

Ocular Surface Preservation for the Glaucoma Patient.

Prevent Defense is the Best Offense.

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Disclosures

- **Lang**- Aerie, Allergan, Avellino, Horizon, Novartis, Ocular Therapeutix, Orasis, Scope, Sun Pharma, AOS

Ocular Surface Preservation

What are we looking at? What are we up against?

- DED is one of the most common ocular disease
 - Approximately 30 million Americans (aprox. 3 million with glaucoma)
- Incidence of OSD increases with AGE as well as many other factors
 - DM
 - Migraines
 - Surgery
 - Associated with Anxiety, Depression, and Mental Health Conditions
 - Eye Drops (Blessing or a Curse?) (Gentamicin)
 - Environmental factors including screen time

What are we looking at? What are we up against?

Glaucoma Incidence

- Affects 60 Million Worldwide
- Prevalence increases with AGE
 - 8% of people older than 80

Shares many risk factors with DED

- Age
- DM
- Migraines
- PXF?
- Inflammation?

What are we looking at? What are we up against?

Co-Incidence of OSD and Glaucoma

- The prevalence of OSD is greatly increased in glaucoma patients, reaching 50% of patients in some studies.

Rate of SPK in Glaucoma patients

- As high as 54% of glaucoma patients have SPK

TBUT and Schirmer scores

- Abnormal in >60% of Glaucoma patients

Inflammation and the OSD/Glaucoma Flip-Flop

OSD has longstanding “roots” in inflammation and inflammatory pathways
But what about Glaucoma? Is Glaucoma an **inflammatory condition**?

- There's a growing body of evidence suggests that neuro-inflammation and immune response are part of the sequence of pathological events leading to the optic neuropathy of glaucoma.
- Azithromycin
 - Strokes, MGD
- Minocycline
 - Strokes, MGD, Corneal Thinning
- Immunomodulation

Inflammation and the OSD/Glaucoma Flip-Flop

OSD has longstanding “roots” in inflammation and inflammatory pathways
But what about Glaucoma? Is Glaucoma an **inflammatory condition**?

We Might be treating **BOTH** conditions when targeting inflammation!!!

Ocular Surface Preservation

Glaucoma Therapies and the **Ocular Surface**

- What are we going to talk about here???
- Insta @SeeOneTeachOne

What's the “**BAK**” Deal?

(Cue the **BAK Rant**, but remember everything is a balance...)

What is **BAK**?

- Benzalkonium chloride
- Quaternary Ammonium Compound
- Bacteriocidal, Bacteriostatic, and surfactant properties
- BAK **destroys cell membranes** to kill pathogens
- **Indiscriminate** killer
- BAK exposure is an **independent risk factor for DED and OSD**
- Has a **detergent** like effect which destabilizes the **lipid layer**
- Especially prevalent in generic formulations

What's the “BAK” Deal?

What is **BAK**, does it cause inflammation?

- BAK has **pro-apoptotic** effects and causes **oxidative stress** similar to those found in the TM of glaucoma patients with accelerated **aging**, trabecular **cell death** and **extracellular matrix accumulation**.
- BAK is a lipophilic molecule that accumulates **deeply**.
- Measurable levels of BAK can be found in the conjunctiva up to **1 week** after administration of a **single drop**.

What's the “BAK” Deal?

What is BAK?

- BAK has been retrieved using the mass spectrometry imaging technique in deep structures such as the trabecular meshwork or the lens in rabbit eyes treated with BAK for several months, which was also confirmed in human tissues.
- At higher concentrations, sub-conjunctival injection of BAK is capable of causing trabecular cell death, inflammatory infiltration, and increased IOP.
- This explains why IOP improves when switching over to PF meds.

Medical Glaucoma Therapies

Prostaglandins

- Known Inflammatory Mediator
- Stimulate the expression of matrix metalloproteinases (MMPs) which hydrolyze excessive ECM, opening up extracellular spaces and decrease fluid resistance flowing through these spaces. In addition, they induce relaxation of the TM and ciliary muscle, which reduces tension and increases the outflow pathways.
- Yet it's our first line of treatment due to it's effectiveness

Medical Glaucoma Therapies

Alpha Agonists

- **Brimonidine**

- α -2 adrenergic receptor **agonist** that decreases aqueous humor secretion and enhances aqueous humor resorption by the uveoscleral channels.
- **Allergenic** and/or pro-inflammatory properties
- Induces a Granulomatous **Uveitis** (and increased IOP) in some patients
- Case reports of **INCREASED IOP** with use (inflammatory response?)

Other Medical Therapies

Lumify???



