Ocular Surface Health in Contact Lens Wear

Apply Contact Lens Technology to Support Ocular Surface Health

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Preparing the ocular surface for contact lens wear—and choosing lenses designed to interact favorably with the tear film—helps keep patients feeling, seeing, and looking their best.

Patients come to contact lens wear with a multitude of refractive and lifestyle needs and with varying levels of tear film quality and ocular surface health. With age, hormonal and environmental changes, and even contact lens wear itself, conditions on the surface of the eye can shift. And even the most biocompatible contact lens can pose a challenge to the ocular surface, making it important to be watchful for even subtle indicators of ocular surface disturbance in contact lens wearers—current or prospective.¹

Conditions such as anterior or posterior blepharitis, affecting the external eyelids, lid margins, and eventually involving the conjunctiva and cornea, can introduce irritating bacterial byproducts into the tear film and/or limit the quality and quantity of tear film lipids, creating a less favorable environment for contact lens wear.²

Likewise, in dry eye conditions, whether of aqueous deficient, evaporative, or mixed etiology, the tear film may not be able to adequately lubricate the corneal surface, much less the surfaces of a contact lens.¹ The result for contact lens wearers can be discomfort and reduced quality of vision.¹

The inflammation and irritation of allergic conjunctivitis, if untreated, can be exacerbated by contact lens wear—particularly if lenses are inadequately cleaned or infrequently replaced.³ Furthermore, significant overlap may exist among patients with allergic conjunctivitis and dry eye.⁴ Other conjunctival abnormalities, including conjunctivochalasis and papillary conjunctivitis, can also be sources of friction and irritation that make comfortable contact lens wear a challenge.

If identified and addressed up-front, ocular surface conditions that may otherwise limit contact lens comfort and visual performance can be mitigated. And to support long-term ocular surface health in contact lens wear, careful attention to contact lens material, modality of wear, and care regimen can be extremely helpful. Here we will discuss patient management and contact lens selection in the context of common ocular surface conditions.

ALLERGIC CONJUNCTIVITIS AND CONTACT LENSES

Prior to the wide availability of daily disposable contact lenses, it was often necessary for ocular allergy sufferers to reduce or suspend contact lens wear during allergic exacerbations.³,⁵ As lenses were taken out at night and put back in the eye the next day, antigens adhered to the lens surface would build up and needlessly prolong the allergic reaction and its associated discomfort.⁵ Identifying patients with ocular allergy is, therefore, critical; this requires effective patient questioning, particularly since an individual’s peak allergy season may not coincide with her visit to the eye clinic.

Once identified, we can have an open discussion with allergic patients and prepare them to deal with allergy through lifestyle changes, pharmaceutical intervention (if warranted), and comfortable contact lenses developed to help them see well. Indeed, advances in ophthalmic anti-allergic medications, and in contact lens material technology, have made comfortable contact lens wear a possibility for many patients with ocular allergy.

Patients with perennial allergies may require yearround treatment, while those with seasonal allergies may only need to use drops to quell periodic flare-ups.

Very likely the best lens option for these patients is a daily disposable, as discarding the lens at the end of the day means discarding any adhered allergens or irritating deposits along with it.⁵ However, if a daily disposable option is not available in the patient’s prescription, another frequent-replacement lens can work, provided the patient understands the relationship between thorough lens cleaning, their allergy symptoms, and their enjoyment of lens wear.

In addition to allergens from the external environment, the lipids and proteins in patients’ own tears can adhere to contact lens surfaces and limit lens performance.⁶ So when daily disposable lenses aren’t an option for an allergic patient, I focus on pairing a wettable, deposit-resistant lens with an effective and compatible cleaning and disinfecting solution. I often direct these patients to use CLEAR CARE® Solution, a peroxide disinfecting system that works remarkably well in these instances.
A COMFORT-OPTIMIZED DAILY DISPOSABLE LENS

In a study that exposed allergic patients with or without contact lenses to grass pollen, researchers found that overall symptoms (discomfort, dryness, and itchiness) and signs (including bulbar hyperemia, corneal and conjunctival staining, and palpebral conjunctival redness) were significantly reduced with either of the two daily disposable lenses studied. However, the daily disposable lenses designed for enhanced comfort (DAILIES® AquaComfort Plus® contact lenses) significantly reduced the severity of burning and stinging symptoms, as well as the degree of limbal and palpebral conjunctival redness.²

DAILIES® AquaComfort Plus® contact lenses are designed to remain continually wettable throughout the day. The nelfilcon A material contains polyvinyl alcohol (PVA), a water-soluble wetting agent, in two forms: most of the PVA is bound within the lens matrix, while a small amount of unbound PVA is expressed from the lens with each blink.⁷ Also embedded in the lens matrix is polyethylene glycol, a demulcent that binds to PVA and helps extend its release.⁷ For comfort on insertion, the DAILIES® AquaComfort Plus® lenses packaging solution contains the demulcent hydroxypropyl methylcellulose (HPMC).⁷

As part of an overall plan to accommodate the patient with an allergic reaction on the ocular surface and, where possible, limit exposure to allergens, DAILIES® AquaComfort Plus® contact lenses, with their multi-tiered approach to wettability, are an excellent choice for patients who experience ocular allergy.

