

SPECIAL ISSUE – SPONSORED BY BAUSCH + LOMB

# REVIEW<sup>®</sup> OF OPTOMETRY

June 15, 2019

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## Go Beyond the Expected

*How one innovative contact lens meets the visual needs  
of more patients than ever before.*



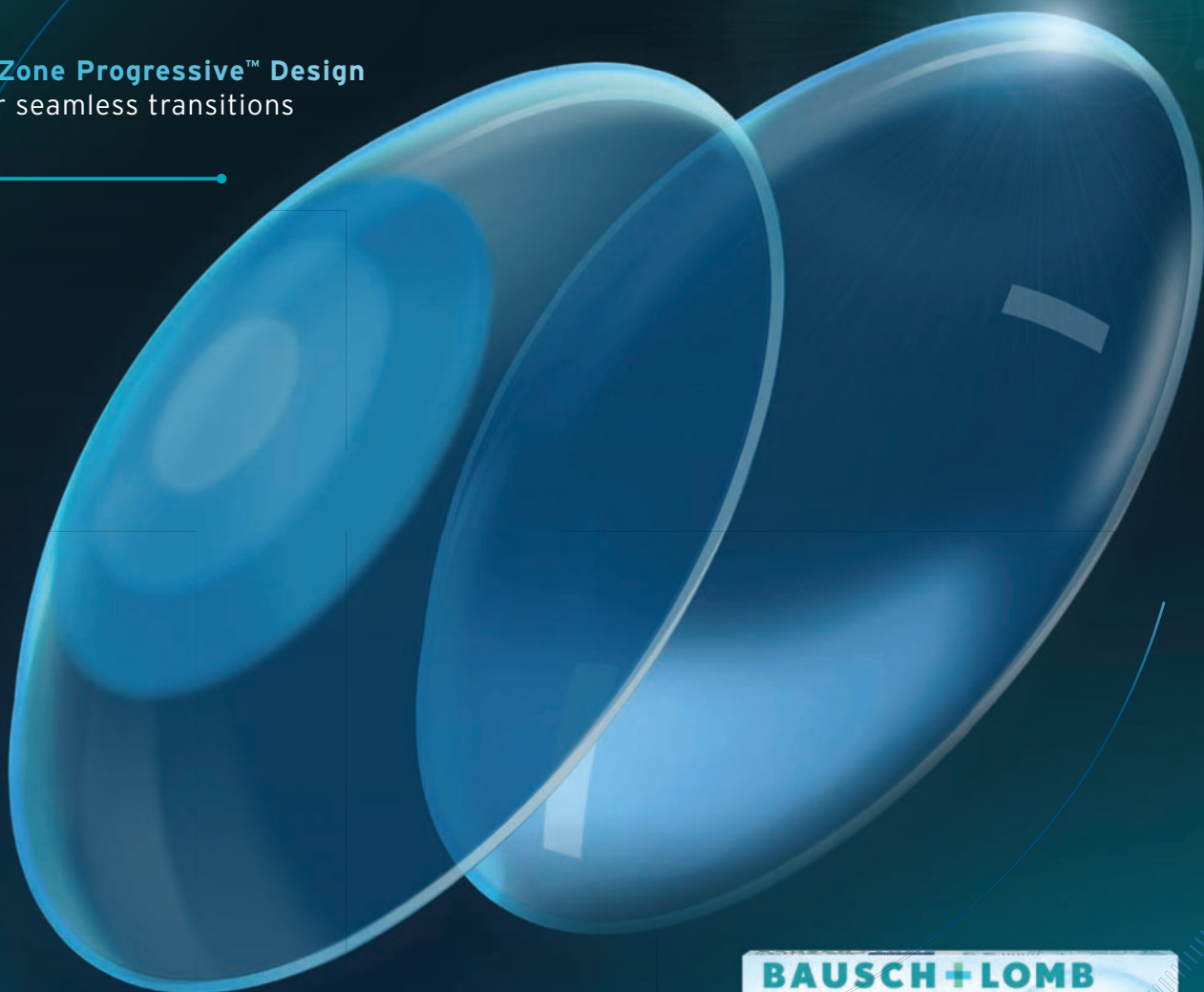
**INSIDE**  
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# Fighting Commoditization

Overcoming misperceptions about contact lens fitting is crucial for your patients and your practice. **By Paul M. Karpecki, OD, Chief Clinical Editor**

Presbyopia can be one of the most challenging, yet rewarding, conditions to manage. While it represents an unprecedented opportunity for our practices—one study found the global unmet need for presbyopia correction has reached 45%—it is also a time-consuming and sometimes frustrating problem to solve.<sup>1</sup> Patients who have never needed vision correction suddenly have to adapt to glasses or contact lenses, and those already in contact lenses have to switch to multifocals. For the millions with high astigmatism, that switch often leads to contact lens dropout.

Today's contact lens advances are hitting those challenges head on. Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lenses provide an opportunity to keep those presbyopic astigmats happy and successful in their contact lenses.

Telling this success story, and helping you be a part of it, is the focus of this special "13th edition" of *Review of Optometry*, sponsored by Bausch + Lomb and published in collaboration with the team responsible for this exciting lens. This partnership has resulted in an entire issue dedicated to the lens, including an in-depth look at presbyopic astigmat patient research, details of the lens's groundbreaking design and expert opinion from key opinion leaders who are already successfully fitting patients.

In today's climate of online contact lens sales, adding another tool to your armamentarium has never been more important.

## Then and Now

When I started practice, optometry was the only place a patient could go for contact lenses. They understood contact lenses were medical devices that required a trained doctor to ensure a proper and safe fit.

Unfortunately—for both patients and practitioners—that is no longer the case. Today's large national distribution companies insinuate that the optometrist is the 'middle man' existing solely to mark up a commodity—a plausible scenario to unknowing patients. But if patients knew the devastating sequelae of a contact lens-induced corneal ulcer, they would immediately understand how important it is to have properly fit contact lenses and the knowledge base to properly care for them.

## Customize and Thrive

Given the lengths to which online companies go to create the fallacy that contact lenses are a commodity, optometry must protect patients by sharing the truth through education and providing individualized products that better serve them.

While online retailers should be ashamed of their actions, they aren't the only guilty parties. They play into the public's desire for instant gratification. Fortunately, patients are also drawn to 'mass customization.' A good example is chain coffee shops, which serve millions of coffees per day, but each one can be customized to the customer's tastes.

For optometry, one key to combatting commoditization is focusing

on what is unique and customized for each individual. Each contact lens fit factors in the patient's ocular health, occupation, hobbies, lifestyle and visual needs.

The Bausch + Lomb ULTRA® Multifocal for Astigmatism lens may be the missing link for many patients heading into their presbyopic years. Unlike custom lenses that take weeks, these allow a same-day fit, addressing the patient's desire for instant gratification. Doctors now have the largest readily available fitting set, with the broadest parameters for patients with presbyopia and astigmatism with a range from +4.00D to -6.00D. Patients who come in wearing reading glasses over their contact lenses can walk out with one correction that meets all their needs.

The lens material is likewise carefully engineered to cater to this patient population. Research shows the Bausch + Lomb ULTRA® lens material maintains 95% of its moisture for up to 16 hours. The unique MoistureSeal® technology achieves something once thought impossible: a high Dk (114), high water content (46%) and a low modulus (70).

We can improve the experience for our patients, and innovative contact lens technologies are crucial. In the pages to follow, you'll get an insider's view of this lens and the techniques you can use to succeed with it. ■

*Note: Dr. Karpecki consults for Bausch + Lomb.*

1. Fricke TR, Tahhan N, Resnikoff S, et al. Global prevalence of presbyopia and vision impairment from uncorrected presbyopia. *Ophthalmology*. 2018;125(10):1492-99.



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PRESBYOPIC

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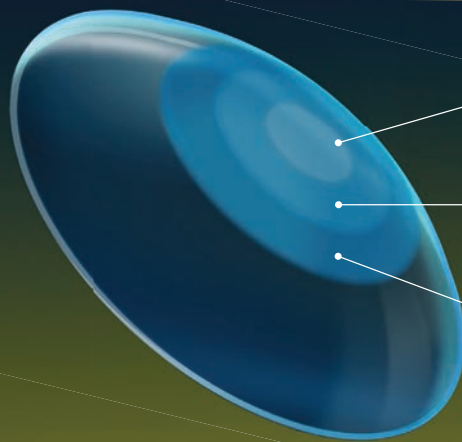
## Simplified Fit

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### NEAR

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using a mobile phone<sup>1</sup>

### INTERMEDIATE

91% of patients  
report clear vision  
when using a computer<sup>1</sup>

### DISTANCE

90% of patients  
report clear vision  
when driving at night<sup>1</sup>

\*First fit success for Bausch + Lomb ULTRA® for Presbyopia achieved when the ECP followed the fitting guide for the 3-Zone Progressive™ Design of PureVision®2 for Presbyopia lens. Thirty-nine ECPs (from 10 countries) refitted 441 existing soft contact lens wearing presbyopes into PureVision®2 for Presbyopia lenses. Patients returned for follow-up visits after 1-2 weeks. ECP assessment of lens performance including ease of fit, and patient satisfaction with lenses in real-world conditions, were measured using a 6-point agreement survey.

**REFERENCE: 1.** Results of an online survey with patients that wore Bausch + Lomb ULTRA® for Presbyopia lenses for approximately 5 days (n=395). Survey questions were top 3-box scores (% Strongly Agree, Agree, Slightly Agree) on a 6-point agreement scale.

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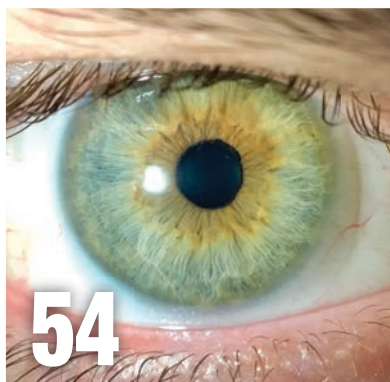
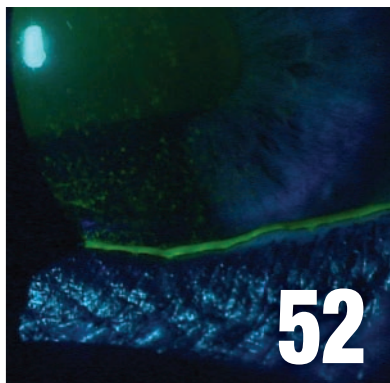
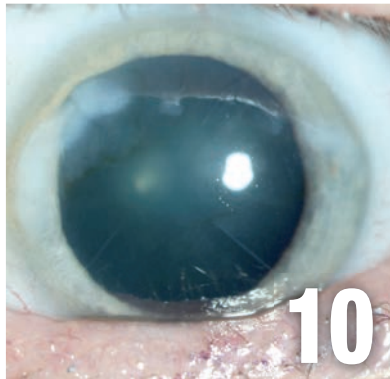
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## REVIEW<sup>®</sup> OF OPTOMETRY

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ASTIGMATIC

# SUCCESS

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# Toss Those Dusty CL Boxes

We aren't in the Stone Age any more, people. It's time to step up and give new designs a try. **By Montgomery Vickers, OD**

Ever wonder where the bright idea to shove something in your eye to see better came from? Let me tell you: eons ago, in a dank hollow formed by a flowing mountain stream, a lone biped placed a tiny clear stone on his dirty finger and gently nestled it against the front surface of his eye.

He was shocked and amazed that he could see more clearly than before. He could finally get a good look at that thing following him. Unfortunately, the dinosaur immediately ate him.

Still, the contact lens had been discovered!

Now, millennia later, the latest technologies in ocular scanning can provide precise measurements of the anatomic variants of a patient's eye, which qualified and experienced eye care professionals can use to design and produce today's modern contact lens. When carefully placed upon a patient's cornea, these babies can lead to world peace! Or at least make sure you can hunt for food without steamed-up glasses.

Such is the evolution of contact lenses! This is the face of progress.