Medical Therapies - Medicamentosa -

We are our own worst enemy

Medicamentosa

- Allergic manifestations of therapy
 - Hyperemia, chemosis, edema, follicular reaction, etc.
- Prostaglandins **1.5%**
- CAls **3-4%**
- Beta-Blockers **11-13%**
- Alpha-Agonists **11.5%**
 - (Combigan?)

A Patient's Story



Medical Therapies - Medicamentosa -

Medicamentosa

- **Pseudopemphigoid**

- Cicatrizing conjunctivitis that mimics true pemphigoid
- **28.3%** of all **pseudopemphagoid** cases were due to topical glaucoma medications



Medical Therapies

TABLE 2. COMMONLY PRESCRIBED GLAUCOMA MEDICATIONS WITH THEIR CORRESPONDING PRESERVATIVE^a

Medication	Preservative
Xalatan	BAK 0.02%
Lumigan	BAK 0.02%
Azopt	BAK 0.01%
Timoptic	BAK 0.01%
Trusopt	BAK 0.0075%
Cosopt	BAK 0.0075%
Combigan	BAK 0.005%
Travatan Z	SofZia
Alphagan P	Purite
Zioptan	None
Cosopt PF	None
Timoptic in Ocudose	None

Vyzulta 0.02% BAK
Rhopressa 0.015% BAK
Simbrinza 0.003% BAK
Rocklatan 0.02% BAK

IOP-Lowering medications	BAK concentration %
Xalatan	0.02
Travatan	0.015
Betoptic S	0.01
Azopt	0.01
Timoptic	0.01
Simbrinza	0.003
Brimonidine	0.005
Lumigan	0.005
Betagan	0.005
Combigan	0.005
Cosopt	0.0075
Trusopt	0.0075

November/December 2016

Preservative-Free Alternatives

Options for decreasing ocular toxicity in patients with glaucoma.

By Arkadiy Yadgarov, MD, and Reena A. Garg, MD

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July/August 2016

Tear Osmolarity in a Glaucoma Practice

The role of point-of-care testing in dry eye disease and glaucoma management.

By Leslie E. O'Dell, OD

[f](#) [t](#) | [E-MAIL](#) | [PRINT](#) | [BOOKMARK](#) [VIEW PDF](#)

- Instill 1 drop in the affected eye(s) once daily in the evening.
- **Storage:** See [Concomitant Use](#) page. 4 drops daily since it has been shown that more frequent administration of prostaglandin analogs may decrease the IOP-lowering effect.
- **Reduction of IOP** starts approximately 2 hours after the first administration with maximum effect reached after 12 hours.
- **May be used concomitantly** with other topical ophthalmic drug products to lower IOP. If more than 1 topical ophthalmic drug is being used, the drugs should be administered at least 5 minutes apart.

VYZULTA (latanoprostene bunod (0.024%) ophthalmic solution)

Prostaglandin Analogs
Indications/Usage:
Indicated for the reduction of intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension.

Typical Dosing:
► **Elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension, recommended:**

- Instill 1 drop in the conjunctival sac of the affected eye(s) once daily in the evening.
- Do not administer more than once daily since it has been shown that more frequent administration of prostaglandin analogs may lessen the IOP-lowering effect.
- If used **concomitantly** with other topical ophthalmic drug products to lower IOP, administer each drug product at least 5 minutes apart.

How Supplied:

- 2.5 mL bottles
- 5 mL bottles

ZIOPTAN (tafluprost (0.0015%) ophthalmic solution)

Prostaglandin Analogs
Indications/Usage:
Indicated for reducing elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension.

Typical Dosing:
► **Elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension, recommended:**

- Instill 1 drop in the conjunctival sac of the affected eye(s) once daily in the evening.
- The dose should not exceed once daily since it has been shown that more frequent administration of prostaglandin analogs may lessen the IOP-lowering effect.
- **Reduction of the IOP** starts approximately 2 – 4 hours after the first administration with the maximum effect reached after 12 hours.
- **May be used concomitantly** with other topical ophthalmic drug products to lower IOP. If more than 1 topical ophthalmic product is being used, each one should be administered at least 5 minutes apart.
- The solution from 1 individual unit is to be used immediately after opening for administration to one or both eyes. Since sterility cannot be maintained after the individual unit is opened, the remaining contents should be discarded immediately after administration.

How Supplied:

- 0.3 mL in 10 single-use containers per pouch

Preservatives:
None listed in package insert.

Cost:

Open-Angle Glaucoma.
Typical Dosing:
► **Elevated intraocular pressure (IOP) in patients with ocular hypertension or open-angle glaucoma.**

- Instill 1 drop in the affected eye(s) 3 times daily.
- **May be used concomitantly** with other topical ophthalmic drug products to lower IOP. If more than 1 topical ophthalmic drug is being used, the drugs should be administered at least 5 minutes apart.

