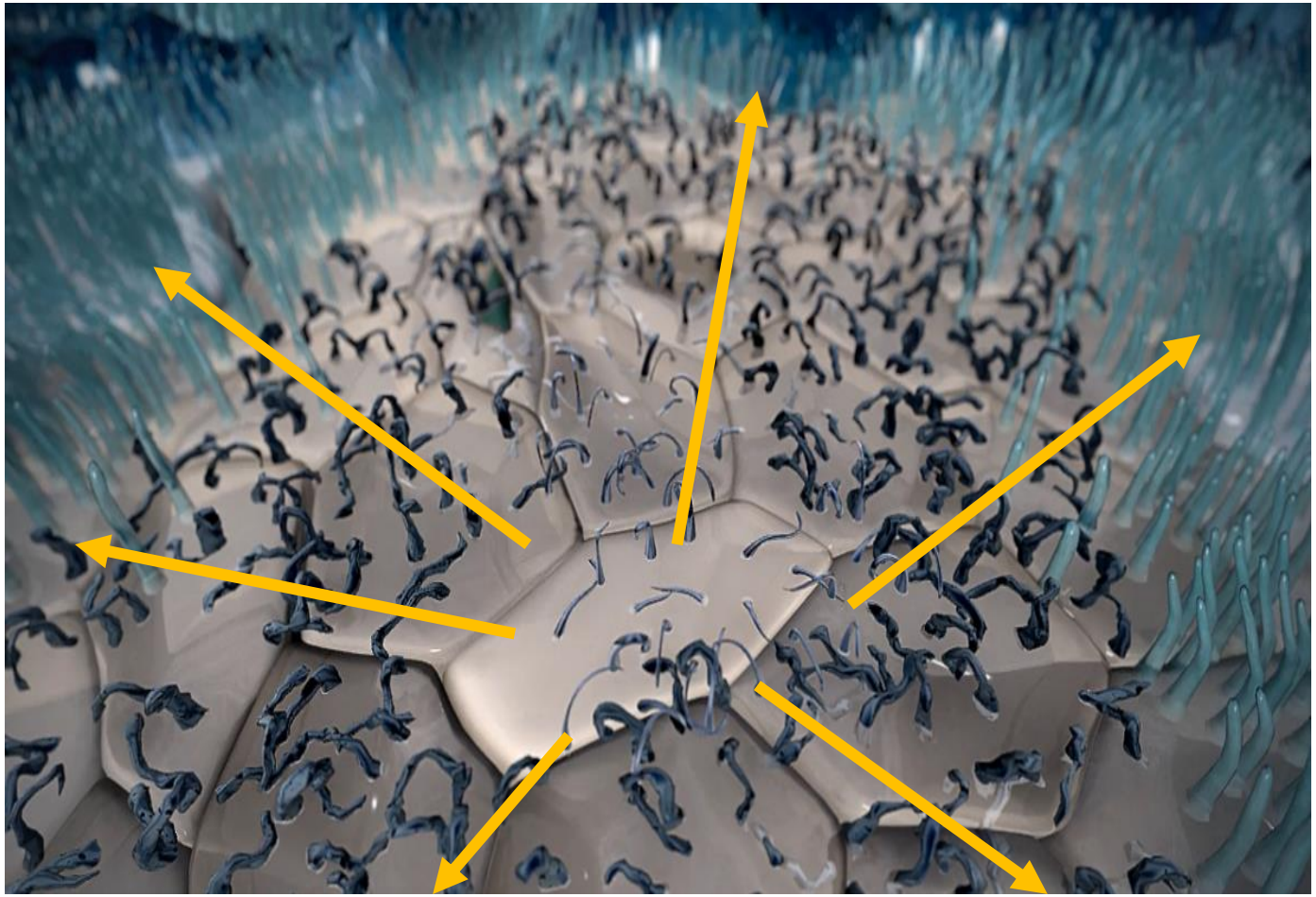
Glycocalyx

- Long chain ‘bottle brush’ molecules migrate out from microvilli to create a hydrophilic network
- Helps hold mucin to surface
- If damaged tear film is destabilised

Image Source: Willcox MDP, et al. TFOS DEWS II Tear Film Report. *The Ocular Surface* 2017; 15: 366-403

1. Bron AJ et al. TFOS DEWS II Pathophysiology report. *The Ocular Surface* 2017; 15(3): 438-510.

Tear Film Instability[1]



- Damaged glycocalyx reduces wettability
- Surface becomes hydrophobic
- Increased tear film instability and evaporation
- Lower TFBUT