## The Missing Link

In the '60s, PMMA hard contact lenses were all the rage. They were also the cause of maddening amounts of blinking, winking and staring as patients who were determined to see without glasses did their best to tolerate and adapt. As we have learned since, winking can only get you in trouble.

So, we needed a revolution. The first soft contact lenses were commercialized by Bausch + Lomb in 1971. I can remember my mentor, Dr. George Bodie, placing a soft contact lens on one of the patient's eyes and a hard lens on the other and innocently asking the patient, "Which would you prefer?" Genius.

Now, upwards of 90% of contact lens wearers are in soft lenses. And technology continues to make these lenses safer, more comfortable and more adaptable. More so now than ever, they can help with our very significant visual demands, often produced by our use of computers—including those little ones we carry around in our pockets the few times we aren't using them for important research on our favorite celebrities and shopping for stuff we don't really need but still want delivered to our doorstep by the weekend.

Inventing computers was probably the best eye care marketing plan in history. I am glad I did it. But I digress.

## Adapt or...

Our profession has come a long way with contact lenses. But now look at your office.

Are you providing the latest technologies in contact lens design? Or do you hide in the staff bathroom when the rep comes in to tell you how you can improve your patient's eye health and visual outcome with new materials and designs that were unheard of just a few short years ago?

When was the last time you refit a patient into a new contact lens technology? Be honest. It should have been yesterday, probably. But maybe you are too busy scrolling through your high school Facebook page looking for ugly pictures of your old flame to spend the time to replace that patient's tiny clear stone with something a little more comfortable. It might actually help them. You never know.

You are your patient's only true advocate here, so... advocate! ■



# Individualized Eye Care: The Benefits of Starting the Dialogue

From career to environmental concerns, each patient's needs are unique



**Kerry Giedd, OD, MS, FFAO**  
Optometric Physician/Clinical Researcher  
Eola Eyes, Orlando, FL

Every patient has different needs. No matter who walks into my office, I try to get a complete picture of each patient's circumstances and help him or her discover the best possible solution. My partner and I opened our boutique practice because we wanted to establish more personal relationships with our patients. After 15 years in business, we attribute our growth and success to this core value: we truly care about the patients we serve. My primary goal is to ensure that all of our patients are fully satisfied with their experience in wearing contact lenses.

I take on this responsibility with every single patient, every single day. I ask each patient, "What can I do to make your contact lens wearing experience better?" No matter how long I've seen my patients, I talk to them at each exam about innovative technology and options that could benefit their vision needs. It doesn't necessarily mean that we change their lenses each year, but we always have that conversation.

## Helping patients overcome inertia

I frequently see patients who are my peers—people in their late 30s and 40s. In most cases, they started wearing biweekly or monthly replacement lenses before daily disposable lenses were an option. Many factors impact their vision needs. Their eyes may have become drier due to hormonal changes, or due to a decrease in blink rate when looking at digital devices. And of course, there are the changes that come with presbyopia. Their circumstances have changed, but their lenses have not. Unfortunately, when people have done something the same way for more than 20 years, they tend to take the attitude that if it's not broken, why fix it?

When these patients try on Bausch + Lomb Biotrue® ONEday lenses, they realize what a difference the lenses can make. The high-definition optics offer patients crisp, clear vision throughout the day, and the dehydration barrier maintains 98% of the moisture in the lens for up to 16 hours. And it's not just the optics and the comfort that appeal to people. They enjoy the convenience that comes with less-frequent cleaning. They appreciate the fact that

every day they get that fresh, new lens experience. And many of my patients enjoy the ease of handling with the Biotrue® ONEday contact lenses.

## Patient priorities help shape provider recommendations

Daily disposable lenses can benefit patients in a wide variety of professions. I recently helped a 40-year-old woman who works with animals at a theme park here in Orlando. She comes into contact with dirt and the dander of animals on a daily basis, causing deposits to build up in her lenses. When she first came to see me, it was apparent that switching to Bausch + Lomb Biotrue® ONEday contact lenses would help. However, she was reluctant to try them because of environmental concerns. She didn't want to contribute to the waste that daily disposable lenses can produce.

“Once my patient learned about the ONE by ONE Recycling Program, she was eager to give Biotrue® ONEday contact lenses a try.”

I was happy to tell her about Bausch + Lomb's ONE by ONE Recycling Program. In collaboration with TerraCycle®, the program offers the opportunity to recycle blister packs, foils, and contact lenses themselves. The program is free to Bausch + Lomb contact lens wearers, and it requires minimal effort. All my patients have to do is collect their lenses and packaging, then ship them prepaid to TerraCycle® or simply drop them off at my office.

Once my patient learned about the ONE by ONE Recycling Program, she was eager to give Biotrue® ONEday contact lenses a try. She has been wearing daily disposable lenses (and recycling them) for more than a year now, and she couldn't be happier with the comfort they provide. ■

## Recycling helps the environment and builds patient loyalty

Bausch + Lomb and TerraCycle®, a world leader in the collection and repurposing of hard-to-recycle post-consumer waste, created the ONE by ONE Recycling Program, the first contact lens recycling program of its kind, to help reduce the environmental impact of used contact lenses and packaging.

Even regular plastic recycling is not effective with contact lenses. Because of their small size, lenses and blister packs get filtered out and end up in landfills.

As of March 2019, the ONE by ONE Recycling Program has recycled more than 9.2 million used contact lenses, blister packs, and top foils, and has diverted more than 55,200 pounds of this waste—roughly the weight of an adult whale shark—from oceans, lakes, streams and landfills.

You are in a unique position to make a difference. By becoming an official ONE by ONE recycling center, you can strengthen relationships with your patients by committing to an environmental movement they care about.

## Enhancing the patient experience benefits everyone

I firmly believe that offering innovative options is a win for patients and practices. A simple conversation only takes a few moments, and it can open patients up to possibilities they may not have considered. Any time I help patients meet their needs, I build loyalty and trust. When I recommend lenses from Bausch + Lomb's Biotrue® ONEday family, I can be confident that I'm helping my patients move toward a satisfying experience.

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RECYCLING PROGRAM





# A Bump in the Road

Salzmann's nodules can pose a challenge for contact lens fitting.

Edited by Paul C. Ajamian, OD

**Q** I have a patient with some odd corneal “scarring” that is affecting contact lens wear. I have had older patients with similar lesions that look like Salzmann's degeneration. Could this be the

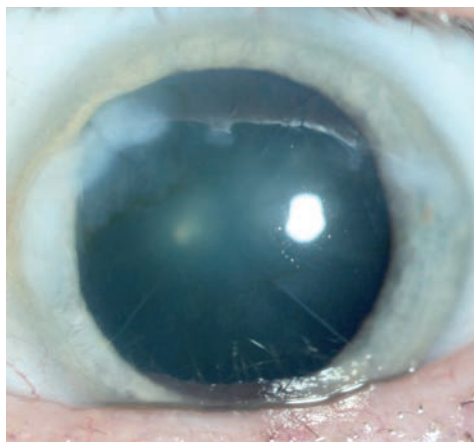
**A** same thing?

“Though many generally describe the problem as rare, I probably see one patient with it each month in clinic,” says Aaron Bronner, OD, of Pacific Cataract and Laser Institute in Kennewick, WA. Salzmann's nodules (SN) occasionally cause comfort and vision issues. They most frequently develop in middle-aged patients and have a nearly 10-fold predilection for women over men.

SN have classically been linked to active or prior bouts of chronic, low grade inflammation. “In practice, I'm seldom able to elicit anything more significant than pre-existing dry eye,” says Dr. Bronner. Atopic, allergic and infectious conditions have all been linked to the condition as well. “The strongest reported comorbidity seems to be meibomian gland dysfunction (MGD), which may be present in 50% of cases of Salzmann's—not much different from MGD incidence in this age group overall,” he adds.

## Learning Nodules

The nodules present as focal accumulations of irregular connective tissue and are almost always asymptomatic early in their course. These grey, white or even slightly blue lesions develop in the corneal mid-periphery and can affect



Iron lines can surround Salzmann's nodules, as seen peripherally at the top of the cornea.

both eyes. The nodules themselves are not vascularized, but corneal neovascularization occasionally leads from the limbus to the nodule. Over time, these lesions get progressively thicker and larger, which may lead to foreign body sensation or contact lens intolerance.

Symptoms associated with SN are almost entirely tied to the formation of focal elevations on the cornea, according to Dr. Bronner. “While there are curvature-associated changes with SN, the lesions at their root are a focal thickening of the cornea,” he says. This leads to elevation differences in the nodule relative to the surrounding corneal epithelium.

“It's easy to see how these areas dry out, as tears roll off of them and lead to areas of focal irritation,” explains Dr. Bronner.

In addition, “these elevations change the corneal curvature, which could result in a prominent flattening of the corneal curve in

the area of the nodule.” In order to observe and document these changes clearly, baseline corneal topography is imperative.

When these changes are small or peripheral, they won't impact the patient. However, as lesions increase in size, both regular and irregular astigmatism will develop. Because of changes to the basement membrane from SN and the propensity for problems with dryness, recurrent corneal erosions rarely develop over the nodule.

## What to Do

Treating SN involves either manual dissection and then removal of the nodule (superficial keratectomy) or excimer laser use. Mitomycin-C may be paired with either approach to reduce recurrent disease or sub-epithelial haze. “In both cases, the patient will be left with an epithelial defect that will need to be managed postoperatively,” Dr. Bronner says.

The timing of SN treatment depends on the presence of associated symptoms the disease causes. For mild nodules, lubricating measures should be the backbone of therapy. For those with symptoms starting to affect vision or contact lens wear, consider surgery. Scleral lenses may also be a viable alternative and could improve vision and comfort.

“Patients with visually significant SN who are considering cataract surgery should have their nodules removed prior to surgery, or they risk having the wrong lens implant power selected due to inaccurate K readings,” Dr. Bronner adds. ■





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# How Aging Accelerates Dry Eye

Be attentive to physiological changes that can impact contact lens success and overall ocular surface health. **By Bisant A. Labib, OD**

**D**ry eye disease (DED) is one of the most commonly encountered conditions in the ophthalmic practice.<sup>1</sup> It is estimated to affect 5% to 35% of the population, with its incidence growing with increasing age.<sup>1-4</sup> As the average life expectancy continues to rise, more and more patients will be affected by this disorder.

DED is a multifactorial disease characterized by inflammation of the tears and ocular surface, leading to symptoms of ocular discomfort and visual disturbances that degrade visual function and markedly affect overall quality of life. Several theories have been hypothesized to explain the underlying cause for the development of DED, and aging has been identified as one of the leading risk factors.<sup>1-3</sup>

The incidence of DED increases within the 4th to 8th decade of life and has been found to increase every five years after the age of 50.<sup>1</sup> The effect of aging and its impact on the ocular surface directly contributes to the development of DED through several mechanisms, including alterations to the ocular adnexa, proinflammatory state, medication use, menopause and oxidative stress.<sup>1,3</sup>

## Eyelids and Adnexa

In recent years, age-related changes to the lids and other structures adjacent to the ocular surface have been increasingly implicated in DED.

- **Lacrimal gland (LG).** This structure sits in the lacrimal fossa in the orbit and is responsible for

secreting the aqueous layer of the tear film, as well as growth factors and antimicrobial peptides that are vital to the ocular surface.<sup>5</sup> Animal and histological studies have identified several changes to the LG with increasing age.