How Supplied:

- 10 mL bottles

Preservatives:
benzalkonium chloride

XALATAN (latanoprost (0.005%) ophthalmic solution)

Prostaglandin Analogs
Indications/Usage:
Indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension.

Typical Dosing:
► **Elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension, recommended:**

- Instill 1 drop in the affected eye(s) 1 time daily in the evening. If 1 dose is missed, treatment should continue with the next dose as normal.
- The dosage should not exceed once daily; the combined use of 2 or more prostaglandins, or prostaglandin analogs including XALATAN is not recommended. It has been shown that administration of these prostaglandin drug products more than once daily may decrease the IOP-lowering effect or cause paradoxical elevations in IOP.
- **Reduction of the IOP starts** approximately 3 – 4 hours after administration and the maximum effect is reached after 8 – 12 hours.
- **May be used concomitantly** with other topical ophthalmic drug products to lower IOP. If more than 1 topical ophthalmic drug is being used, the drugs should be administered at least 5 minutes apart.
- **Contact lenses should be removed** prior to the administration of XALATAN, and may be reinserted 15 minutes after administration.

How Supplied:

- 2.5 mL bottles

Preservatives:
benzalkonium chloride

Storage:

- Protect from light.
- Store unopened bottle(s) under refrigeration at 36° – 46°F (2° – 8°C).
- During shipment to the patient, the bottle may be maintained at temperatures up to 104°F (40°C) for a period not exceeding 8 days.
- Once a bottle is opened for use, it may be stored at room temperature up to 77°F (25°C) for 6 weeks.

Cost: [Compare Prices](#)

Assistance: [Payment Assistance](#)

[Show More](#)

- If the clinical response is not adequate, the dosage may be changed to 1 drop of 0.5% solution in the affected eye(s) administered three times daily.
- Since in some patients the pressure-lowering response to Preservative-free TIMOPTIC in OCUDOSE may require a few weeks to stabilize, evaluation should include a determination of IOP after approximately 4 weeks of treatment with Preservative-free TIMOPTIC in OCUDOSE.
- If the IOP is maintained at satisfactory levels, the dosage schedule may be changed to 1 drop once a day in the affected eye(s).
- Because of diurnal variations in IOP, satisfactory response to the once-a-day dose is best determined by measuring the IOP at different times of the day.

XELPROS (latanoprost (0.005%) ophthalmic emulsion)

Prostaglandin Analogs
Indications/Usage:
Indicated for the reduction of elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension.

Typical Dosing:
► **Elevated intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension, recommended:**

- Instill 1 drop in the affected eye(s) once daily in the evening.
- If 1 dose is missed, treatment should continue with the next dose as normal.
- The dosage should not exceed once daily; the combined use of 2 or more prostaglandins, or prostaglandin analogs including XELPROS is not recommended. It has been shown that administration of these prostaglandin drug products more than once daily may decrease the IOP-lowering effect or cause paradoxical elevations in IOP.
- **Reduction of the IOP starts** approximately 3 – 4 hours after administration and the maximum effect is reached after 8 – 12 hours.
- **May be used concomitantly** with other topical ophthalmic drug products to lower IOP. If more than 1 topical ophthalmic drug is being used, the drugs should be administered at least 5 minutes apart.
- **Contact lenses should be removed** prior to the administration of XELPROS, and may be reinserted 15 minutes after administration.

How Supplied:

- 2.5 mL bottles

Preservatives:
potassium sorbate

Storage:

- Protect from light.
- Store at 36° – 77°F (2°C – 25°C).
- During shipment to the patient, the bottle may be maintained at temperatures up to 104°F (40°C) for a period not exceeding 8 days.
- After opening, XELPROS can be used until the expiration date stamped on bottle and then discarded.

Cost: [Compare Prices](#)

Assistance: [Payment Assistance](#)

[Show More](#)

Assistance: [Payment Assistance](#)

[Show More](#)

Ocular Surface VS. Optic Nerve **Testing**

- What do you **do** when you see a patient with Glaucomatous Optic Neuropathy???
- What do you **do** when you see a patient on Plaquenil?
- How do you **track** the effectiveness of your therapy?
- How do you know there's been a **change** without a **baseline**?
- Do you tell refractive surgery patients that it may **worsen** their OSD?