1. Bron AJ et al. TFOS DEWS II Pathophysiology report. *The Ocular Surface* 2017; 15(3): 438-510.

The Vicious Cycle of Dry Eye Disease[1]

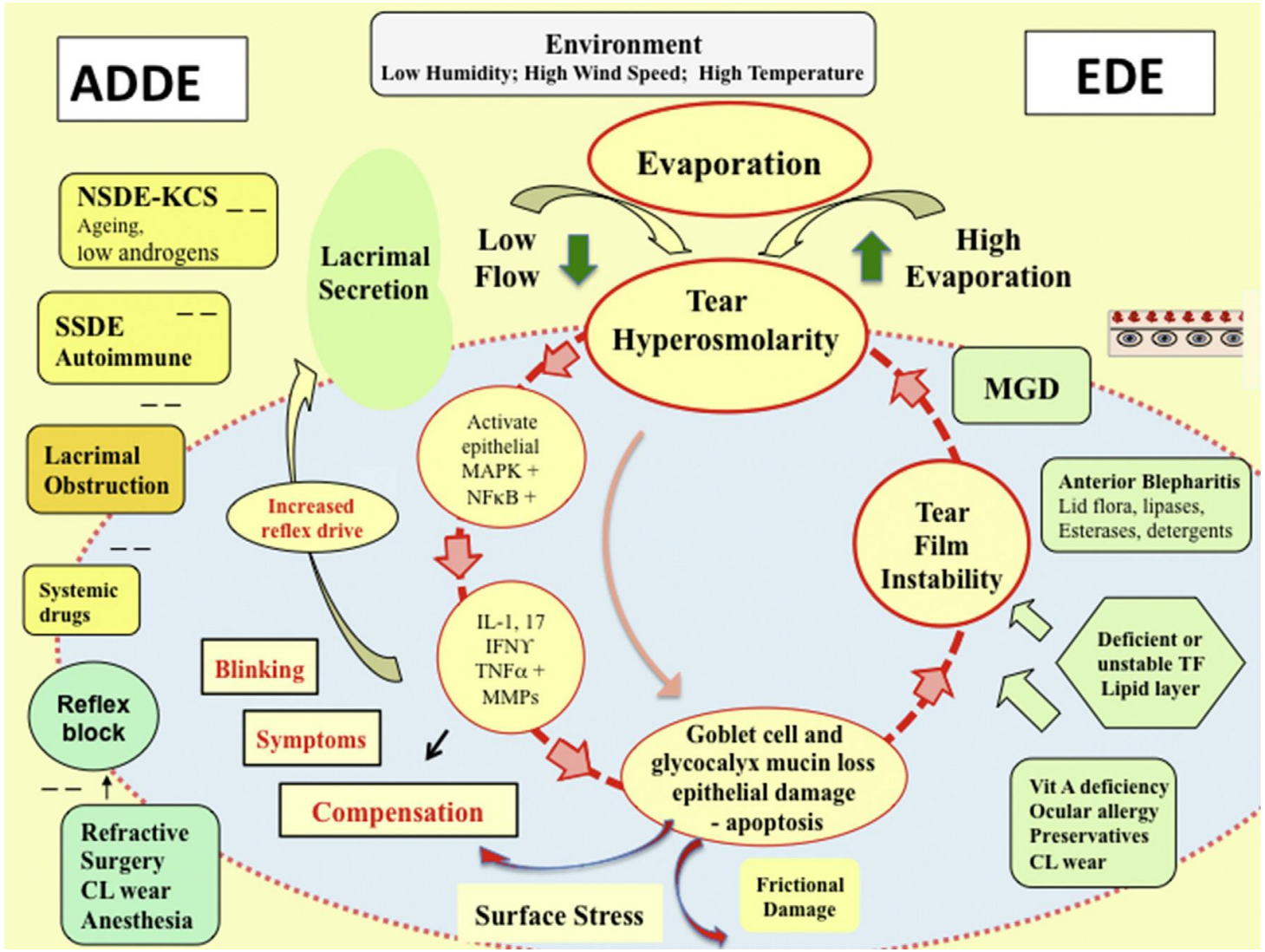
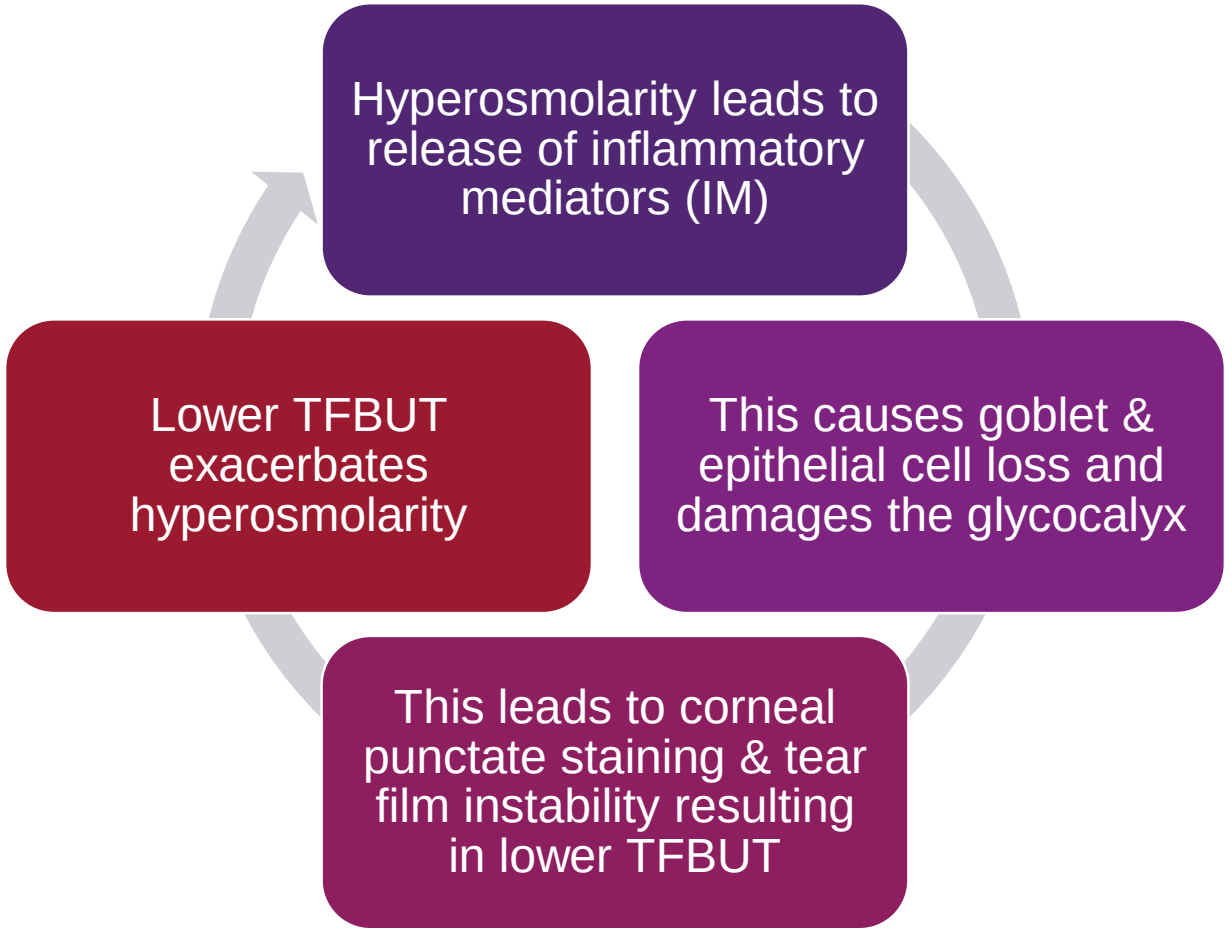