DRY EYE CONDITIONS

While we don’t yet have a complete understanding of the complex relationship between dry eye and contact lens wear, research in this area is expanding rapidly due to the prevalence of dry eye, its importance to patient quality of life, and the effect of dryness and discomfort symptoms on contact lens wearers’ satisfaction. Indeed, we know that at least half of the patients who discontinue contact lens wear do so because of discomfort.⁸

In practice, we must be vigilant for signs, probe for symptoms, and educate contact lens wearers about discomfort to make sure they understand that it is not a necessary part of contact lens wear. Ocular wellness should be part of the conversation. As the likelihood of experiencing ocular dryness increases with age, it is particularly important to help lens wearers enter presbyopia with tear film and ocular surface health adequate to take maximum advantage of multifocal contact lens optics.

IDENTIFYING PATIENTS

As with ocular allergies, dry eye must be identified in anyone who wears or wishes to wear contact lenses. To identify potential problems, we begin contact lens visits by asking about ocular comfort in an open ended but specific way.

I always ask patients to rank their comfort in contact lenses on a scale from zero to ten. How comfortable are they just after putting lenses on in the morning? Then, how comfortable are they about 5 to 10 minutes before they take their lenses out in the evening? It is not uncommon to find a significant disparity between these numbers. When we do, we must find the cause, treat any underlying condition, and/or change the contact lens regimen.

Routinely expressing the meibomian glands to assess the quality of the meibum and evert the eyelids of contact lens wearers to assess for signs of lid wiper epitheliopathy and any papillary response makes it possible to catch and address issues before they become significant or threaten to interrupt lens wear.

The anterior eyelid margin also cannot be overlooked. Anterior blepharitis, an inflammatory condition that is often associated with bacterial overgrowth, is characterized by redness, swelling, and scaling or crusting of the lids.² Anterior blepharitis must be addressed, and affected patients made to understand that long-term eyelid hygiene will be necessary to maintain their ocular health and comfort—whether they wear contact lenses or not.

TREATMENT

When I find ocular surface issues that are compromising comfortable contact lens wear, I take a stepwise approach to treatment not unlike the approach I take with non-wearers. This begins with environmental modification. Patients who work at computers, for example, can be instructed to position the screens lower; looking down slightly decreases the size of the palpebral aperture, reducing ocular surface exposure. Similarly, positioning fans, air conditioners, and heaters so that they don’t blow directly at the face can help patients to be more comfortable.

If meibomian gland dysfunction is contributing to change to dryness symptoms, we may temporarily suspend lens wear and begin treatment with a warm compress. In our practice, we offer a product that can be heated in the microwave and placed on the eyes for 10 to 15 minutes. In some cases, we may perform therapeutic gland expression in the office. I often recommend omega-3 fatty acid supplementation, which can help improve tear stability in patients with meibomian gland dysfunction.⁹,¹⁰

At this stage we also introduce artificial tears,
administered 10 minutes before the patient inserts and again immediately after removing contact lenses. In the case of a more significant aqueous deficient dry eye, we will treat with topical ophthalmic cyclosporine to help improve tear production.

In the case of an acute anterior blepharitis, eyelid hygiene is paramount. I will often clean the lid margins of affected patients and recommend commercial lid scrubs, instructing patients to use them nightly, and demonstrating their proper use. I may recommend warm compresses for these patients to soften lid debris. If anterior blepharitis is producing significant inflammation, cessation of lens wear and use of an antibiotic and/or steroid combination drop may be warranted.

**LENS SELECTION**

Whether patients are new to lens wear or are being re-fit to help address discomfort, assessment and preparation of the ocular surface are vital first steps in creating an optimal wearing experience.

A wettable lens surface is critical especially for patients with a compromised tear film. For the convenience they offer, and because of advances in lens technology, daily disposable lenses can be a great option. As noted earlier, DAILIES® AquaComfort Plus® contact lenses are built to offer enhanced comfort and continued wettability throughout the day.

Indeed, one study of normal contact lens wearers found that the tear film breakup time (measured noninvasively with a corneal topographer) was more stable on the surface of DAILIES® AquaComfort Plus® contact lenses than on other lenses tested—indeed, tear film stability with DAILIES® AquaComfort Plus® lenses was similar to that on eyes with no lenses at all (Figure 1).  