Ocular Surface VS. Optic Nerve Testing



ELSEVIER

Contents lists available at [ScienceDirect](#)

The Ocular Surface

journal homepage: www.theocularsurface.com

Original Research

Exploring topical anti-glaucoma medication effects on the ocular surface in the context of the current understanding of dry eye

Aaron B.C. Wong, Michael T.M. Wang, Kevin Liu, Zak J. Prime, Helen V. Danesh-Meyer, Jennifer P. Craig*

Department of Ophthalmology, New Zealand National Eye Centre, The University of Auckland, New Zealand

Ocular Surface and Medical Glaucoma Tx

- Of note, **decreased tear film stability** and **elevated tear osmolarity**, both global indices of dry eye disease, were observed in eyes treated with topical anti-glaucoma medications.
- This was associated with **increased levels of bulbar conjunctival hyperemia** and **eyelid margin changes**.
- These findings suggest that **inflammatory mechanisms** may play a role in the propensity of dry eye development in patients receiving long term topical anti-glaucoma medications.

Baseline DED/OSD Testing

- Osmolarity
- Inflammation
- Staining
 - Fluorescein,
 - Lissamine green
- Tear Prism
- Tear Production
 - Schirmer
- TBUT
- Symptom Surveys
 - SPEED
 - DEQ-5
- Meibography & Gland Analysis/Expression
- Lid Anatomy, Skin Conditions, Demodex

BAK and Neurotrophic Keratitis



July 2018
Volume 59, Issue 9
< ISSUE >

OPEN ACCESS

ARVO Annual Meeting Abstract | July 2018

Thirty-minute ocular application of benzalkonium chloride (BAK) leads to a disappearance of neuronal spikes associated with a marked fragmentation of tight junctions and corneal nerves in rodents: implications for dry eye disease.

[Evguenia Ivakhnitskaia](#); [Kamila Mizerska](#); [Valentina Dallacasagrande](#); [Victor H Gualquil](#); [Mark Rosenblatt](#); [Harumitsu Hirata](#)

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science July 2018, Vol.59, 3284. doi:

BAK and Neurotrophic Keratitis

DEWS II Definition: *“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.”*

Conclusions : Our results revealed that short exposure to ophthalmic solutions with low BAK concentrations used in routine eye examinations has profound consequences on corneal nerve and epithelial integrity; hence, caution is warranted with such uses. The long-term consequences of this short exposure on corneal nerves and tight junctions is currently under investigation. Overall, these studies may lead to a better understanding of the pathogenesis of dry eye disease.

This is an abstract that was submitted for the 2018 ARVO Annual Meeting, held in Honolulu, Hawaii, April 29 - May 3, 2018.

BAK and Neurotrophic Keratitis



Leading clinical and laboratory
ophthalmology and vision research



[Invest Ophthalmol Vis Sci](#). 2012 Apr; 53(4): 1792–1802.

PMCID: PMC3995561

Published online 2012 Apr 18. doi: [10.1167/iovs.11-8775](https://doi.org/10.1167/iovs.11-8775)

PMID: [22410563](https://pubmed.ncbi.nlm.nih.gov/22410563/)