Image source: Bron AJ et al. TFOS DEWS II Pathophysiology report. *The Ocular Surface* 2017; 15(3): 438-510.

1. Bron AJ et al. TFOS DEWS II Pathophysiology report. *The Ocular Surface* 2017; 15(3): 438-510.

The Vicious Cycle of Dry Eye Disease[1]



Alcon

1. Bron et al. TFOS DEWSII Pathophysiology Report *The Ocular Surface* 2017; 15:438-510

Dry Eye Management

According to the DEWSII 4-Step Suggested Treatment Algorithm

Alcon

Step One[1]

Lid Hygiene	• Lid Wipes better efficacy in managing blepharitis than baby shampoo[2]
Heat	• >40^{0}C for optimal warm compression[3]
Nutrition	• Essential Fatty Acids[1]
Environmental Changes	• VDU[1] • Air Conditioning[1]
Ocular Lubricants	• Viscosity Agents[1] • Lipids[1]

1. Jones L, et al. TFOS DEWSII Management & Therapy Report. *The Ocular Surface* 2017;15:575–628
2. Craig JP, Sung J, Wang MT, Cheung I, Sherwin T, Ismail S. Commercial lid cleanser outperforms baby shampoo for management of blepharitis in randomized, double-masked clinical trial. Invest Ophthalmol Vis Sci 2017;58. Eabstract 2247eB0014.
3. Murakami DK, Blackie CA, Korb DR. All Warm Compresses Are Not Equally Efficacious. Optom Vis Sci 2015;92(9):e327e33.