For patients whose prescriptions are not available in a daily disposable, or who for other reasons may prefer a frequent replacement lens, lens selection should again favor a highly wettable, deposit-resistant surface. Because silicone hydrogel contact lens materials offer maximum oxygen permeability, these are generally preferred for frequent replacement lenses. But because the silicone moieties within these lenses are inherently hydrophobic, manufacturers have devised a number of strategies—typically coatings, internal wetting agents, or wetting agents in the packaging solution—to help improve surface wettability.  

**WETTABILITY, DEPOSIT RESISTANCE**

AIR OPTIX® AQUA contact lenses are plasma-treated to create a continuous, hydrophilic surface that is bonded to the lens bulk, effectively sequestering the silicone away from the lens surface and maintaining wettability throughout the 1-month wear cycle. Silicone hydrogel lenses without a plasma or other continuous, permanently wettable surface can allow dry spots to form on areas where the tear film breaks up between blinks. These lipid deposits can reduce wettability and impair tear film stability, degrading contact lens performance. But in vitro studies quantifying polar and non-polar surface properties—similar to that on eyes with no lenses at all (Figure 1).  

**FIGURE 1 Pre-lens tear film breakup time measured noninvasively using a corneal topographer.**

*(Figure source: Reference 7.)*

![Pre-lens Non-invasive Break-up Time](image)

**FIGURE 2 Wettability measured by contact angle on AIR OPTIX® AQUA and comparator lenses.** (In vitro measurement of contact angles on unworn spherical lenses; significance at the 0.05 level; Alcon data on file, 2009.)

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lens wear begins with the healthiest possible ocular surface.

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REFERENCES

THIS IS WHY the smallest details make the biggest difference in patients’ comfort.

AIR OPTIX® AQUA contact lenses feature our unique permanent plasma treatment, creating a hydrophilic layer that leaves less than 1% surface silicon. Less exposed silicone helps to resist lipid deposits, which can impact comfort. Now your patients can experience consistent comfort.

Permanent Plasma Surface Technology

<1% silicon
Resists lipid deposits

Creates a hydrophilic layer of moisture

Ask your sales representative about AIR OPTIX® family of contact lenses or visit MYALCON.COM

PERFORMANCE DRIVEN BY SCIENCE™

*AIR OPTIX® AQUA (lotrafilcon B) and AIR OPTIX® AQUA Multifocal (lotrafilcon B) contact lenses: Dk/t = 138 @ -3.00D. AIR OPTIX® NIGHT & DAY® AQUA (lotrafilcon A) contact lenses: Dk/t = 175 @ -3.00D.

AIR OPTIX® for Astigmatism (lotrafilcon B) contact lenses: Dk/t = 108 @ -3.00D; 1.25 x 180.

Important information for AIR OPTIX® AQUA (lotrafilcon B), AIR OPTIX® AQUA Multifocal (lotrafilcon B) and AIR OPTIX® for Astigmatism (lotrafilcon B) contact lenses: For daily wear or extended wear up to 6 nights for near/far-sightedness, presbyopia and/or astigmatism. Risk of serious eye problems (e.g., corneal ulcer) is greater for extended wear. In rare cases, loss of vision may result. Side effects like discomfort, mild burning or stinging may occur.

Important information for AIR OPTIX® NIGHT & DAY® AQUA (lotrafilcon A) contact lenses: Indicated for vision correction for daily wear (worn only while awake) or extended wear (worn while awake and asleep) for up to 30 nights. Relevant Warnings: A corneal ulcer may develop rapidly and cause eye pain, redness or blurry vision as it progresses. If left untreated, a scar, and in rare cases loss of vision, may result. The risk of serious problems is greater for extended wear vs. daily wear and smoking increases this risk. A one-year post-market study found 0.18% (18 out of 10,000) of wearers developed a severe corneal infection, with 0.04% (4 out of 10,000) of wearers experiencing a permanent reduction in vision by two or more rows of letters on an eye chart. Relevant Precautions: Not everyone can wear for 30 nights. Approximately 80% of wearers can wear the lenses for extended wear. About two-thirds of wearers achieve the full 30 nights wear. Side Effects: In clinical trials, approximately 3-5% of wearers experience at least one episode of infective keratitis, a localized inflammation of the cornea which may be accompanied by mild to severe pain and may require the use of antibiotic eye drops for up to one week. Other less serious side effects included conjunctivitis, lid irritation or lens discomfort including dryness, mild burning or stinging. Contraindications: Contact lenses should not be worn if you have: eye infection or inflammation (redness and/or swelling), eye disease, injury or dryness that interferes with contact lens wear, systemic disease that may be affected by or impact lens wear, certain allergic conditions or using certain medications (e.g. some eye medications). Additional Information: Lenses should be replaced every month. If removed before then, lenses should be cleaned and disinfected before wearing again. Always follow the eye care professional’s recommended lens wear, care and replacement schedule. Consult package insert for complete information, available without charge by calling 800-241-5999 or go to myalcon.com.


See product instructions for complete wear, care, and safety information. © 2014 Novartis. 1/14 AOA140055JAD-A.