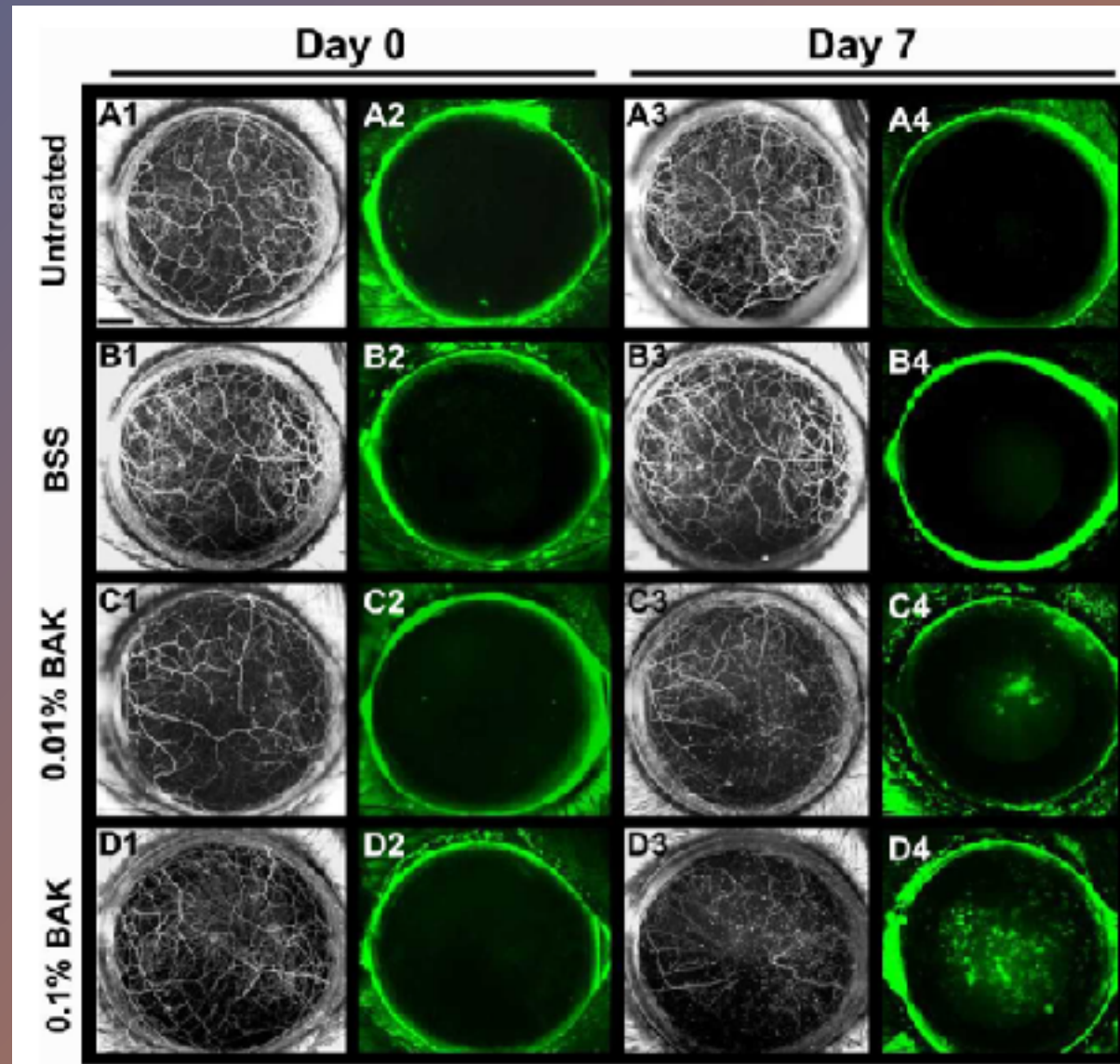
Corneal Neurotoxicity Due to Topical Benzalkonium Chloride

[Joy Sarkar](#), [Shweta Chaudhary](#), [Abed Namavari](#), [Okan Ozturk](#), [Jin-Hong Chang](#), [Lisette Yco](#), [Snehal Sonawane](#),
[Vishakha Khanolkar](#), [Joelle Hallak](#), and [Sandeep Jain](#)

Conclusion.

Topical application of BAK to the eye causes corneal neurotoxicity, inflammation, and reduced aqueous tear production.

BAK and Neurotrophic Keratitis



OSD Treatment in the setting of Glaucoma

Influence of Treating Ocular Surface Disease on Intraocular Pressure in Glaucoma Patients Intolerant to Their Topical Treatments: A Report of 10 Cases

Pierre Dubrulle, MD,† Antoine Labbé, MD, PhD,*†‡§
Emmanuelle Brasnu, MD, PhD,* Hong Liang, MD, PhD,*†‡
Pascale Hamard, MD, PhD,* Lyes Meziani, MD,*
and Christophe Baudouin, MD, PhD*†‡§*

DED Treatment in the setting of Glaucoma

- Case Series (10) patients **referred for filtering glaucoma surgery.**
- The main **treatments** were
 - **change** of topical anti-glaucoma medications to **preservative-free equivalents**
 - **removal of allergenic treatments** or those identified as causing side effects
 - **switch** to another therapeutic class with the same efficacy but **with a better safety profile**
- **Treatment of OSD** especially MGD.

DED Treatment in the setting of Glaucoma

- After a minimum follow-up of 6 months, we observed **improved ocular surface in all patients**, associated with an **intraocular pressure (IOP) decrease** or stabilization even if some anti-glaucoma **medications were removed**.
- The **mean IOP significantly decreased** from $23.75 \pm 9.98 \text{ mmHg}$ to $15.15 \pm 4.75 \text{ mmHg}$ (-36.2% ; $P=0.0001$).
- The mean number of IOP-lowering medications was 3.7 ± 1.06 at presentation and 2.8 ± 0.63 **after treatment** ($P=0.01$).
- The **Oxford staining score also decreased** from a mean 1.7 ± 0.67 to 0.4 ± 0.51 (-76.5% ; $P<0.001$).

DED Treatment in the setting of Glaucoma

- For 2 patients, IOP was not sufficiently reduced after treatment and they finally underwent filtering surgery.
- **You need surgery? PROVE IT!**
- **Who wants to do surgery on a sick ocular surface?**

▼ How do I get my prescription to Eagle Pharmacy?