In a young, healthy subject, the LG appears pink in color and smooth in consistency; later on in life, it takes on a tan, lobular appearance.<sup>3</sup> This change in the exterior of the LG is due to several histopathological mechanisms, such as gland atrophy, fibrosis, dilatation of interlobular ducts and both fatty and lymphocytic infiltration.<sup>1,3</sup>

This leads to reduced secretion of the aged LG, which contributes to DED and a compromised ocular surface. Secretory function is also reduced by the impairment of parasympathetic and sympathetic innervation of the LG with aging.<sup>3</sup>

- **Meibomian glands (MGs).** Another important structure affected by aging, and subsequently DED, are the MGs. These line the upper and lower eyelid and lie anteriorly to Marx's line, a physiologic line of staining with ophthalmic dyes.<sup>1</sup> In contrast to the LG, MGs secrete the meibum, or lipid, necessary for the outermost layer of the tear film to combat rapid tear evaporation.<sup>4</sup>

Aging MGs display decreased meibocyte differentiation and cell renewal, decreased size and increased inflammatory cell infiltra-

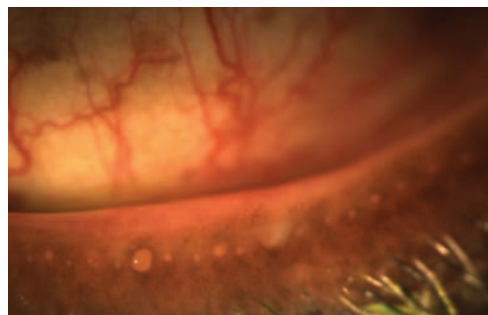


Photo: Dean Huynh Kwak, OD

**Age-related changes to the meibomian glands are a chief culprit in DED. Obstructions, as seen here, reduce both the quantity and quality of lipid secretion to the ocular surface.**

tion.<sup>4</sup> Meibomian gland atrophy reduces the amount of lipid on the ocular surface, leading to rapid tear evaporation and tear film instability. In addition to atrophy, meibum stasis secondary to obstruction and inflammation of the MGs creates an environment favorable to bacterial growth and development of chronic blepharitis. Skin conditions such as acne rosacea are more prevalent in elderly populations and directly impact gland function, primarily in the face, such as the MGs.<sup>4</sup>

- **Eyelid abnormalities.** Alterations to the normal lid architecture commonly occur with increasing age. These changes include lid laxity, floppy eyelid syndrome, retraction, entropion, ectropion and lagophthalmos.<sup>3,4</sup> Changes to eyelid positioning and lid-globe congruity may lead to increased corneal exposure and poor tear distribution and outflow, causing DED. Up to 70% of patients with eyelid malposition will develop DED.<sup>3,4</sup>

## Cornea and Conjunctiva

Of course, the ocular surface itself directly undergoes numerous changes that sustain and exacerbate the course of dry eye.

- **Goblet cells.** These highly specialized epithelial cells exist in the mucosal tissues of the body, including the conjunctival epithelium. Their function is to secrete the mucin or innermost layer of the tear film, responsible for lubrication and hydration of the ocular surface. Goblet cells also serve as the first line of defense, as mucins not only reduce the risk of desiccation, but also aid to deter pathogens from entering the eye.

Goblet cell loss is a common and well-studied cause of DED, as well as the reduction in goblet cell density with aging. Contact lens wearers also commonly exhibit large decreases in goblet cell numbers; the precise mechanisms for these findings are not yet understood.<sup>6</sup>

- **Conjunctivochalasis.** This is another common age-related condition characterized by redundancy and folds of the bulbar conjunctiva that is interposed between the eyelid and globe.<sup>1,3</sup> It is present in up to 98% of patients over 61 years of age.<sup>3</sup> The exact pathogenesis for conjunctivochalasis is unknown, but hypothesized to result from cumulative UV exposure causing elastic degeneration or inflammatory degeneration from delayed tear film clearance. This leads to DED through mechanical obstruction of the puncta, influencing normal tear spread and drainage.<sup>1,3,4</sup>

- **Corneal sensitivity.** Studies report a gradual, generalized reduction in corneal sensitivity with aging, predisposing older adults to DED. Peripheral sensitivity gradually decreases throughout life, in contrast to central corneal sensitivity, which remains consistent until age 60 and

then sharply declines.<sup>3,4</sup> In patients with DED, corneal nerves undergo a beadlike transformation that represents nerve damage, likely due to inflammatory dry eye mechanisms. There is conflicting evidence regarding corneal sensitivity and DED, i.e., whether it is caused by decreased or increased corneal nerve sensitivity. Corneal hypersensitivity would result in more symptomatic patients but hypoesthesia increases risk of exposure keratopathy.<sup>3</sup>

## Inflammation and Oxidative Stress

The concept of immunosenescence refers to the decline in immune system and function with age. This is characterized by chronic low-grade inflammation sometimes termed “inflammaging.”<sup>1</sup> This systemic inflammatory change is evident on the ocular surface as well, with the presence of increased osmolarity and levels of inflammatory cytokines in the tears of dry eye patients. Several inflammatory mediators, such as IL-6, IL-8 and TNF-alpha, are found in much higher quantities in dry eye patients, whose presence also recruits even more inflammatory markers to the ocular surface.<sup>3</sup>

Aging and inflammation coincide with levels of oxidative stress throughout the body. This is a result of reactive oxygen species and free radical formation generated through various normal metabolic processes that have not been neutralized by antioxidants. This activates regulatory pathways that alter the regenerative properties of cells and may deter the regeneration of corneal epithelial cells in DED.<sup>3</sup> Increased levels of inflammatory mediators in the blood are also associated with disease conditions such as Alzheimer’s, dementia, Parkinson’s and Type 2 diabetes, all of which are also common in an older adult population.<sup>1</sup>

## Hormonal Factors

Besides aging, the female sex is one of the most common risk factors for the development of DED, particularly in elderly women. This led to studies researching the role of hormones in DED. Women manifest with DED signs and symptoms more commonly in times where hormonal levels in the body are altered, such as pregnancy, lactation, oral contraceptive use and menopause.

The aforementioned affected glands of the eyelid—LG and MGs—contain receptors for androgen and estrogen.<sup>4</sup> Women normally have lower androgen levels than men, and a further decline in menopause or other hormonal changes may lead to androgen levels below the capacity needed for normal ocular health. Additionally, women have reduced estrogen levels with age, which inhibits proper regulation of ocular surface homeostasis. Both androgen and estrogen imbalance lead to reduced LG secretion and increase the risk of DED.<sup>5</sup>

Several other well-studied underlying causes of DED exist, such as autoimmune disease, environmental factors, increased computer use and topical and systemic medication side effects, to name a few. However, age and sex are the leading risk factors and are non-modifiable. Understanding the pathological mechanisms of normal aging and the development of DED can lead to potential drug therapies to target those areas. ■

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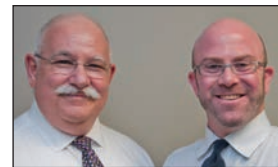
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# Low Cylinder, High Impact

Find a way to make this part of your prescribing process.

By **Marc B. Taub, OD, MS, and Paul Harris, OD**

**A**stigmatism has been a perennial topic of importance to this column. Here, we dive a little deeper and look specifically at the phenomenon of low-powered astigmatism. Clinicians sometimes disregard the significance of low cylinder when performing a refraction, but it is important for us to elicit any visually meaningful refractive error and address it in our Rx.

## Shifting Rules

We are all familiar with the terms “with-the-rule” (WTR) and “against-the-rule” (ATR). Traditionally, WTR has been the most often encountered astigmatism measured in the general population. These days, however, we encounter far more axis 90 cylinders, or ATR cases. So, has there been an actual change or are we just seeing more of a different subgroup of our population? The shift seems real, and it doesn't look like it's based on a sampling error. No one knows for sure what caused it or how it affects our practices and patients, but many people have weighed in about it over the years. We suspect the shift to ATR cylinders is most likely due to the large demand on the accommodative system in our computer age.

With low-powered (0.25, 0.50 and 0.75) WTR cylinders, we

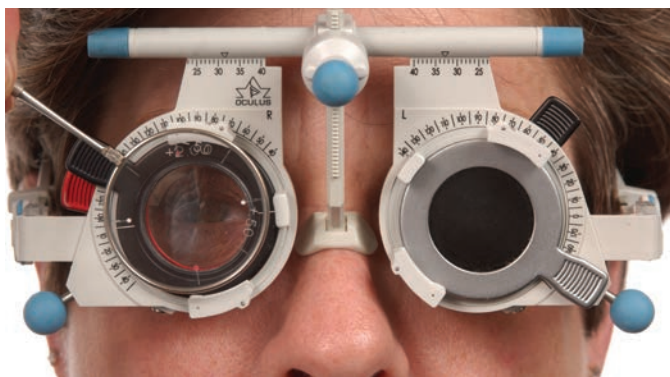


Photo: Mark E. Wilkinson, OD

**A Jackson cross cylinder is an important tool to help you identify the small cylinders you can correct with glasses or contact lenses.**

often see associated convergence insufficiency or other binocular instabilities, along with reduced overall base-in and base-out ranges, more so at near than at distance.

With low-powered (0.25, 0.50 and 0.75) ATR cylinders, we see accommodative insufficiency and infacility, as well as ill-sustained accommodation. With the same amount of cylinder, ATR cylinders decrease visual acuity much more than WTR cylinders. Many patients with WTR cylinders of -0.50 and -0.75 still have 20/20 unaided visual acuity, while patients with ATR cylinders of the same powers have 20/30 or even 20/40 visual acuity. The difference in the two major meridians is exactly the same in both cases: 0.75. When you think about it, there is no reason that there should be a difference between the two.

The most popular explanation is that ATR issues are secondary to accommodative disorders and that the underlying accommodative problem is causing a disruption in

a patient's ability to see detail clearly. We have yet to have a device to record accommodation in patients with -0.50 WTR and -0.50 ATR to look at what is happening to the stability, over time, of the accommodative mechanism, but this could help us better understand what is happening.

## Prescribing Cylinder

We, the front-line clinicians, know that we can elect to leave out small WTR prescriptions, typically with little-to-no impact on patient happiness and visual acuity. But, we must think long and hard about not correcting for ATR when we write our prescriptions.

When we find ATR cylinder, we should take the time to more precisely pin down the power and axis, as there is a higher probability that we will be including these parameters in our prescription—and that they will make more of a difference to our patients.

The quicker you complete the questioning process with your patients to determine which prescription offers them clearer vision, the happier they will be and the less chair time you will use.

We recommend incorporating the +/-0.50 Jackson cross cylinder (JCC) in your phoropters to make it easier for your patients to pick out differences in prescriptions and find what best suits them. Using the

higher power JCC and applying a five-question-maximum protocol will help you confidently identify the small cylinders you can correct with ophthalmic lenses or contact lenses. Incorporating cylinder correction and obtaining an accurate Rx are critically important in achieving great vision with contact lenses.

### Working With Asymmetric Astigmatism

Elliott B. Forrest, OD, has taught us how to approach cases of asymmetric astigmatism. When the power is greater in one eye than the other, this often means the work the person is doing is being asymmetrically placed during the day. The work is usually unequally distributed to the eye with the lower amount of cylinder.

For example, with -0.50 of cylinder in the right eye and -1.00 of cylinder in the left, it's safe to

### Clinical Guidelines for Assessing Low-powered Astigmatism

- Question small WTR cylinders, but be ready to prescribe ATR cylinders.
- Spend more time refining ATR cylinder, as you'll probably be prescribing it.
- Add JCC capabilities to your phoropter.
- Look at your patient's posture when axes deviate from 90 or 180.

assume that more work is being done at near asymmetrically to the right eye. If this is the case, helping the patient find a way to move to a more symmetrical posture can help even out this difference over time. If that's not possible, then you know you need to prescribe the differences as you measured them.

In the instances that the axes are not at 90 or 180, Dr. Forrest notes it is common to see head tilts depending on the work a person is doing during the day. For example,

with the axes tilted to 100 in both eyes, we might observe a patient's head leaning toward their right shoulder. With axes tilted to 170 in both eyes, by contrast, we would expect to see the patient's head leaning toward their left shoulder.

When the axes shift in a complementary way, meaning they still add up to 180, Dr. Forrest says you should expect to see the patient present with chin up or chin down postures. In the case of axis 100 in the right eye and 80 in the left, we expect to see the patient's chin tucked in toward their chest. When we see axis 170 in the right eye and 10 in the left, this is when we should expect to see the patient's chin raised.

