

Punctal Plugs/Ophthalmic Insert Can Alleviate Dry Eye

Physicians give an overview of how they analyze, diagnose, and treat various dry eye sufferers to resolve symptoms and reduce an inflammatory response.

BY WILLIAM B. TRATTLER, MD; PENNY ASBELL, MD; AND JONATHAN STEIN, MD

The Odyssey Parasol Punctal Plug

By William B. Trattler, MD



As the US population ages, an increasing number of patients are presenting for cataract surgery. Although the chief complaint of these individuals is usually decreased vision, many also have dry eye disease and/or disease of the lid margin. Although it is easy to focus on the most pressing problem affecting the patient (his cataract), failing to diagnose and treat the eye for dryness or lid margin disease prior to surgery can compromise visual outcomes and increase complaints. The preoperative diagnosis of dry eye disease is even more important in patients who are considering either accommodating or multifocal IOLs, because the performance of these lenses relies on a healthy tear film and minimal residual astigmatism.

ANALYSIS

The first step toward improving surgical outcomes in both traditional and refractive cataract surgery is analyzing the ocular surface and lid margin. I begin by looking at the level of the tear lake to get a rough estimate of the quantity of tears present. I then place fluorescein dye and evaluate the health of the tear film via the tear breakup time. Two minutes after placing the dye, I examine the level of staining of the cornea and conjunctiva. Finally, I assess the lid margin

by looking for debris on the eyelashes as well as lid margin erythema. I also attempt to express some meibomian gland secretions to determine whether the glands are clogged or open, and I evaluate the secretions to see if they are free flowing (which is desirable) or thick and minimally expressible (which is problematic).

TREATMENT

After evaluating my surgical patients for dry eye and lid margin disease, I initiate a treatment regimen based on my findings. For patients with a pure dry eye condition, I have found that prescribing topical cyclosporine along with a 1-week pulse of a topical steroid is usually effective. In cases in which I am planning to perform limbal-relaxing incisions, which will sever corneal nerves and potentially further exacerbate postoperative dry eye, I place punctal plugs in addition to starting topical anti-inflammatory drops. My goal is to increase the level of the tear film by occluding its outflow and by using the topical anti-inflammatory drops to counteract any trapping of inflammatory mediators present in the tear film.

There are numerous options for punctal plugs. I do not use the temporary collagen type, because I do not believe they are very effective at completely blocking the flow of tears through the canalicular system. Moreover, it is unlikely that a therapeutic trial of temporary plugs will be predictive of whether or not permanent plugs will be helpful. In regard to the extended duration of intracanalicular plugs, my concern is that I can-

not determine whether these plugs are present or have dissolved or migrated. I prefer external silicone punctal plugs, which completely occlude the punctum and are visible upon examination. Numerous companies make external silicone plugs.

During the past 5 years, I have had a great deal of success with the Odyssey Parasol Punctal plug (Odyssey Medical, Inc., Memphis, TN). One of the main differentiating features of these plugs is that they are exceptionally easy to place. They have an umbrella-like head that squeezes down as it passes through the punctum but then springs open once it is in place. This mechanism secures the plug in the punctum and reduces the inserter's chance of losing track of it. These plugs come in four sizes (extra small, small, medium, and large). I find that 65% of the plugs I place are small, 30% are medium, and only 5% are large. I am currently not using the extra small size.

One of the most important therapeutic treatments to improve patients' tolerance of punctal plugs is the initiation of a topical steroid (prednisolone acetate 1% works best in my experience) q.i.d. for the first 5 days after the placement of the plugs. The topical steroid reduces any initial ocular surface irritation from the plug. This strategy has dramatically reduced the number of patients who call me with complaints of irritation during the first few days after receiving punctal plugs. If a patient still calls, I advise him to continue the topical steroids and, if needed, preservative-free artificial tears for a few extra days. Typically, by day 5 to 7, any irritation caused by the plug has resolved.

In severe cases of aqueous deficiency, such as patients with Sjögren's syndrome, I have found that adding punctal plugs to the upper ducts can be helpful. Alternatively, I have recently used Lacrisert (Aton Pharma Inc., Lawrenceville, NJ) q.h.s. in some severely dry eyes with relatively good success, although educating patients on the proper placement of the Lacrisert is critical to their compliance.