- There are two ways to have your prescription sent to Eagle Pharmacy:

CHOOSE HOW TO GET YOUR PRESCRIPTION TO EAGLE PHARMACY

Doctor's Office Sends the Rx

The fastest and best way to get your prescription to Eagle Pharmacy is to ask your eye doctor's office staff to call, fax, or ePrescribe your prescription directly to Eagle Pharmacy, just like they do with other pharmacies.

Your doctor's office may need the contact information for Eagle Pharmacy so be sure to provide them the information below.



Call Eagle Pharmacy at 844-813-3864
Mon to Fri 9AM – 7PM EST



Fax Eagle Pharmacy at
855-618-4610



ePrescribe to
Eagle Pharmacy, Lakeland FL 33810
NPI: 1487905840
NCPDP: 5711975

You Send the Rx

If your eye doctor gave you a paper prescription, you can mail the original paper prescription directly to Eagle Pharmacy along with your completed enrollment form.



Mail to
Akorn EyeRx Direct
c/o Eagle Pharmacy
PO Box 90937
Lakeland, FL 33804



[Click here](#) to
download
an enrollment form



DED Treatment in the setting of Glaucoma

Decrease Inflammation

- Decrease **BAK** (other preservatives) Load
- Anti-Inflammatory Medications
 - Lifitegrast
 - Cyclosporine
 - NSAIDS
 - Acuvail is **PF**
 - Steroids
 - Nanoparticles

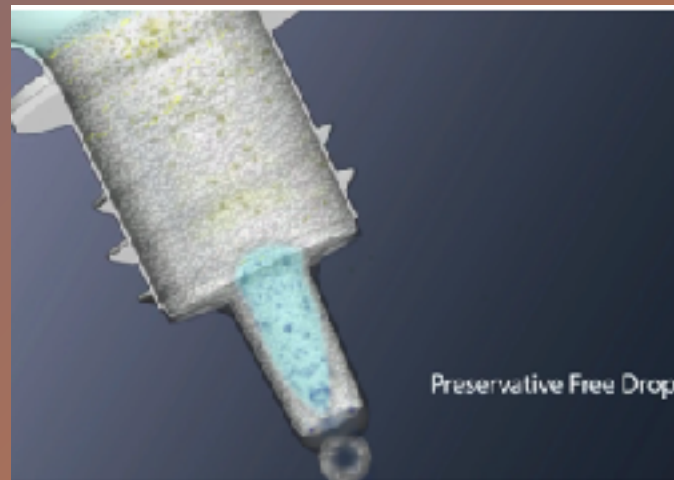
DED Treatment in the setting of Glaucoma

Decrease Inflammation

- Decrease **BAK** (other preservatives) Load



- ~10 μL vs. 40 μL
- Eliminate **BAK** (other preservatives) Load
- TearClear



DED Treatment in the setting of Glaucoma

Decrease Inflammation

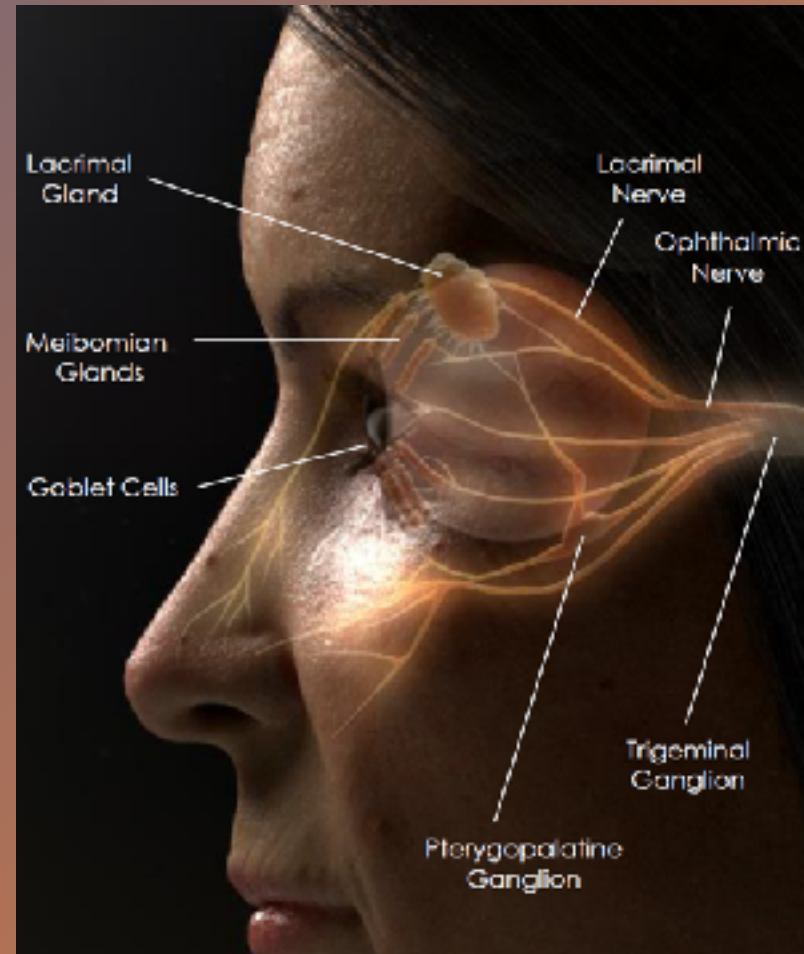
- Tear Stimulation
 - ~~TrueTear~~ (discontinued June 2020), iTear100
- “**Fill**” the **Swamp?** (Plugs)
- Treat the Lids
 - Lipiflow, ILux, TearCare
 - Lid Hygiene
 - IPL
- Don't forget about
 - Contact Lens Care & Solutions
 - Allergic Conjunctivitis