Putting all of this together can help quickly and accurately identify those small-powered astigmatisms that need to become part of our treatments for better results moving forward. ■

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# Reframing Vision Correction for the Presbyopic Astigmats in Your Practice

Recent data and analyses provide new insights into the presbyopic astigmatic patient opportunity.

By Gina Wesley, OD, MS, FAAO, Jill Saxon, OD, FAAO, Beth Wilson and Miriam Konz

**P**resbyopic astigmats comprise a large and growing segment of the patients presenting at eye care practices. Over the coming decade, the presbyopic astigmatic population is expected to expand by about 10%—higher than the 8% growth anticipated for the total adult population.<sup>1</sup> Estimates suggest that about 32 million presbyopic astigmats are contact lens candidates in the US today.<sup>1,2</sup>

Presbyopic astigmats are by no means uncommon, and we know that all of these patients require vision correction in some form. But how well do we understand this group—their visual symptoms and demands, lifestyles, and motivations? Looking more closely at this patient population can generate valuable insights—ideas that can be implemented in practice to help presbyopic astigmats take advantage of the advanced vision correction options available to them.

## Visually Demanding Lifestyles

Not only do demographic shifts equate to more aging presbyopes,

many of whom have astigmatism, trends in employment and lifestyle mean that these patients are remaining in the workforce longer than their predecessors a generation ago.<sup>3</sup> Their visual demands—for both work and leisure activities—are also changing. Over the course of a given day, presbyopic astigmats find themselves actively shifting from one digital device or screen to another: between the smartphone and the laptop, the tablet and the televi-

sion, and so on. It is not uncommon for today's professionals to have multiple computer monitors at staggered distances—and still have to be able to read up close. Presbyopic astigmats who wear contact lenses report an average of 6.8 hours per day using digital devices, longer than other vision-corrected adults 40 years and older.<sup>1</sup>

The visual and ocular demands of extended screen time are known to affect people of all ages.<sup>4</sup> For

### Do you recognize this patient?

The data detailed in this article depict the profile of a presbyopic astigmat who may be:

- A lapsed contact lens wearer, or a glasses wearer who believes that contact lenses are not an option for them
- Engaged in a wide variety of visually demanding activities
- Spending substantial portions of each day using digital devices for work and leisure
- Struggling with symptoms of dry eyes, tired eyes, blurry vision and neck pain—especially when interacting with computers and other screens
- Expecting more from their vision correction as they age
- Engaged in physical activities
- Interested in physical appearance





**Table 1. Subject Disposition**

	All Participants	Contact Lens Wearers	Eyeglasses Only
<b>Gender</b>			
Male	45%	50%	44%
Female	55%	50%	56%
<b>Age</b>			
40 to 49	29%	46%	22%
50 to 59	29%	33%	29%
60+	42%	22%	49%

presbyopic astigmats, changes in accommodative ability, suboptimal correction of astigmatism, and tear film alterations may all contribute to digital eyestrain.<sup>4,6</sup> Now more than ever, presbyopic astigmats stand to benefit from vision correction options that support their visually demanding lifestyles—stably correcting their astigmatism and providing clarity at all distances.

### Changing Attitudes

Beyond workplace trends and increasing digital connectedness, cultural expectations and attitudes around aging are also changing. Several initiatives have called for a reframing of discussions about aging and the removal of terms such as “anti-aging” from prominent publications and retailers.<sup>7</sup> The picture that emerges is of increasing autonomy and activity as people age, and of an attitude toward appearance that is characterized by aging gracefully or “naturally.”<sup>7,8</sup> Many Baby Boomers and Gen-Xers who are presbyopic or becoming presbyopic are interested in staying active and prioritizing health and wellness as they age, which forms part of their motivation to find vision correction options that offer flexibility and support an active lifestyle.<sup>7,8</sup> This is the case for many Millennials as well, the oldest of whom will turn 40 in 2021.<sup>9</sup>

Still, research consistently indicates that both men and women

place high importance on maintaining a youthful appearance. A recent survey found that nearly half (49%) of women and a quarter (23%) of men said they felt “pressured to stay looking young.”<sup>7</sup> A large 2015 survey of Gen-Xers found that a majority (68%) valued looking younger, and nearly half of participants (49%) said they would avoid reading glasses if they knew they would make them look older.<sup>10</sup>

Indeed, for some, glasses are associated with aging and a self-perception of older appearance.<sup>8</sup> A survey of Baby Boomers in New Zealand also found that quality of life is a major consideration regarding glasses—and a driver of interest

in other options, including contact lenses, which can provide greater flexibility.<sup>8</sup>

Contact lenses give presbyopes—including those with astigmatism—the flexibility to change their appearance and engage in a wide variety of activities. The impact of a high-quality contact lens option for presbyopic astigmats can be large and far-reaching, helping them to work and play, remain active and live the kinds of lives they see for themselves as they age.

### Interest in and Perceptions of Contact Lens Wear

Presbyopic astigmats are motivated to wear contact lenses for reasons including desire to improve appearance, dislike of glasses, and the benefit of contact lenses for an active lifestyle, however, many presbyopic astigmats believe they are not candidates for contact lens wear.<sup>1</sup> Over half of presbyopic astigmats who wear eyeglasses believe that they have vision problems (astigmatism and the need for multifocal correction) preventing them from being

**Table 2. Habitual Spectacle Lenses**

Eyeglasses worn most often	Contact Lenses	Eyeglasses Only
Single-vision (sphere and/or cylinder correction)	41%	17%
Bifocals	27%	24%
Trifocals	6%	8%
Progressive lenses	18%	38%
Separate glasses for distance and reading	5%	6%
Reading glasses	4%	8%

**Table 3. Duration and Frequency of Wear**

Years wearing current correction	Contact Lenses	Eyeglasses Only
≥ 5 years	63%	57%
≥ 10 years	43%	37%
<b>Average days/week of wear</b>		
≥ 5 days/week	83%	95%
7 days /week	55%	90%
<b>Average hours/day of wear</b>	14.0 hours	13.4 hours

**Table 4. Habitual Contact Lenses**

Primarily wear	
Contact lenses only	38%
Both contact lenses and glasses equally	62%
Contact lens types worn most often	
Single-vision (sphere and/or cylinder correction)	56%
Monovision	22%
Modified monovision	2%
Bifocal or multifocal	21%
Wear schedule	
Daily wear	80%
Extended wear	20%
Replacement schedule	
≥ 6 months	8%
2 to 3 months	8%
Monthly	44%
Every 2 weeks	17%
Weekly	10%
Daily	14%

able to wear contact lenses.<sup>1</sup>

Not only do many presbyopic astigmats believe they are ineligible for contact lens wear, a substantial proportion are also contact lens dropouts. Presbyopic astigmats who wear eyeglasses are nearly twice as likely as other 40-and-older eyeglasses wearers to be former contact lens wearers. These patients attribute their discontinuation to changing vision needs, unsatisfactory correction and doctor recommendation.<sup>1</sup>

Interestingly, presbyopic astigmats are also more likely than other former contact lens wearers in this age group to drop out of contact lenses after long-term wear (≥20 years), and when they discontinued, 50% of presbyopic astigmats were wearing single-vision spherical contact lenses—an option that did not address their astigmatism.<sup>1</sup> Over half of presbyopic astigmats agree that as their vision has changed, contact lens options have not kept up with their needs. Further, among those who wear both glasses and contact lenses, that number rises to 70%, suggesting that these presbyopic astigmats have been driven to a greater reli-

ance on glasses as their visual needs changed.<sup>11</sup>

Whether they are dropouts or new to contact lens wear, presbyopic astigmats are primed for conversations with their ECPs about contact lenses. The availability of advanced contact lens technology, readily accessible for immediate fitting, supports a fruitful conversation that can lead to a contact lens trial. To optimally frame that conversation requires a nuanced understanding

of the presbyopic astigmat patient experience.

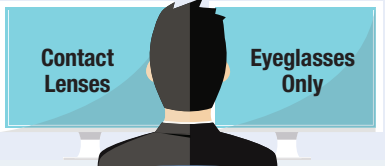
## Patients' Perspectives

To better understand the ocular, visual and physical symptoms of presbyopic astigmats, a group of subjects were recruited to assess the frequency and severity of their symptoms; the conditions under which they occur; and the steps taken to combat them. For inclusion in the study, participants were required to have been diagnosed with both presbyopia and astigmatism and to currently wear eyeglasses or contact lenses for vision correction. Subjects were excluded if they were under 40 years of age, if it had been more than two years since their last appointment with an ECP, or if they wore rigid gas permeable or hybrid contact lenses.<sup>11</sup>

## Demographics and Vision Correction Modalities

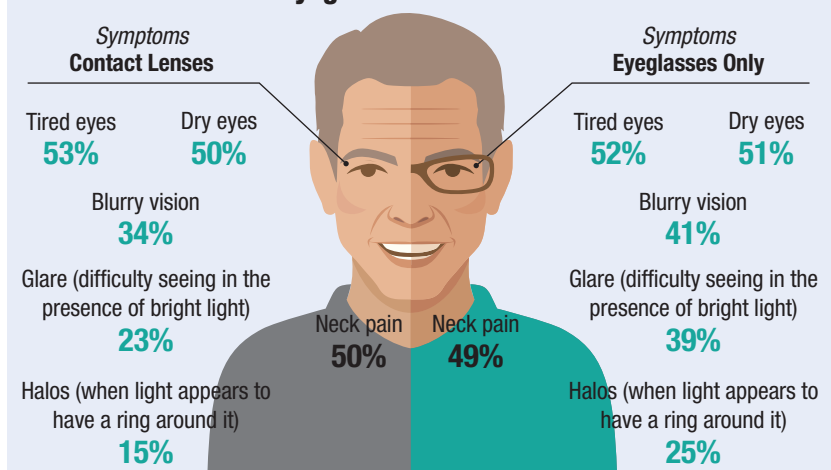
Five-hundred ninety-seven vision-corrected presbyopic astigmats participated in the survey. Subjects were aged 40 to 92 years and 55% were female (Table 1).<sup>11</sup> In total, 77% of the group wore spectacles only, and this proportion increased with

**Table 5. Time Spent on Visually Demanding Tasks**



	Contact Lenses	Eyeglasses Only
Use a desktop computer	3.6	3.3
Use a laptop computer	3.3	3.4
Watch TV	4.5	5.5
Drive at night	1.3	1.0
Drive during the day	2.1	1.9
Use a smartphone or tablet	2.8	2.6
Read books, magazines or newspapers	1.3	1.7
Play electronic games	1.1	1.2
Go to a venue with low light where I have to read, like a bar or a restaurant	0.9	0.5

**Figure 1. Symptoms Experienced by Wearers of Contact Lenses and Eyeglasses**



**Table 6. Frequency of Symptoms—Subjects who Reported Experiencing Symptoms Four or More Times per Week**

	Contact Lenses	Eyeglasses Only
Tired eyes	24%	28%
Dry eyes	26%	32%
Neck pain	30%	30%
Blurry vision	16%	23%
Glare (difficulty seeing in the presence of bright light)	14%	20%
Halos (when light appears to have a ring around it)	8%	13%

increasing age—comprising nearly all (91%) of those over 60, versus just 57% of those between 40 and 49 years. Most eyeglasses-only wearers were in progressive or bifocal spectacles, and most said they wore their glasses at least five days per week (Tables 2 and 3).<sup>11</sup>

Most contact lens wearers were in single-vision contact lenses, suggesting a reliance on reading glasses; a majority reported a monthly replacement schedule (Table 4).<sup>11</sup> For the approximately one in five patients who wore bifocal or multifocal contact lenses, it is reasonable to suppose that their astigmatism was not corrected. And for roughly the same proportion (22%) in monovision contact lenses, there may have been a sacrifice in stereopsis.<sup>11</sup> The contact lens modalities reported by these

subjects accentuate the opportunity to provide a contact lens option for presbyopic astigmats that maintains binocularity and offers both multifocal and toric correction.