Many of my surgical patients also suffer from lid margin disease. In my experience, warm compresses can help improve the meibomian gland lipids, but compliance is often a major issue. At the Aspen Cornea Society Meeting 2009, Jeffrey Gilbard, PhD, presented details on a new product to help improve compliance with warm compresses with an iHeat Eye Mask (Advanced Vision Research, Woburn, MA).¹ The underlying cause of lid margin disease is typically lipases that are released from bacteria, which metabolize the lipids into a thicker form. These thicker lipids are not able to coat the tear film effectively, and tear film instability ensues. These thicker lipids can also be proinflammatory. Recently,

pilot studies by Jodi Luchs and Thomas John have suggested that topical azithromycin (Azasite; Inspire Pharmaceuticals, Inc., Durham, NC) may be an effective treatment for blepharitis.^{2,3} Other therapeutic options for lid margin disease include topical anti-inflammatory drops (steroids and cyclosporine), antibacterial lids scrubs, and/or oral antibiotics (tetracyclines, azithromycin).

CONCLUSION

Evaluating the health of the ocular surface prior to cataract surgery is an important step in providing the best postoperative outcomes, especially when performing limbal relaxing incisions or when using presbyopia-correcting IOLs. For patients with significant preoperative findings, it is important first to differentiate whether the condition is due to an insufficient tear film or lid margin disease. For a compromised tear film, topical anti-inflammatory agents as well as punctal plugs are effective. For lid-margin disease, warm compresses, topical antibiotics, anti-inflammatory medications, and lid scrubs are effective. Overall, identifying these conditions prior to surgery will improve patients' visual results and overall satisfaction.

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1. Gilbard J. Blepharitis and dry eye: separate, related and treatable. Paper presented at: The Aspen Corneal Society Twenty-Ninth Annual Meeting. February 16, 2009; Snowmass-at-Aspen, CO.
2. Luchs J. Efficacy of topical azithromycin ophthalmic solution 1% in the treatment of posterior blepharitis. *Adv Ther.* 2008;25(9):858-870.
3. John T, Shah AA. Use of azithromycin ophthalmic solution in the treatment of chronic mixed anterior blepharitis. *Ann Ophthalmol.* 2008;40(2):68-74.

The Lacrisert Ophthalmic Insert

By Penny Asbell, MD



Lacrisert (Aton Pharma Inc., Lawrenceville, NJ) is a sterile, preservative-free, once-daily, sustained-release prescription ophthalmic insert that helps to retain moisture, stabilize the tear film, and lubricate the eye. The insert, which is approved by the FDA for use in patients with moderate-to-severe dry eye, contains 5 mg of hydroxypropyl cellulose. It is self-administered into the inferior cul de sac of the eye, where it slowly dissolves over the course of a day and acts to thicken the pre-

THERAPEUTICS FOCUS ON DRY EYE

corneal tear film. A plastic applicator supplied with the product helps the patient to administer the medication.

Lacrisert was approved by the FDA and introduced more than 20 years ago. Because awareness of dry eye was lower and practitioners were less aggressive about treating it, the medication was not widely used and was in scarce supply until 2006, when Aton Pharma acquired the rights to distribute it and expanded its availability. Younger physicians therefore may be unfamiliar with the insert and its uses with dry eye. Clinical studies have demonstrated the insert's ability to improve dry eye symptoms, to increase tear film breakup time, and to decrease rose bengal staining.¹⁻⁶

PATIENTS WHO MAY BENEFIT FROM LACRISERT

Dry eye syndrome's negative impact on quality of life and daily activities such as reading, computer use, work, driving, and viewing television has been documented.⁷ I prescribe Lacrisert for symptomatic relief to patients who show signs of moderate-to-severe dry eye, including those with filamentary keratitis or those who use artificial tears frequently (six or more times daily), especially if there is no evidence of inflammation. In general, these are patients with Dry Eye Workshop severity levels 2 through 4.⁸ Because Lacrisert has no interactions with other ocular medications, it can be used by patients who administer other dry eye products. Since Lacriserts is a lubricant, relief is immediate, but it can be combined with anti-inflammatory agents if greater treatment is required.

I recommend the nighttime use of Lacrisert for patients who find that ointments cause blurring and "gooeyness" in the morning, which can be a problem for contact lens wearers. In fact, the insert is generally helpful for some patients with contact lens intolerance. Some contact lens wearers improve their comfort by placing Lacriserts before sleep. Others first put in their contact lenses and a drop of a nonviscous artificial tear and then Lacrisert. This method is particularly helpful for patients who must use rigid lenses for good vision, such as for keratoconus or a postoperative graft.