DED Treatment in the setting of Glaucoma

Decrease Inflammation

- Tear Stimulation
 - OC-01 Nasal Spray



Intense Pulse Light (IPL) and Inflammation

- Proposed MoA
 - Lowers cytokine levels (IL-17A, IL-6, TNF- α)

> [Sci Rep](#). 2019 May 21;9(1):7648. doi: 10.1038/s41598-019-44000-0.

Meibum Expressibility Improvement as a Therapeutic Target of Intense Pulsed Light Treatment in A Meibomian Gland Dysfunction and Its Association C with Tear Inflammatory Cytokines

M Moonjung Choi ¹, Soo Jung Han ², Yong Woo Ji ^{2 3}, Young Joon Choi ^{2 4}, Ikhyun Jun ², Mutlaq Hamad Alotaibi ^{2 5}, Byung Yi Ko ¹, Eung Kweon Kim ^{2 6}, Tae-Im Kim ², Sang Min Nam ⁷, Kyoung Ru Yul Seo ⁸
³, Xiaoming Yan ⁴

DED Treatment in the setting of Glaucoma


Decrease Inflammation

- Medication Vacation (AKA Ocular Surface Quarantine)
 - Oral CAIs as a transitional therapy

DED Treatment in the setting of Glaucoma

What about **Punctal Plugs**?

Effect of a punctal plug on ocular surface disease in patients using topical prostaglandin analogues: a randomized controlled trial

Justin C Sherwin MPhil FRANZCO,^{1,2,3}  Gokulan Ratnarajan MD FRCOphth,⁴ Babar Elahi FRCOphth,⁵ Anna Bilkiewicz-Pawelec MD¹ and John F Salmon MD FRCOphth¹

¹Oxford Eye Hospital, John Radcliffe Hospital, Oxford, ⁴The Queen Victoria Hospital, East Grinstead, ⁵Dudley Hospital NHS Trust, Dudley, UK; and ²Ophthalmology, University of Melbourne Department of Surgery, and ³Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital, Melbourne, Australia

DED Treatment in the setting of Glaucoma

What about **Punctal Plugs**?

- Conclusions and Relevance: Punctal plug insertion improves **subjective and objective measures of OSD** and results in a **reduced IOP** in patients with symptomatic ocular surface disease using prostaglandin analogue monotherapy.
- TBUT **increased**
- Oxford Staining Score **decreased**
- Tear Osmolarity **decreased**

DED Treatment in the setting of Glaucoma

What about **Surgery**?

- SLT and MIGS
 - Should SLT be the **first option** for POAG with concomitant OSD???
- At Cataract Extraction
 - PHACO Study
- Filtering procedures (Trabs and Tubes)
 - What is the first/most important intra-operative indicator of success

Should we LiGHT them up?

- SLT first line in Europe
- Delay topical treatments x 3 years

ARTICLES | [VOLUME 393, ISSUE 10180, P1505-1516, APRIL 13, 2019](#)

Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT): a multicentre randomised controlled trial

[Gus Gazzard, FRCOphth](#)   • [Evgenia Konstantakopoulou, PhD](#) • [Prof David Garway-Heath, MD](#) •

[Anurag Garg, FRCOphth](#) • [Victoria Vickerstaff, MSc](#) • [Rachael Hunter, MSc](#) • et al. [Show all authors](#) • [Show footnotes](#)

[Open Access](#) • Published: March 09, 2019 • DOI: [https://doi.org/10.1016/S0140-6736\(18\)32213-X](https://doi.org/10.1016/S0140-6736(18)32213-X) •

What about MIGS?