About two-thirds of participants who wore contact lenses had been wearing them for more than five years, and just 55% of contact lens wearers said they wore their lenses seven days a week.<sup>11</sup> This may reinforce the value of part-time contact lens wear for presbyopic astigmats—or it may underscore the fact that currently available contact lens options do not meet all presbyopic astigmats’ visual needs (Table 3).

Almost half of the subjects wearing eyeglasses only had never tried contact lenses. When asked why, common responses included: “I’m satisfied with my glasses,” “I think

contacts would be uncomfortable to wear,” and “I’m concerned about the process of inserting and removing the lenses.”<sup>11</sup>

Knowing these common responses, ECPs can develop dialogs that progressively address these perceptions. Many presbyopic astigmats who wear eyeglasses either assume that contact lenses are not an option for them, or had a previous experience with contact lens wear that was unsatisfactory.<sup>1</sup> Starting a conversation about contact lens benefits with these patients—highlighting the fact that contact lens technology has advanced—can be very powerful. Likewise, for those already wearing single vision or monovision contact lenses, a discussion of the merits of multifocal toric contact lenses is also warranted.

### Visual Demands

Study participants estimated their daily time spent doing a variety of activities, requiring near, intermediate and distance vision. The data reveal a dynamic visual landscape for presbyopic astigmats, who average substantial time each day using computers, watching television, playing electronic games, reading printed material, using a mobile device, and driving (Table 5).<sup>11</sup>

These data highlight the busy, active lives of many presbyopic astigmats. These patients often have high expectations for their vision correction and want a contact lens that will perform well for distance, intermediate and near tasks. The data supports that many presbyopic astigmats who were strongly motivated to wear contact lenses would compromise vision at one of these distances or sacrifice overall clarity by forgoing toric correction. A contact lens option able to provide clear vision during this wide variety of activities, including smooth



**Table 7. Symptom Bother—Subjects who Felt Symptoms were Very or Slightly Bothersome**

	Contact Lenses	Eyeglasses Only
Tired eyes	92%	92%
Dry eyes	94%	91%
Neck pain	94%	98%
Blurry vision	100%	98%
Glare (difficulty seeing in the presence of bright light)	96%	95%
Halos (when light appears to have a ring around it)	94%	90%

**Table 8. Symptom Concerns—Subjects who Felt Very or Slightly Concerned About Experiencing Symptoms**

	Contact Lenses	Eyeglasses Only
Tired eyes	79%	73%
Dry eyes	78%	77%
Neck pain	89%	86%
Blurry vision	95%	95%
Glare (difficulty seeing in the presence of bright light)	96%	84%
Halos (when light appears to have a ring around it)	88%	85%

transitions from one distance to another, represents a tremendous opportunity for these patients.

### Symptoms and Incidence by Time of Day and Activity

Both contact lens wearers and glasses-only wearers share common symptoms that include dry eyes, tired eyes and neck pain (*Figure 1*). Somewhat surprisingly, visual symptoms, including blurry vision, halos and glare, were reported by more eyeglasses-only than contact lens wearers. This could stem from situational/environmental issues or, perhaps, from poor fit or the absence of anti-reflective coatings on their spectacle lenses. More eyeglasses wearers also reported these issues happening four or more times a week (*Table 6*), however, slightly more contact lens wearers reported being bothered by and concerned about their symptoms (*Tables 7 and 8*).<sup>11</sup>

Participants who reported being “bothered” were annoyed by the symptoms themselves, whereas those who were “concerned” were

worried about the fact of having the symptoms. Listening for these factors—the degree of bother and concern patients express about their symptoms—can help ECPs have intentional conversations about options that could address the issues.

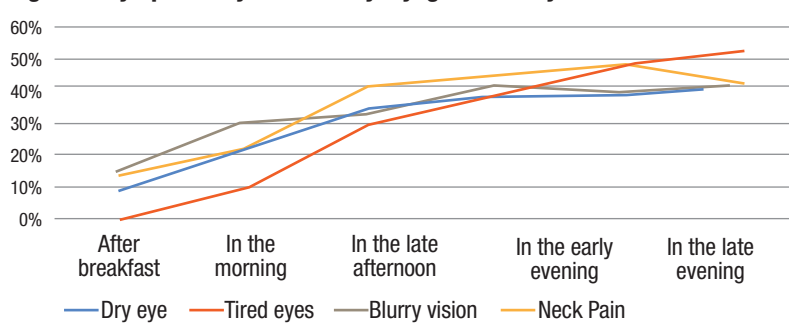
Subjects were asked to identify the times of day when they experienced symptoms, and in general, it was found that symptoms increase as the day goes on. Compared to the other symptoms, however, blurry vision was higher in the morning, which could be related to tear film/ocular surface or eyelid margin issues (*Fig-*

*ures 2 and 3*).<sup>11-13</sup> For contact lens wearers, tired eyes, neck pain, and dry eyes peaked in the late afternoon or early evening and dropped off by late evening, whereas for glasses wearers, tired eyes, dry eyes and blurry vision all peaked in the late evening.<sup>11</sup>

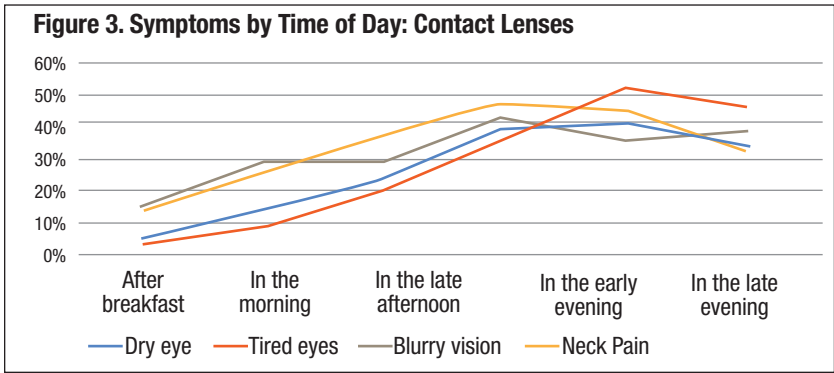
In addition to time of day, subjects indicated the activities during which they noticed experiencing each symptom. For both groups, symptoms were common during use of computers and other digital devices, reading and TV watching (*Tables 9-12*). Symptoms during most activities were worse for the eyeglasses-only group, suggesting that quality of life could be improved for these patients with the flexibility to wear contact lenses.<sup>11</sup>

The data underscore the importance of computers and other digital devices in presbyopic astigmats’ lives: not only do presbyopic astigmats spend substantial time interacting with screens for work and leisure, they also, critically, associate visual and ocular discomfort with these activities. The significance of digital device use and symptoms for presbyopic astigmats highlights the value of vision correction that offers clarity at intermediate and near, as well as smooth transitions between distances. It is also worth reminding both contact lens and spectacle

**Figure 2. Symptoms by Time of Day: Eyeglasses Only**



**Figure 3. Symptoms by Time of Day: Contact Lenses**



wearers—regardless of age—to be mindful of their eyes when using digital devices and practice the 20-20-20 rule.

### Ergonomic Symptoms

When working at a computer, the survey also revealed that eyeglasses-only wearers may be prone to more ergonomic issues. The eyeglasses-only group reported tilting their heads back or moving their heads up and down to see clearly more often than the contact lens wearers.<sup>11</sup> Presbyopic astigmats who wear bifocal or progressive spectacles may unconsciously adopt uncomfortable head and neck positions in order to see a computer screen through the lower portion of their lenses.<sup>14,15</sup> Though they can lead to discomfort, these positions may be so habitual that patients are unaware of them. Further, without prompting from an ECP, it is uncommon for patients to volunteer their physical symptoms, which may seem to them to be quite disconnected from their eyes.

The impact of these behaviors is not trivial, given the time spent using computers and the degree to which patients are annoyed by having to engage in them: indeed, 85% of eyeglasses-only wearers reported that they find it bothersome to have to move their heads up and down to see clearly while using the

computer.<sup>11</sup> Multifocal and multifocal toric contact lenses can be a beneficial option for patients who experience ergonomic issues associated with wearing glasses. Again, because patients may not connect their neck pain with their vision correction, ECPs need to draw this information out when asking about

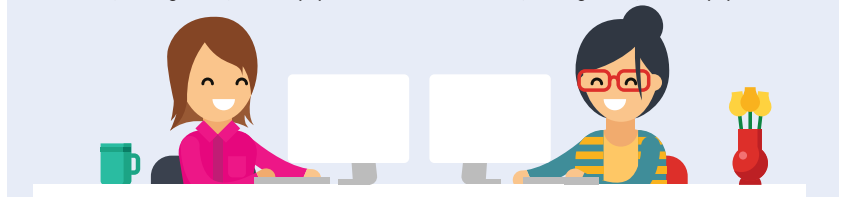
their satisfaction with and experience of wearing glasses.

### Coping Strategies

All subjects who reported symptoms were asked about actions taken to alleviate them. In general, subjects said they had some way of dealing with dry, tired or itchy eyes and neck, shoulder or back pain; but substantially fewer said they had ways of managing symptoms of glare, halos and ghosting/double vision.<sup>11</sup> Subjects who experienced dry eyes, tired eyes, neck pain and blurry vision noted the strategies they used to cope with any of the symptoms they experienced (*Table 13*). Strategies most often employed were the application of eye drops and closing the eyes/taking a break. Many also said they coped with

**Table 9. Dry Eyes by Activity**

Contact Lenses		Eyeglasses Only	
Use a desktop computer	48%	Use a desktop computer	44%
Use a laptop computer	39%	Use a laptop computer	46%
Watch TV	40%	Watch TV	48%
Drive at night	26%	Drive at night	21%
Drive during day	21%	Drive during day	23%
Use a smartphone or tablet	32%	Use a smartphone or tablet	37%
Read book, or magazines, or newspapers	30%	Read book, or magazines, or newspapers	42%



**Table 10. Tired Eyes by Activity**

Contact Lenses		Eyeglasses Only	
Use a desktop computer	40%	Use a desktop computer	40%
Use a laptop computer	48%	Use a laptop computer	48%
Watch TV	38%	Watch TV	52%
Drive at night	31%	Drive at night	30%
Drive during day	14%	Drive during day	16%
Use a smartphone or tablet	33%	Use a smartphone or tablet	44%
Read book, or magazines, or newspapers	33%	Read book, or magazines, or newspapers	44%



**Table 11. Blurry Vision by Activity**

	Contact Lenses	Eyeglasses Only
Use a desktop computer	43%	39%
Use a laptop computer	52%	39%
Watch TV	35%	50%
Drive at night	39%	40%
Drive during the day	22%	20%
Use a smartphone or tablet	36%	47%
Read books, magazines, or newspapers	30%	47%

**Table 12. Neck Pain by Activity**



	Contact Lenses	Eyeglasses Only
Use a desktop computer	51%	50%
Use a laptop computer	52%	46%
Watch TV	25%	35%
Drive at night	23%	17%
Drive during the day	23%	20%
Use a smartphone or tablet	34%	34%
Read books, magazines, or newspapers	30%	26%

symptoms by avoiding potentially uncomfortable or demanding activities, such as the use of digital devices or driving at night.<sup>11</sup>

Beyond coping strategies, about 95% to 100% of contact lens wearers and 70% to 75% of eyeglasses-only wearers in this study said they would be interested in a contact lens that could prevent or reduce symptoms of dry and tired eyes, blurry vision, glare or halos.<sup>11</sup>

Again, many participants in this study indicated being bothered and concerned with their symptoms. Looking at their use of coping strategies, it also becomes clear that their visual, ocular and physical symptoms impose limitations on their lives. Vision correction interventions that could address these symptoms, then, could also help remove some of these limitations and make it possible for these patients to live fuller lives.