Special patient groups that benefit from Lacrisert include those with conditions that cause chronic or extreme dry eye like Sjögren's syndrome, lid-function abnormalities that cause exposure of the cornea such as lagophthalmos or Graves' disease, those with neurotrophic keratitis who do not get relief from other treatment modalities, and patients who have undergone surgical procedures along their lid margin or certain types of cosmetic surgery. Patients with severe cases of dry eye may benefit by placing the Lacrisert at night to reduce morning discomfort from dry eye. Also,

individuals with computer vision syndrome (reduced blinking) can benefit, as can glaucoma patients who have dry eye due to preservatives in their medications. The insert may also be helpful for patients with epithelial defects or ocular surface irregularities that interfere with ocular wetness.

PATIENTS WHO MAY NOT BENEFIT

I would not use the insert in patients who show no ocular surface staining and have only mildly dry eyes, because Lacrisert does not usually benefit this group. Likewise, it will not help patients whose eyes produce almost no tears. In patients with the most severe cases of dry eye, Lacrisert will not dissolve properly, although using it with artificial tears may help.

USE OF BEFORE OR AFTER LASIK

The insert should not be used immediately after LASIK, when the patient should not manipulate his eye due to the risk of displacing the flap. To help manage transient dry eye that may result from LASIK, Lacrisert can be used once the corneal flap has healed (typically 3 to 4 weeks after surgery). The insert helps reform the ocular surface postoperatively, as its high viscosity covers and protects the epithelium during the healing process. It can also be used for a month before surgery to improve the condition of the cornea. PRK patients may benefit as well.

LENGTH OF USE

Several studies have shown the insert to be a safe therapy for patients with moderate-to-severe dry eye syndrome.¹⁻⁶ A recent unpublished chart review study of Lacrisert patients showed their median length of therapy to be more than 5 years, with nearly 65% using the inserts for more than 2 years. Long-term use is simple because patients can use the insert concurrently with other dry eye medications or ocular prescriptions for glaucoma, which should be administered before Lacrisert's insertion.

CLINICAL EXPERIENCE

Patients must be trained to use Lacrisert. In my experience even older patients get the hang of it, many of whom find it easier than using artificial tears several times a day. The learning curve is comparable to initial contact lens instruction, and once proficient, patients can insert Lacrisert very quickly. The technician who teaches the patient how to insert the device should follow up to check on progress after a couple of days and should also plan a follow-up appointment within a month.

THERAPEUTICS FOCUS ON DRY EYE

My patients who have been trained properly in the use of Lacrisert are very pleased. Many have reduced their use of artificial tears from six or more times daily to twice daily. My examination of the signs of dry eye in Lacrisert patients has shown improvements in corneal permeability, tear-film breakup time, and staining. Patients report relief of dry eye symptoms and improvement in their quality of life.

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1. Hovding G, Aasved H. Slow-release artificial tears (SRAT) in dry eye disease: Report of a preliminary clinical trial. *Acta Ophthalmol.* 1981;59:842-846.
2. Breslin C, Katz J, Kaufman H, Katz I. Slow-release artificial tears. In: Leopold IH, Burns RP, eds. *Symposium on Ocular Therapy.* New York: John Wiley & Sons; 1977:77-83.
3. Katz J, Kaufman H, Breslin C, Katz I. Slow-release artificial tears and the treatment of keratitis sicca. *Ophthalmology.* 1978;85:787-793.
4. Lamberts D, Langston D, Chu W. A clinical study of slow-releasing artificial tears. *Ophthalmology.* 1978;85:794-800.
5. Werblin T, Rheinstrom S, Kaufman H. The use of slow-release artificial tears in the long-term management of keratitis sicca. *Ophthalmology.* 1981;88(1):78-81.
6. Hill J. Slow-release artificial tear inserts in the treatment of dry eyes in patients with rheumatoid arthritis. *Br J Ophthalmol.* 1989;73:151-154.
7. Miljanovic B, Dana R, Sullivan DA, Schaumberg DA. Impact of dry eye syndrome on vision-related quality of life. *Am J Ophthalmol.* 2007;143(3):409-415.
8. Definition and Classification of the Subcommittee of International Dry Eye Workshop. The definition and classification of dry eye disease: report of the Definition and Classification Subcommittee of the International Dry Eye WorkShop (2007). *Ocul Surf.* 2007;5(2):75-92.

Form Fit Soft Plug Collagen Intracanalicular Plugs

By Jonathan Stein, MD



The tear film is one of the most important refractive surfaces in the human optical system. Any change in its integrity—even in otherwise healthy eyes—can drastically affect visual quality. Because cataract and refractive surgery can disrupt the tear film, I take special care to optimize every patient's ocular surface before bringing him to the OR. This article describes my testing protocol and explains why I use punctal plugs to treat dry eye.