Options?

- TM bypass
 - iStent original vs iStent Inject
 - Hydrus
- Trabeculotomy
 - Trabectome
 - Kahook dual blade
 - OMNI (viscodilation + trabeculotomy)


OSD Treatment in the setting of Glaucoma

Ophthalmol Ther (2020) 9:941–953
<https://doi.org/10.1007/s40123-020-00290-6>



ORIGINAL RESEARCH

Prospective Interventional Cohort Study of Ocular Surface Disease Changes in Eyes After Trabecular Micro-Bypass Stent(s) Implantation (iStent or iStent *inject*) with Phacoemulsification

Justin A. Schweitzer  · Whitney H. Hauser · Mitch Itach ·
Brandon Baartman · Subba R. Gollamudi · Andrew W. Crothers ·
John E. Linn · John P. Berdahl

Received: July 5, 2020 / Published online: August 13, 2020
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OSD Treatment in the setting of Glaucoma

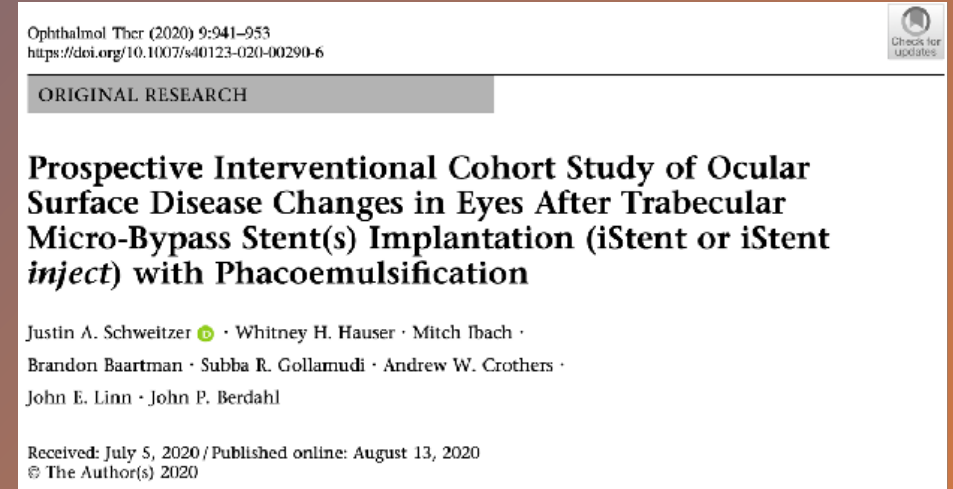


Table 2 Preoperative and month 3 ocular surface parameters, intraocular pressure, and number of medications eyes undergoing istent + phacoemulsification ($n = 45$)^a

	Conjunctival hyperemia (Efron Scale)	Corneal/conjunctival staining (Oxford Schema)	FTBUT (no. seconds)	Ocular Surface Disease Index (OSDI)	Intraocular pressure (mmHg)	Number of medications
Preoperative	1.4 ± 0.7	1.4 ± 1.0	4.4 ± 2.4	39.8 ± 21.9	17.5 ± 4.2	1.5 ± 0.9
Month 3	1.2 ± 0.6	0.4 ± 0.5	6.5 ± 2.5	16.4 ± 14.8	14.5 ± 3.3	0.6 ± 0.8
<i>p</i> value vs. preoperatively (paired t-test)	0.128	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.0001
% Change vs. preoperatively	14% reduction	71% reduction	48% increase (improvement)	56% reduction	17% reduction	60% reduction

^a Analysis does not include two eyes receiving iStent *inject*

OSD Treatment in the setting of Glaucoma



Implantation of trabecular micro- bypass stent(s) (iStent or iStent inject) with cataract surgery produced significant improvements in ocular surface health, alongside significant reductions in IOP and medications.

10 mcg Bimatoprost Implant (Durysta™)

- Intracameral injection
- Biodegradable implant
- Last 4-6 months
- Consistent IOP lowering effects without the topical side effects of preservatives



2 Weeks

9 Months

12 Months

10 mcg Bimatoprost Implant (Durysta™)

- 30% IOP ↓ over 12 weeks
- 80% of patients on no additional drops over 9 month study
- Long term--40% had 30% reduction at 1 year, 28% at 2 years.

Medeiros FA, et al Ophthalmology June 2020



2 Weeks

9 Months

12 Months

Other Devices for Drug Delivery?

- Plugs
 - Dextensa derivative?
- Subconjunctival?
- Fornix?
 - Lacrisert

THANK YOU!

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