Step Two[1] – If Step One Inadequate

Non-preserved ocular lubricants to minimise preservative-induced toxicity

Tea tree oil treatment for Demodex (if present)

Tear conservation

Overnight treatments (such as ointment or moisture chamber devices)

In-office, physical heating and expression of the meibomian glands (including device-assisted therapies)

In-office intense pulsed light therapy for MGD

Prescription drugs to manage DED (or complications of DED)*

- Topical antibiotic or antibiotic/steroid combination applied to the lid margins for anterior blepharitis (if present)
- Topical corticosteroid (limited-duration)
- Oral macrolide or tetracycline antibiotics

**Please note some of these therapeutic products may not be indicated in Australia for use in dry eye management*

Alcon

1. Jones L, et al. TFOS DEWSII Management & Therapy Report. *The Ocular Surface* 2017;15:575–628

Next Steps[1]

Step Three

Oral secretagogues*	Autologous/allogeneic serum eye drops*	Therapeutic contact lens options • Soft bandage lenses • Rigid scleral lenses

Step Four

Topical corticosteroid for longer duration^	Amniotic membrane grafts	Surgical punctal occlusion	Other surgical approaches (eg tarsorrhaphy, salivary gland transplantation)

*Not currently available in Australia
^Not indicated for the treatment of dry eye in Australia

1. Jones L et al. TFOS DEWS II Management and Therapy Report *The Ocular Surface* 2017;15:575–628

Eye Drops

Which one and why?

Alcon

Viscosity-Enhancing Agents

Cellulose derivative (CMC, HPMC)

- Viscoelastic[1], non-irritating[1], can cause crusting on lids[1], good ocular retention[1] time but reduced compared to PEG/PG products[2]
- Refresh^[3], Xailin^ Fresh[3], Celluvisc^[3], BionTears[2]

Glycerin-containing

- Lubricant as well as humectant[4] (retains moisture). Shorter ocular retention time compared to PEG/PG products[2].
- Optive^ Family[3]

Sodium Hyaluronate (SH)

- SH is hypo-osmatic[4], a derivative of hyaluronic acid[4], which is non-Newtonian[5]
- Hylo-Forte^/Fresh^[6], Xailin^ HA[3], Blink^ Family[3], Systane® Hydration*[3]

Polyethylene Glycol (PEG) & Propylene Glycol (PG)

- Intelligent delivery system of Systane®, balanced osmolarity[7], PG is a humectant[4], the combination forms a protective layer over mucous membranes[4]
- Systane® Family[3]

*Systane Hydration not currently available in Australia ^Trademarks belong to their respective owners

1. Macedo & Galera. Ocular lubricants: what is the best choice? *Cliencia Rural* 2016; 46(11): 2055:2063
2. Foulks, G. Clinical evaluation of the efficacy of PEG/PG lubricating eye drops with HP Guar for the relief of the signs and symptoms of dry eye disease: A review. *Drugs of today* 2007; 43(12): 887-896.
3. Larson, T. Ocular Lubricants List *Optician* 2018
4. Artificial Tears: A Primer. EyeRounds.org. November 23, 2016; Available from http://EyeRounds.org/tutorials/artificial-tears.htm
5. Jones et al. TFOS DEWS II Management and Therapy Report *The Ocular Surface* 2017;15: 575-628
6. https://www.aftpharm.com/products/non-prescription/hylo-forte-eye-drops/
7. Dutescue et al Osmolarity of Prevalent Eye Drops *Cornea* 2015 vol. 34 Issue 5 p 5606

Emulsion Products[1]

- Emulsions consist of oily droplets stabilised by surfactants or emulsifiers dispersed in an aqueous medium
- Most emulsions contain submicron-sized particles prepared with oils and emulsifiers
- Nano emulsions allow greater spreading
- May or may not contain phospholipids