## Summary

Patient expectations for vision correction are increasingly high, and presbyopic astigmats—like pres-

byopes generally—are unwilling to compromise their active lifestyles or be stymied in their professional endeavors as a result of their vision challenges. It is imperative to keep the dialogue open

with these patients because, though they may be interested in contact lens wear, many of them may believe that contact lenses are not a viable option for them. Further, though it is likely that presbyopic astigmats experience ocular, visual and physical symptoms related to their vision, they may not talk about them without prompting. In the present survey, about 30% of subjects said they had never mentioned their symptoms to their ECP.<sup>11</sup>

The results of the survey described here may offer some potential avenues for beginning effective conversations with presbyopic astigmats about their experiences. Tailoring some of the examples below to patients' specific histories can be a fruitful starting point:

- *How do your (contact lenses and/or glasses) perform for you throughout the day?* Are there particular activities for which the lenses don't perform as well as you'd like?
- *(For contact lens wearers): Is the performance of your contact lenses missing any elements?*
- *(For eyeglass only wearers): Do*

*you wish you had freedom from your glasses?* During what times or activities do you wish you had another option? Have you ever considered contact lenses?

- *Roughly how much time each day do you spend using your computer or other digital devices?* How comfortable do you feel during these times?

- *Do you avoid or limit any activities in an attempt to maintain the comfort of your eyes?*

- *How do your eyes feel at the end of the day versus the beginning of the day?*

When looking closely at presbyopic astigmats as a group, what becomes clear at all levels is the strong opportunity to improve the vision correction experiences of this population. Compared to earlier generations, today's current and emerging presbyopes are more active and digitally savvy. They are interested in cultivating fulfilling, active lifestyles as they age, and they are looking for precision, clarity and flexibility from their vision correction. They are currently managed with a variety of spectacle and contact lens options that may limit their ability to participate in certain activities, or require that they compromise some aspect of vision clarity or quality.

Whether they currently wear contact lenses or not, many



# Building relationships to help patients see what's possible

A Colorado provider takes on the challenge of dry air and helps patients enhance their contact lens wearing experience



## Philip Wren, OD

Optometric Physician and Owner  
Gunbarrel Optometry, Boulder, CO

In the Gunbarrel area of Boulder, I see patients every day who enjoy skiing, hiking, and mountain biking. The dry air and high altitude of the Colorado outdoors can make it challenging to maintain contact lens comfort. If patients are outside all day, it's important for their contact lenses to retain moisture. When I prescribe new contact lenses to my patients, I want to be confident that the lenses I recommend will stay moist and comfortable in tough conditions.

Fortunately, I can depend on Bausch + Lomb ULTRA® contact lenses to provide my patients with exceptional vision and all-day comfort. And Bausch + Lomb Biotrue® multi-purpose solution uses hyaluronan (HA), a lubricant found naturally in the eyes, to help keep contact lenses moist and comfortable throughout the day.

### Taking a closer look at patient satisfaction

In the 4 years that I've owned my practice, I've developed a rapport with my patients. At every appointment, my goal is to discover what my patients really need. I take the time to ask about their current contact lenses and address any challenges they may be experiencing.

When people come into my office, most of them tell me that the lenses they're wearing are fine. I try to delve into their day-to-day routine and find out how we can enhance their experience. I ask my patients specific questions about blurriness throughout the day, their work environment, and how long they can comfortably wear their lenses.

Once we have assessed their level of satisfaction, I try to bring up options that they may not be familiar with. I describe innovations in contact lenses that may bring about specific differences in their daily experience. If they work on computers all day, I let them know about technology like MoistureSeal®, which can help provide comfort even with long hours on digital devices which may lead to a decreased blink rate. For patients who don't think they can wear contacts because

of astigmatism, I talk to them about the stability, clear vision, and comfort of Bausch + Lomb ULTRA® for Astigmatism contact lenses.

### My patients deserve better than compromise

Patients with complex needs may come into my office feeling like they've tried everything. Often, they've settled for a compromise that's not really a solution. I recently saw a 49-year-old software programmer whose favorite forms of recreation were indoor cycling and outdoor trail hiking. She had been wearing a monovision prescription for a few years after she decided it was the only way to suit her different distance needs: computer screen, cycling display, and natural vistas.

“My patient appreciated the ease of the fitting experience and was impressed with the clear vision she achieved with the 3-Zone Progressive™ Design.”

I recommended Bausch + Lomb ULTRA® for Presbyopia contact lenses. My patient appreciated the ease of the fitting experience, and she was impressed with the clear vision she achieved with the 3-Zone Progressive™ Design. She took a trial pair of the lenses home, and a week later, she came back very pleased. She loved that she had clear binocular vision, and she no longer had to lean in to see well at intermediate distances. She was also pleasantly surprised that she could comfortably wear the Bausch + Lomb ULTRA® for Presbyopia lenses all day.

I'm always happy when I can help my patients see the connection between contact lens technology and improving their experience. I think they appreciate that I'm willing to explore beyond what they've tried before. I am committed to helping my patients maintain good ocular health and find the best possible solutions to their eye care needs. ■

### Comfort and ease of fitting with Bausch + Lomb ULTRA® contact lenses

The Bausch + Lomb ULTRA® family of contact lenses offers MoistureSeal® technology to lock in moisture. The contact lenses maintain 95% of their moisture for up to 16 hours.

Bausch + Lomb ULTRA® for Astigmatism contact lenses

- Incorporate OpticAlign™ Design and are engineered for stability to promote a successful first fit
- Are the only monthly toric lens with a -2.75 D cylinder available as a standard offering in your fit set

Bausch + Lomb ULTRA® for Presbyopia contact lenses

- Incorporate 3-Zone Progressive™ Design to offer seamless transitions between 3 zones to provide easy adaptation between key distances
- Achieve success with the single-visit multifocal lens design—80% of patients were successfully fit in one visit with 3-Zone Progressive™ Design.\*

Biotrue® multi-purpose solution uses hyaluronan (HA) to help provide up to 20 hours of moisture.\*\*

\*ECPs achieved first fit success with 80% of patients when the ECP followed the fitting guide for the 3-Zone Progressive™ Design of the PureVision®2 for Presbyopia lens. Thirty-nine ECPs (from 10 countries) refitted 441 existing soft contact lens-wearing presbyopes into PureVision®2 for Presbyopia lenses. Patients returned for follow-up visits after 1 to 2 weeks. ECP assessment of lens performance including ease of fit and patient satisfaction with lenses in real-world conditions, were measured using a 6-point agreement survey.

\*\*Based on a laboratory study.

### The benefits of personalizing the patient experience

As the owner and sole provider at my main practice, I take the opportunity to give each patient a high-quality individualized experience. I'm proud of the relationships I've built and of the success I've had in helping people see clearly and comfortably. My patients reward me with referrals, which means I get to help more patients, and my business grows.



**Table 13. Strategies for coping with symptoms**

Subjects who reported each symptom (tired eyes, dry eyes, etc.) were asked about their coping strategies, which encompassed any and all of the symptoms they experienced.

Those who experienced						
	↓	Said they found themselves →	Rubbing eyes	Blinking rapidly	Applying eye drops	Taking contacts out
Tired eyes			57%	49%	63%	24%
Dry eyes			51%	45%	83%	22%
Neck pain			57%	43%	66%	22%
Blurry vision			60%	54%	70%	21%

Those who experienced					
	↓	Said they found themselves →	Closing eyes/taking break	Avoiding night driving	Avoiding long hours of working on computer, phone, or tablet
Tired eyes			76%	41%	54%
Dry eyes			68%	41%	47%
Neck pain			68%	42%	54%
Blurry vision			80%	46%	52%

presbyopic astigmats also have negative or self-limiting attitudes about the possibility of contact lens wear. As technology has advanced, the opportunity to introduce or reintroduce contact lenses to the presbyopic astigmat has never been more worthwhile.

Ideally, a contact lens designed for presbyopic astigmats would maintain moisture for a consistently smooth, wettable surface and reduced dryness/discomfort; multifocal optics to provide clear vision for near, intermediate and distance; and toric stabilization to minimize lens rotation and help reduce blurry, fluctuating vision. These criteria describe the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens, which is an essential addition to the complement of vision correction options available for presbyopic astigmats.

Moreover, it is helpful for practice flow and patient adoption for an

ECP to be able to fit most patients with lenses that are in the practice’s in-office inventory—lenses that are easy to fit and readily available to demonstrate vision benefits, comfort, and ease of insertion to patients. The Bausch + Lomb ULTRA® Multifocal for Astigmatism lenses enable ECPs to have diagnostic lenses available in the office for immediate fitting that can satisfy the complex needs of this patient population—a welcome advance to patients and providers alike. ■

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*Miriam Konz is the Managing Director at Kadence International.*

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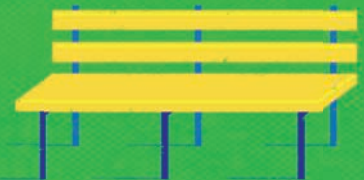
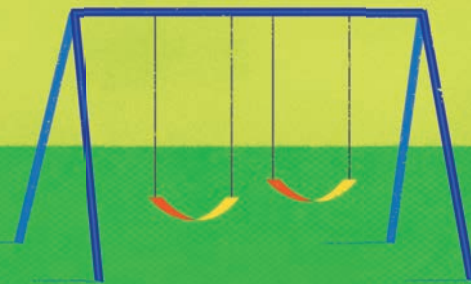
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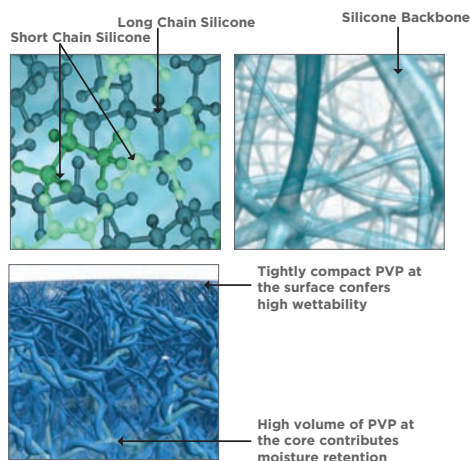
# Foundational Technologies Behind an Innovative Soft Multifocal Toric Contact Lens

A close look at the material and design innovations behind a contact lens option for presbyopic astigmats.

By Kristen R. Hovinga, MS, Mohammad Musleh, MS, Daniel Hook, PhD, and William Reindel, OD, MS

For contact lens practitioners, presbyopic astigmats are a patient population with significant growth potential. The prevalence of presbyopia is expected to continue to increase as the population ages, and a large number of emerging presbyopes are likely to be astigmatic.<sup>1</sup> In the US, the segment of the adult population with both presbyopia and astigmatism is expected to grow by over 10% in the next decade—more than estimates of total population growth over the same timeframe.<sup>2</sup>

The visual needs of presbyopic astigmats, however, are complex (see “Challenges for Presbyopic Astigmats”). In recent years, soft multifocal and toric contact lenses have undergone remarkable improvements in materials and designs. Indeed, multifocal contact lenses are expected to show the greatest growth in the soft lens category for 2019.<sup>3</sup> Meanwhile, the share of toric soft lenses, after more than a decade



**Fig. 1. The MoistureSeal® technology two-phase manufacturing process. Top: Three different silicones are combined in phase 1 to produce a flexible and highly breathable silicone backbone. Bottom: The building blocks of PVP are incorporated into the lens matrix during phase 2 to maximize moisture retention and surface wettability.**

of gradual growth, has reached just over 25% of all contact lens fits.<sup>4</sup>

Despite this growth and innova-

tion in toric and multifocal soft contact lens categories, practitioners and patients have had access to relatively few contact lens options that combine toric and multifocal optics. Presbyopic astigmats who wish to wear contact lenses have often needed to compromise—for example, with reading glasses over toric contact lenses—or surmount the hurdles associated with specialty lens fitting.

A much-anticipated development in this segment is the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens. Incorporating proven contact lens material and optical technologies, this lens is well positioned to meet the combined challenges of presbyopia and astigmatism. Following is an overview of the science behind the material properties and optical design of this innovative lens.

