inSight

February 2019

A PUBLICATION OF THE KENTUCKY LIONS EYE CENTER AT THE UNIVERSITY OF LOUISVILLE

EDITOR: CYNTNIA BROCK, MARKETING & COMMUNICATIONS SPECIALIST

Not all Artificial Tears are Created Equal

Dry eye disease (DED) affects 5% to 33% of the adult population worldwide and is estimated to cost the US healthcare system $3.84 billion annually. Although evidence suggests the etiology of DED is likely multifactorial, most clinicians subscribe to using artificial tears as a first-line defense to manage ocular symptoms. However, not all artificial tears are created equal. The physician should be aware of the active ingredients as well as the proposed mechanism(s) of action for an array of artificial tears in order to maximize symptomatic relief in patients with DED.

The primary active ingredients in artificial tears fall into two categories: *demulcents* – lubricate the ocular surface via a mucoprotective film-like layer, and *emollients* – fats or oils that enhance thickness of the lipid layer to prevent evaporation of the underlying aqueous layer of the tear film. Individual brands of artificial tears are then further differentiated based upon their ingredients that include buffers, electrolytes, additives, and preservatives.

Common ophthalmic demulcents include: cellulose derivatives, dextran 70, gelatin, liquid polyols, polyvinyl alcohol, and povidone. Celluose derivatives such as carboxymethylcellulose (CMC) and hydroxypropyl methylcellulose (HPMC) are the most commonly used ophthalmic demulcents as they have mucoadhesive properties that increase the viscosity of the tear film allowing for prolonged symptomatic relief. However, cellulose-based products (Refresh Tears, Allergan; GenTeal Tears, Alcon; TheraTears, Akorn) may cause transient blur due to their mechanism of action and should be administered at night as well as reserved for those patients with severe DED. Polyol based artificial tears (Systane, Alcon; Blink, Johnson & Johnson Vision; Soothe, Bausch + Lomb; Refresh Optive, Allergan) containing propylene glycol, glycerin, and polyethylene glycol also increase tear film viscosity by forming a mucoprotective barrier.

Ophthalmic emollients contain lipid droplets designed to enhance and stabilize the lipid layer of the tear film to prevent evaporative DED. Patients with meibomian gland dysfunction (MGD) will benefit most from the use of emollient-based artificial tears (Systane Balance & Systane Complete, Alcon; Refresh Optive Advanced, Allergan; Refresh Optive Mega-3; Sooth XP, Ocusoft; Retaine MGD, Ocusoft). Patients should be instructed to shake emollient-based artificial tears to ensure uniform concentration and distribution across the ocular surface.

Artificial tears are available in single or multidose unit vials. Keep in mind that most multidose artificial tears contain at least one antimicrobial substance, the most common being the preservative benzylkonium chloride (BAK). BAK and other preservatives can be cytotoxic to the conjunctival and corneal epithelium, delay wound healing, and damage corneal nerves if their concentration exceeds 0.005%. Patients using artificial tears more than four times a day, taking glaucoma drops containing preservatives, or post-operative patients should use non-preserved artificial tears to decrease potential cytotoxicity to the ocular surface.

Thus, when selecting an artificial tear for your patient, keep in mind the type of DED (aqueous *vs* lipid *vs* mucosal), concurrent topical ophthalmic medications (preserved *vs* non-preserved), ease of instillation, and cost – the primary reason patients discontinue treatment. Simply changing the brand of artificial tears can make a world of difference to those patients with symptomatic DED.

By Abelani at English Wikipedia - Transferred from en. wikipedia to Commons., Public Domain, https://commons.wikimedia.org/w/index.php?curid=3906179

By Patrick A. Scott, O.D., Ph.D.

To schedule an appointment at the Kentucky Lions Eye Center, please call 502-588-0588.

UL Physicians
EYE SPECIALISTS

Kentucky Lions Eye Center
301 East Muhammed Ali Blvd.
Louisville, KY 40202-1594

Non-Profit Org.
U.S. Postage
Paid
Louisville, KY
Permit No. 769

Office Locations:

Kentucky Lions Eye Center
University of Louisville
301 E. Muhammad Ali Blvd.
Louisville, KY 40202
Referring Physician Line
(502) 588-0588

The Springs Medical Center
6400 Dutchmans Parkway, Suite 310
Louisville, KY 40205
Referring Physician Line
(502) 588-0588

Old Brownsboro Crossing
Medical Plaza II
(Pediatric Only)
9880 Angies Way, Suite 330
Louisville, KY 40241
Referring Physician Line
(502) 588-0588

Meet the Doctors

HOSSIEN ASGHARI, *MD*

Cornea & Refractive Surgery

CHRISTOPHER COMPTON, *MD*

Oculofacial Plastic & Orbital Surgery

THONG PHAM, *MD*

Neuro-Ophthalmology

DOUGLAS SIGFERD, *MD*

Retina & Vitreous

CHARLES BARR, *MD*

Retina & Vitreous

HENRY KAPLAN, *MD, FACS*

Retina, Vitreous and Uveitis

APARNA RAMASUBRAMANIAN, *MD*

Pediatrics / Ocular Oncology

ANDREA SMITH, *OD*

Low Vision / Optometry

RAHUL BHOLA, *MD*

Pediatric Ophthamology & Adult Strabismus

JUDITH MOHAY, *MD*

Glaucoma/Cataract

HARPAL SANDHU, *MD*

Retina & Vitreous

JOERN SOLTAU, *MD*

Glaucoma/Cataract

JEREMY CLARK, *MD*

Oculofacial Plastic & Orbital Surgery

WILLIAM NUNERY, *MD, FACS*

Oculofacial Plastic & Orbital Surgery

PATRICK SCOTT, *OD, PhD*

Optometry

HARRY STEPHENSON, *MD*

Comprehensive Ophthalmology