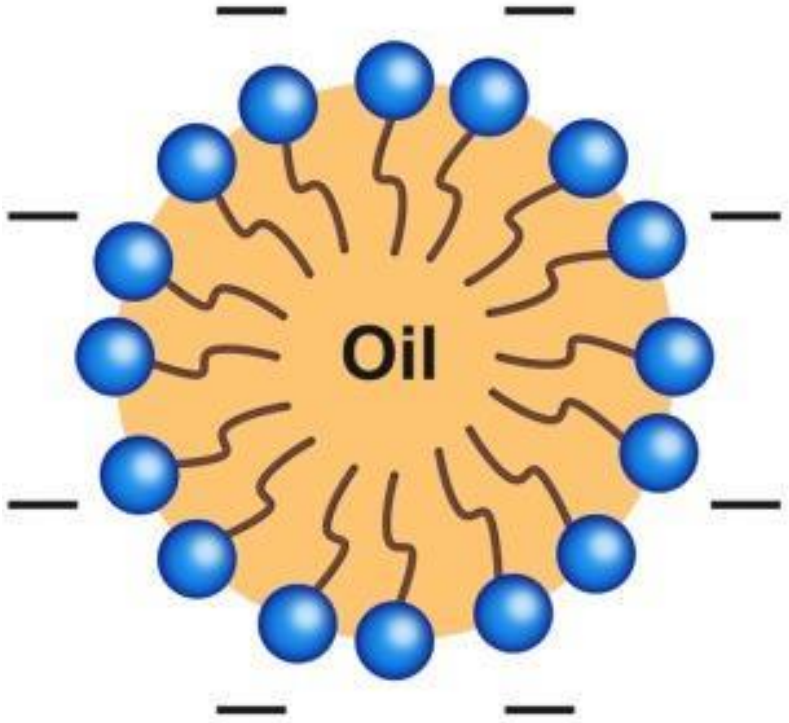


Image source: Garrigue, J. Relevance of Lipid-Based Products in the Management of Dry Eye Disease. J Ocul Pharmacol Ther. 2017 Nov 1; 33(9): 647–661.

1. Garrigue, J. Relevance of Lipid-Based Products in the Management of Dry Eye Disease. J Ocul Pharmacol Ther. 2017 Nov 1; 33(9): 647–661.

Preservatives

Step 1 in the DEWSII Suggested treatment algorithm involves the use of lubricants that can contain preservatives[1], and that contain a lipid component when EDE is present[1].

When Step 1 is insufficient and moving to Step 2 it is suggested to use non-preserved tear supplements[1].

The Systane family of drops that contain preservatives use the preservative POLYQUAD®

- POLYQUAD® has been shown to have fewer side effects and be much better-tolerated in comparison to the traditional preservative, BAK[2].
- A recent review suggested that when following the DEWSII treatment algorithm and using preserved drops it is best to use non-BAK alternate preservatives, such as POLYQUAD®[2]

Alcon

1. Jones et al. TFOS DEWSII Management and Therapy Report *The Ocular Surface* 2017; 15: 575-628
2. Walsh & Jones. The use of preservatives in eye drops. *Clinical Ophthalmology* 2019; 13: 1409-1425 (Sponsored by Alcon)

Dry Eye Management

#1 DRY EYE BRAND IN AUSTRALIA[1]

DRY EYE | EYE HYGIENE

1. IMS S1K Artificial Tears MATApr19

Intelligent Delivery System[1]

*PEG isn't an ingredient of SYSTANE® COMPLETE or SYSTANE ® BALANCE

IN THE BOTTLE

- Loosely cross-linked droppable gel
- HP-guar loosely cross links with borate
- Sorbitol limits any further cross linking

Poly-ethylene glycol 400 (PEG) *

Propylene glycol (PG)

HP-Guar

Borate

Sorbitol

1. Springs, C. Novel Ocular Lubricant Containing an Intelligent Delivery System: Details of Its Mechanism of Action. Dev Ophthalmol. Basel, Karger, 2010, vol 45, pp 139–147

SYSTANE® COMPLETE

An all-in-one drop providing optimal coverage for dry eye relief[1-3]

SYSTANE® COMPLETE combines the properties of:

- Systane® HP-Guar technology, which is known to enhance the effect of demulcents[4]
- Nanosized lipid delivery technology[1]

1. Alcon DOF Nanoemulsion for MGD, 2013, available on request.
2. Ketelson H, Rangarajan R; Pre-clinical evaluation of a novel phospholipid nanoemulsion based lubricant eye drops. Poster presented at ARVO 2017, sponsored by Novartis.
3. Gokul A. Tear lipid supplement prophylaxis against dry eye in adverse environment 2018
4. Jones L, et al. TFOS DEWS II Management and Therapy Report *The Ocular Surface* 2017;15: 575–628