## Material Chemistry and Manufacturing

Choosing a lens material that maximizes comfort and ocular health is vital for successful contact lens wear of presbyopic patients. This demographic is susceptible to symptoms of dryness due to age-related physiological changes of the ocular surface.<sup>5</sup> According to recent market research, issues of dryness and end-of-day discomfort are more common among presbyopic astigmatic contact lens wearers than other wearers over age 40.<sup>2</sup>

All Bausch + Lomb ULTRA® contact lenses are manufactured using samfilcon A, a material distinguished by high oxygen permeability (a Dk of 114), a highly wettable lens surface, and a relatively low modulus of elasticity. These attributes and benefits are attained through MoistureSeal® technology, a unique two-phase polymerization process for producing highly breathable and comfortable soft lenses (*Figure 1*).

During the first phase of polymerization, a flexible matrix material comprising three distinct silicones forms the lens backbone. The long-chain silicone gives the material a low modulus, while the short-chain silicones form channels in the matrix for high oxygen transmission. In the second phase, the building blocks of polyvinylpyrrolidone (PVP), an extremely hydrophilic polymer, are distributed throughout and around the silicone matrix to attract and retain water.

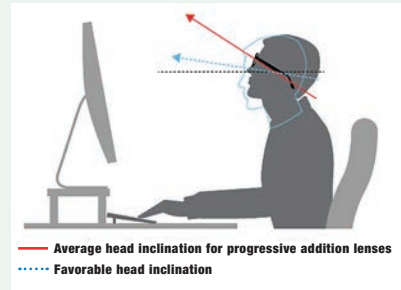
This approach of creating a silicone framework first and polymerizing PVP next maximizes the amount of PVP incorporated into the lens material.<sup>6</sup> The high volume of hydrophilic PVP at the core of samfilcon A lenses contributes to their moisture retention, whereas the PVP tightly compacted at the

## Challenges for Presbyopic Astigmats

Today's presbyopic patients, with or without astigmatism, are challenged by a diverse range of visually demanding daily tasks that involve varying viewing distances: driving, working on a computer, scrolling on a smartphone, reading printed material, etc. Because of the ubiquitous presence of digital devices in everyday lives, there is an unprecedented need for sustained clarity of near and mid-range vision.

A result of age-related decline in accommodative ability, presbyopia diminishes the range of clear vision and creates difficulties with near tasks to varying degrees. When presbyopes make an effort—often subconsciously—to optimize their visual experience and performance, postural changes and discomfort may result. Bifocal or progressive addition spectacle lens-wearing presbyopes may find that, throughout the day, they move their heads closer or further away from the computer monitor, printed materials or a smartphone in order to see clearly; they may also find themselves tilting their heads at an uncomfortable angle to better read text on a computer monitor.<sup>16,17</sup>

These challenges highlight the need to provide presbyopic correction to reduce ergonomic symptoms and provide quality vision. For presbyopes who also have astigmatism, precise cylinder correction is important as significant residual astigmatism can reduce the quality of vision. In addition to the obvious advantages of youthful appearance, convenience, a wider field of view and the flexibility to wear plano sunglasses, multifocal toric contact lenses may also be beneficial from an ergonomic perspective: recent research has suggested that unlike multifocal contact lenses, use of bifocal or progressive addition spectacle lenses may induce poor posture and musculoskeletal strain in computer users. (*Figure A*).<sup>16,17</sup>



**Fig. A. The ergonomic challenge for presbyopic computer users. While working at a computer screen, bifocal or progressive spectacle wearers may habitually adopt a sitting posture with head tilted back to look through the lower part of their lenses. Such upward inclination of the head (eye-ear line, relative to horizontal) can induce musculoskeletal strain and potentially discomfort or pain in the neck, shoulder and upper back.**

### Presbyopes and Emerging Presbyopes – Generations Defined

Baby Boomers: Born 1946 to 1964 (55 to 73 years old)

Generation X: Born 1965 to 1980 (39 to 54 years old)

Millennials: Born 1981 to 1996 (23 to 38 years old)

The younger generations entering presbyopia are demonstrating a marked shift in attitude. Active, demanding and health-conscious—these are not your parents' presbyopes.<sup>18,19</sup>

surface delivers high wettability.

By means of this material chemistry, the lenses are capable of resisting dehydration.<sup>7</sup> Lenses with MoistureSeal® technology maintain 95% of their moisture for a full 16 hours.<sup>8</sup> Maintaining the water content of a material throughout the day helps to ensure

the intended optics of the lens are preserved. When evaluated for optical image quality using an in vitro method, samfilcon A lenses produced consistently better optical image quality than three other commercially available lenses (senofilcon A, comfilcon A and lotrafilcon B) during the entire

simulated 30-second blink cycle.<sup>9</sup>

The optical quality of a contact lens also depends on a smooth surface. Like other monthly replacement lenses in the Bausch + Lomb ULTRA<sup>®</sup> family, the innovative Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism contact lens has a smooth, durable surface that is maintained during wear and care routines. In a study using atomic force microscopy and x-ray photoelectronic spectroscopy to assess lens surface durability, samfilcon A lenses demonstrated no significant change in surface morphology, roughness, or composition after 30 rub/rinse cycles simulating one month of wear.<sup>10</sup>

The integrity of physical properties in Bausch + Lomb ULTRA<sup>®</sup> contact lenses, such as water content and surface morphology, translate to consistent comfort and visual performance throughout the wearing period.<sup>11</sup>

## Toric Design

For toric soft contact lenses to provide effective and consistent cylinder correction, a stable orientation is crucial. When these lenses shift or rotate on the eye, the cylinder axis becomes misaligned with the axis of the astigmatic error, causing blurry and fluctuating vision. The orientation and stability of toric lenses can be influenced by a variety of factors, including gaze direction, eye or head movements, and the compatibility between the lenses' stabilization mechanism and patients' blinking patterns.<sup>12,13</sup>

Using high speed videography, researchers at Bausch + Lomb have

been able to delineate the biomechanics of the blink across a wide variety of eye sizes and shapes. This has led to a better understanding of the natural blink pattern and, in turn, development of toric lens designs that leverage movement of the upper eyelid during blinking to improve stability.

The Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism lenses feature the same innovative OpticAlign<sup>™</sup> design that is found in the Bausch + Lomb ULTRA<sup>®</sup> for Astigmatism lenses.<sup>14</sup> Features of the OpticAlign<sup>™</sup> design include anterior optimized ballast stabilization, posterior toric geometry, a thin edge to minimize lid interaction, and an orientation mark to assist lens insertion and rotational stability evaluation.<sup>8</sup>

In a seven-investigator, multi-site, two-week clinical study of Bausch + Lomb ULTRA<sup>®</sup> for Astigmatism contact lenses on 157 current soft contact wearers, practitioners rated the speed of fitting as "excellent" or "very good" for 92%

of patients and agreed the lens delivered clear vision for 9 out of 10 patients.<sup>14</sup> For 94% of the patients, lens rotation at dispensing was 5 degrees or less.<sup>14</sup>

Real-world performance of Bausch + Lomb ULTRA<sup>®</sup> for Astigmatism lenses in astigmatic patients (n=426) showed high levels of satisfaction.<sup>8</sup> After a minimum of four days of wear, 93% of patients agreed they had consistently clear vision throughout the day; 96% agreed they had comfortable vision while using digital devices for long periods; 93% agreed they had consistently clear vision while laying down; and 93%

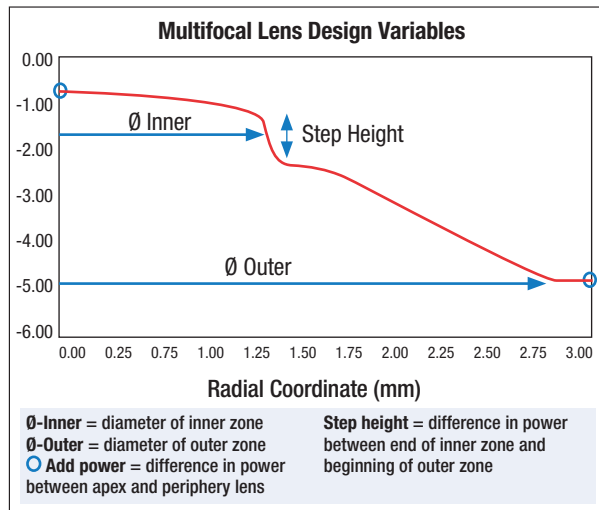
found the lens helpful in reducing halos and glare in low light.

## Multifocal Optics

The Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism contact lenses also feature the 3-Zone Progressive<sup>™</sup> design, which provides multifocal correction through three distinct zones for near, intermediate and distance vision, with consistent focusing power within each zone. The power consistency within the zones and smooth, quick transitions between zones work together to deliver a design that provides clear vision for important visual tasks at near, intermediate and distance throughout the day.

Additionally, the multifocal power profile in Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism is combined with the toric correction to provide a consistent power profile in all meridians.

The 3-Zone Progressive<sup>™</sup> design was developed using a broad approach that accounted



**Fig. 2. Parameters assessed as part of the multifocal lens design process included zone diameters, total add power and change in power across each zone.** Image adapted from Reindel WT, Hovinga K, Musleh M. Impact of multifocal power profiles on visual outcomes. *Contact Lens Spectrum*. 2016;31:32-35.

for multiple human vision factors, including: refractive error, higher order aberrations, pupil diameter, corneal curvature, axial length and residual accommodation across nine distances.<sup>15</sup> This design approach, based on computer-based modeling and a novel, clinically relevant retinal image quality metric, allowed researchers to test and adjust various design options (e.g., diameters of the zones, the add power or change in power across zones) to optimize predicted visual outcomes<sup>15</sup> (Figure 2). The final design was selected based upon the optimal visual outcomes across nine distances, ranging from 6m to 25cm, and patient experience in real-world conditions.

The 3-Zone Progressive™ design is used across the range of Bausch + Lomb multifocals, including the Biotrue® ONEday for Presbyopia, the Bausch + Lomb ULTRA® for Presbyopia contact lens and the Bausch + Lomb ULTRA® Multifocal for Astigmatism lenses. Evaluations conducted by practitioners among their presbyopic patients indicate that both the Biotrue® ONEday and Bausch + Lomb ULTRA® Multifocal lenses offer excellent visual performance for key real-world tasks.<sup>8</sup>

After one to two weeks of wearing the Biotrue® ONEday for Presbyopia lens (n=326), 95% of patients agreed that they had clear vision while driving during the day; 96% agreed they had clear vision while using a computer; and 91% agreed the lens provided clear vision for near tasks such as using a mobile phone or reading printed material. Among the group fitted with the Bausch + Lomb ULTRA® for Presbyopia lens (n=344), the percentage of patients having clear vision for distance, intermediate, and near was 90%, 92% and 90%, respectively.<sup>8</sup>

## An Innovative Solution

Material chemistry, surface properties and the manufacturing process all play an important role in a soft contact lens' visual performance and wearing comfort for patients. The Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens is a combination of the company's advanced lens material and its unique multifocal and toric technologies.

Results from a study (n=42 eyes) evaluating the clinical performance of Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lenses were positive across measures of lens stability, vision, and handling.<sup>8</sup> Lens rotation of 5 degrees or less at dispensing was observed for 95% of eyes. Visual acuity at near, intermediate and distance was excellent at both initial dispensing and two-week follow-up visits, with mean logMAR VA scores ranging from -0.09 to 0.10 (Snellen equivalent: 20/16 to 20/25). Subjective scores for vision, handling on insertion and removal, and subjects' overall impression of the lens were likewise high.