WHO SHOULD BE SCREENED?

I evaluate all of the patients in my practice for dry eye disease, especially if they also have macular degeneration, diabetic retinopathy, glaucoma, or another chronic condition that reduces their contrast sensitivity and visual

acuity. Any dysfunction in the tear film can further degrade these patients' already compromised vision.

Maintaining a healthy tear film is also important for patients who plan to undergo lens- or cornea-based refractive surgery. Many of the diagnostic devices used to calculate the strength of IOLs or identify corneal aberrations can produce inaccurate results if the patient has an unstable tear film. Postoperatively, the optimization of the tear film is mandatory in order to achieve the best possible results. Even patients who have an apparently normal tear film preoperatively can benefit from treatment for dry eye, because incisions made during ocular surgery can lead to corneal denervation and induce dryness of the ocular surface.

DIAGNOSING DRY EYE

I initially screen patients for dry eye by taking a detailed medical history. I ask them if they are experiencing fluctuations in their vision, foreign body sensation, burning, and tearing. If the patient answers yes to one or more of these questions, I perform a dry eye workup.

I use several different methods to evaluate patients for dry eye, including fluorescein staining, lissamine green staining of the cornea and conjunctiva, tear breakup time, and Schirmer testing. Once I determine the severity of the of the patient's dry eye disease, I formulate a treatment plan.

MANAGING DRY EYE

My standard treatment regimen for dry eye incorporates several steps. Artificial tears and bland ointments are a very important part of the treatment armamentarium, because they relieve patients' symptoms and protect the ocular surface from additional degradation. Patients who have blepharitis or meibomitis should always follow a protocol of lid hygiene. To control inflammation, I often prescribe steroidal and nonsteroidal anti-inflammatory eye drops, topical cyclosporine, and systemic doxycycline. Furthermore, I have found that patients can benefit from nutritional supplements such as TheraTears Nutrition (Advanced Vision Research, Woburn, MA). This product contains a combination of flaxseed and fish oils that reportedly reduces inflammation and thins the oils secreted by the meibomian glands.

PUNCTAL PLUGS

Some physicians hesitate to treat dry eye with punctal plugs until they have exhausted most of the other options in the treatment algorithm. I have a low threshold for using these devices in my practice, especially in patients who have already lost some vision due to another ocular condition. I implant punctal plugs in the majority of my patients who undergo refractive cataract surgery and laser vision correction. I insert these plugs prophylactically (approximately 2

weeks preoperatively) in patients who have preexisting symptoms of dry eye and therapeutically in those who experience blurriness and fluctuations in their vision postoperatively. I always attempt to optimize the tear film of patients who are dissatisfied with their postoperative vision before scheduling further surgical intervention.

Fortunately, I have access to a variety of products that allow me to cater to patients' individual needs that helps me to optimize their outcomes. The biggest obstacle I face is usually convincing patients that they can benefit from the placement of punctal plugs.

OVERCOMING RESISTANCE

I have found that patients tend to balk when I introduce the idea of placing a silicone prosthetic in their tear duct. Because they are often more receptive to temporary devices, I tend to start with absorbable plugs that dissolve over the course of 3 to 5 days (Form Fit Soft Plug collagen intracanalicular plugs; OASIS Medical, Inc. Glendora, CA) or 90 days (Form Fit Soft Plug extended duration plugs; OASIS Medical, Inc.).

I find that patients who are comfortable with collagen plugs usually accept silicone plugs. Depending on an individual's needs, I can implant standard (available in 0.4- to 0.8-mm sizes) or limited-flow (0.6- and 0.7-mm sizes) silicone plugs (both from OASIS Medical, Inc.). Unlike the standard silicone plug, the limited-flow version allows some tears to drain into the tear duct and thus presents a useful alternative for patients who may be apprehensive about undergoing punctal occlusion.

Finally, OASIS Medical, Inc., offers the Form Fit Hydrogel punctal plug, which is, in essence, a one-size-fits-all option. This plug is preloaded on a disposable inserter, varies in diameter with different states of hydration, and if necessary, can be flushed from the canaliculus.

CONCLUSION

Patients who have severe ocular disease or who are candidates for lens- and cornea-based refractive surgery can benefit from aggressive treatment for dry eye. A ready willingness to perform punctal occlusion may help patients improve the function and quality of their tear film more effectively and efficiently than medical therapy alone. ■

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