SYSTANE® Ultra Lubricant Eye Drops[1,2]

Demulcents: Polyethylene Glycol 400 and Propylene Glycol

Preservative: POLYQUAD®

Viscosity-enhancing agents: HP-Guar/borate, and sorbitol

1. Benelli, U. Systane lubricant eye drops in the management of ocular dryness. *Clin Ophthalmol* 2011; 5: 783-790
2. Davitt WF, Bloomenstein M, Christensen M, et al. Efficacy in patients with dry eye after treatment with a new lubricant eye drop formulation. *J Ocul Pharmacol Ther*. 2010;26(4):347-353.

Intelligent Delivery System[1,2]

1. Jones L, et al. TFOS DEWS II Management and Therapy Report *The Ocular Surface* 2017;15:575-628
2. Springs C. Novel Hydroxypopyl-GuarGell for Treatment of Dry Eye. *Adv Ther* 2010; 27(10):681-690

Summary

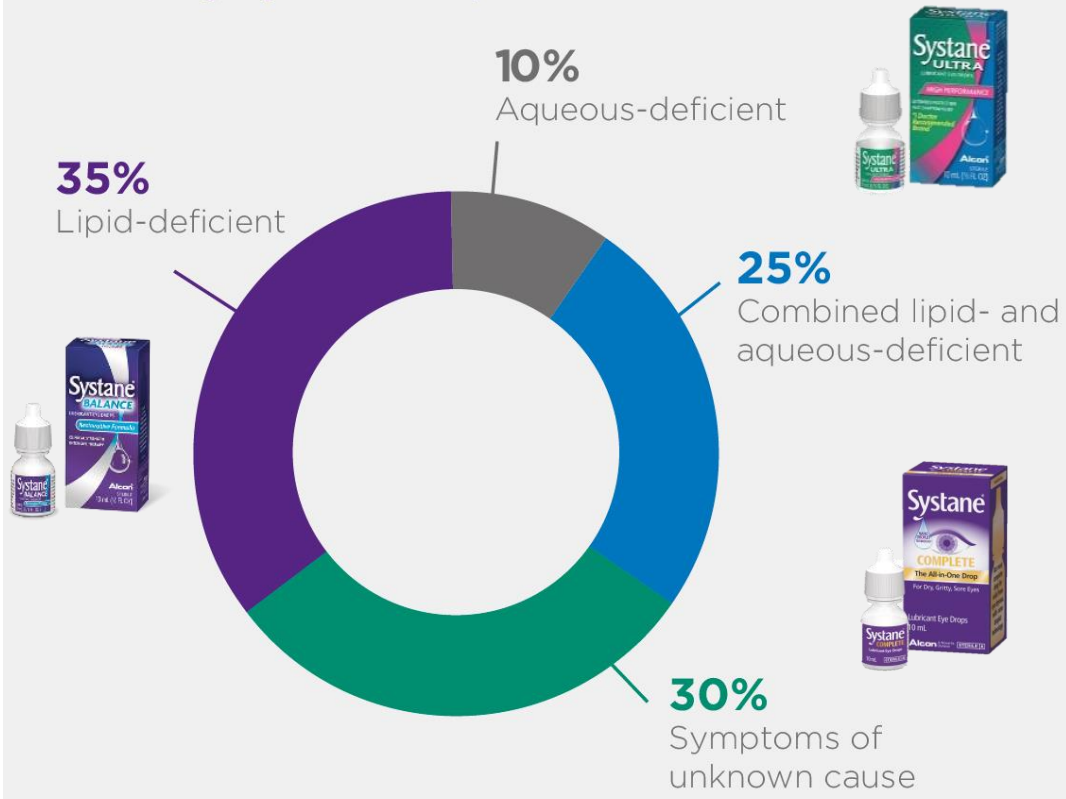
Relieve aqueous- and mucin-deficient dry eye

Relieve evaporative dry eye

Relieve multiple types of dry eye

Distribution of Dry Eye by Type [1]

According to data from a cohort of 224 patients with dry eye disease published in 2012



1. Lemp MA et al Distribution of aqueous-deficient and evaporative dry eye in a clinic-based patient cohort: a retrospective study, Cornea 2012

professional.affairs@alcon.com

Alcon Laboratories (Australia) Pty Ltd: 1800 224 153
Alcon Laboratories Auckland NZ: 0800 101 106