For those patients in the growing population of presbyopes who also have astigmatism, a soft contact lens option with excellent material properties—a smooth, wettable surface, high water content and oxygen transmissibility—and an optical design that provides stability and consistent areas of near, intermediate and distance focus, the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lenses provide a complete package. ■

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# TAKE A CLOSER LOOK

at the lens with a smart combination of performance and value



#WARNING: UV-absorbing contact lenses are NOT substitutes for protective UV-absorbing eyewear, such as UV-absorbing goggles or sunglasses, because they do not completely cover the eye and surrounding area. The effectiveness of wearing UV-absorbing contact lenses in preventing or reducing the incidence of ocular disorders associated with exposure to UV light has not been established at this time. You should continue to use UV-absorbing eyewear as directed. NOTE: Long-term exposure to UV radiation is one of the risk factors associated with cataracts. Exposure is based on a number of factors such as environmental conditions (altitude, geography, cloud cover) and personal factors (extent and nature of outdoor activities). UV-blocking contact lenses help provide protection against harmful UV radiation. However, clinical studies have not been done to demonstrate that wearing UV-blocking contact lenses reduces the risk of developing cataracts or other eye disorders.

	Biotrue® ONEday	1-DAY ACUVUE MOIST	DAILIES AquaComfort Plus
Moisture content	78%	58%	69%
Oxygen level*	42 Dk/t	25 Dk/t	26 Dk/t
Spherical aberration control†	✓		
UVA/UVB protection‡	✓	✓	

**Give your patients a \$200 rebate on the lens with the most moisture.<sup>1§</sup>**

\*Oxygen levels for single vision spherical (SVS) lenses only.

†In SVS and toric lenses only.

‡Minimum purchase required. Terms and conditions apply. See all terms and conditions at [www.BauschRewards.com](http://www.BauschRewards.com)

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**BAUSCH + LOMB**  
See better. Live better.

# Early Clinical Experience with Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism Contact Lenses

A study shows promising results in terms of vision quality and fitting efficiency for an innovative soft multifocal toric contact lens.

By Jeffery Schafer, OD, MS, and Robert Steffen, OD, MS

Historically, there has been a paucity of readily available multifocal toric contact lens options for presbyopic astigmats. Findings from a recent online survey of 150 eye care practitioners (ECPs) highlight prescribing information for presbyopic astigmats.<sup>1</sup> These ECPs reported that over

half of their presbyopic astigmatic patients were wearing progressive addition spectacles (*Figure 1*). Of those who wore contact lenses, most were in either single-vision toric soft contact lenses with reading glasses or monovision with soft contact lenses, options that involve some inherent compromise.<sup>1-3</sup>

In the same survey, ECPs said that only 5% of their presbyopic astigmatic patients were fit with multifocal toric soft contact lenses. This lens category should be attractive to presbyopic astigmats who desire freedom from spectacles; clear vision at near, intermediate and distance; and the convenience of soft contact lens wear.<sup>4</sup> However, the top five concerns expressed by ECPs asked about their reservations with fitting a new multifocal toric soft contact lens were: chair time/patient follow-up, probability of success, vision quality, patient cost and the range of parameters available (*Figure 2*).<sup>5</sup>

Presbyopic astigmats, like presbyopes generally, live active, busy lives and have dynamic visual needs, and these patients have a strong interest in contact lens wear.<sup>4</sup> But among those currently wearing only spectacles, presbyopic astigmats are more likely to be

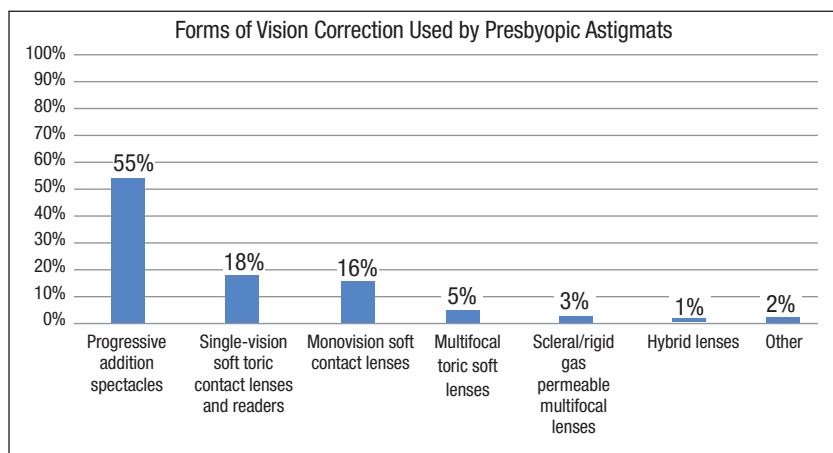
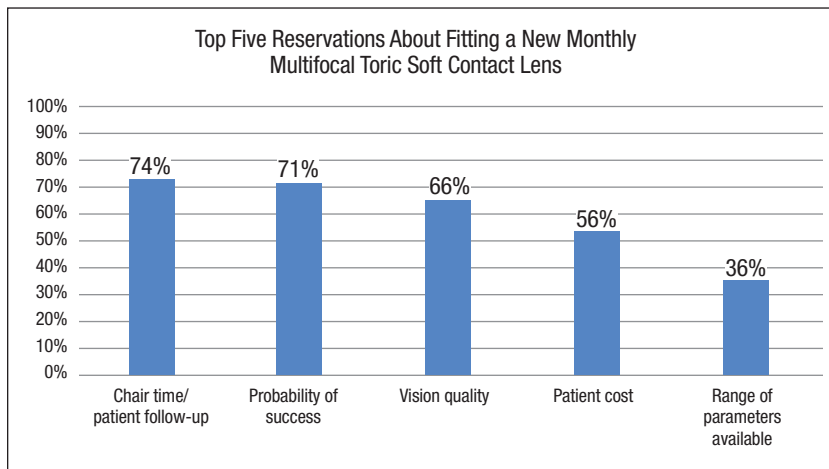


Fig. 1. Mean percentage estimates of presbyopic astigmats using various vision correction options (n=150 surveyed ECPs).<sup>1</sup>



**Fig. 2. The reservations most commonly selected by ECPs when asked about the prospect of fitting a new monthly replacement multifocal toric soft contact lens (center-near with prism ballast). (n=77 surveyed ECPs).<sup>5</sup>**

former contact lens wearers than other eyeglasses-only wearers 40 years and older. They are also more likely to perceive barriers to contact lens wear.<sup>4</sup>

These findings point to a need for more contact lens options to correct both presbyopia and astigmatism—options that provide patients with excellent vision and comfort and that offer practitioners a straightforward, reliable fitting process.

### An Innovative Option

An innovative soft multifocal toric lens, Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism, has been developed using the proven samfilcon A material and 3-Zone Progressive<sup>™</sup> multifocal and OpticAlign<sup>™</sup> toric designs. These design technologies are distinguished by a track record of success in both the Bausch + Lomb ULTRA<sup>®</sup> for Presbyopia as well as the Bausch + Lomb ULTRA<sup>®</sup> for Astigmatism contact lens lines. Both were developed using innovative approaches that combined computer modeling and prototyping with real-world patient data.

The 3-Zone Progressive<sup>™</sup> design began with a clinical evaluation of vision at nine object distances, analyzing factors including subjective refraction, higher-order aberrations, pupil size, residual accommodation, corneal topography, anterior chamber depth and axial length. A proprietary model was used to determine the ideal diameters of each zone, the total add power and the change in power across distinct zones.<sup>6</sup> Patients wearing Bausch + Lomb ULTRA<sup>®</sup> for Presbyopia lenses report clear vision at near, intermediate and distance, and comfortable vision throughout the day; and practitioners report a simple, predictable

fitting process.<sup>\*6</sup>

Researchers arrived at the OpticAlign<sup>™</sup> design through analysis of blink patterns using high-speed videography, working toward a ballasting system that would harmonize with the lens material and maintain rotational stability while limiting eyelid interaction. Patients wearing Bausch + Lomb ULTRA<sup>®</sup> for Astigmatism lenses report consistently clear vision, even while lying down, and comfortable vision throughout the day.<sup>†6</sup>

Built on these established technologies, the Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism contact lens was designed with several goals in mind. For patients, these included clear vision at all distances, stability and comfort, and for practitioners, an efficient fitting process.<sup>6</sup>

Following are the results of a study designed to evaluate the clinical performance of the Bausch + Lomb ULTRA<sup>®</sup> Multifocal for Astigmatism contact lens.

### Methods

All subjects were seen for a screening/dispensing visit at which informed consent was obtained and eligibility assessed. A spherocylindrical baseline refraction was performed on each eye, including determination of the near add and ocular dominance. Baseline high-contrast logMAR visual acuity

**Table 1. Lens Rotation at the Dispensing Visit**

Rotation	Eyes (%) (n=42)
0 degrees	28 (66.7%)
1 to 5 degrees	12 (28.6%)
6 to 10 degrees	2 (4.8%)
11 to 15 degrees	0
16 to 20 degrees	0
>20 degrees	0



with high illumination was measured binocularly at 6m, 2m, 1m, 65cm, 50cm and 40cm through the baseline refraction. Baseline visual quality was also assessed at each distance, and a baseline slit lamp examination was performed.

Lenses were fit using the spherocylindrical baseline refraction and the Bausch + Lomb ULTRA® Multifocal for Astigmatism fitting guide. The trial lenses were inserted and allowed to equilibrate for 10 minutes, after which initial lens fit and rotation were assessed. Distance and near vision were evaluated binocularly in normal room illumination to determine if refinements were necessary as outlined by the fitting guide.

After parameter adjustments as needed, subjects were evaluated for lens fit, lens rotation, visual acuity (logMAR), and subjective visual quality at 6m, 2m, 1m, 65cm, 50cm and 40cm in the exam room. In addition, subjects were asked their overall impression of the lens.

Once the appropriate prescription had been determined, study subjects were asked to wear the lenses for at least eight hours per day for approximately two weeks, using Biotrue® multi-purpose solution for lens care and storage. A

take-home survey was completed by each subject prior to the two-week follow-up visit, at which the subjects were once again asked their impression of the lens.

## Results

Twenty-one subjects were enrolled in this study, with a mean age of 52 years (range 42 to 62 years). Their mean add, sphere and cylinder were +1.75D (+0.75 to +2.50), -1.64D (+0.25 to -6.50) and -1.80D (-0.75 to -3.00), respectively.

**Table 2. Lens Centration at the Dispensing Visit**

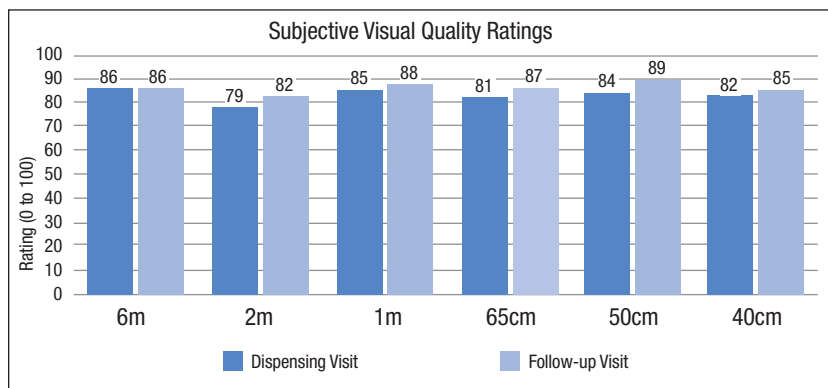
Centration	Eyes (%)
Excellent	36 (85.7%)
Good	6 (14.3%)
Fair	0
Poor	0

**Table 3. Lens Movement at the Dispensing Visit**

Movement	Eyes (%)
Adequate	42 (100%)
Excessive	0
Insufficient	0
Adherence	0

The Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens exhibited excellent primary gaze orientation. Mean lens rotation was low (1.9 degrees), and a rotation of 5 degrees or less was found for 95% of patients (Table 1). Likewise, lens centration was rated as excellent or good with the cornea fully covered for all eyes, and lens movement was adequate with the lens moving freely for all eyes (Tables 2 and 3).

The Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens performed well in both objective and subjective vision measures. Visual acuity (VA) was excellent at all six distances tested for both dispensing and follow-up visits. Mean logMAR VA scores ranged from -0.09 to 0.10 (Snellen equivalent: 20/16 to 20/25) (Table 4). Similarly, subjective visual quality (rated on a scale of 0 to 100, with 100 being most favorable) was high across distances at both visits and increased from baseline to the follow-up visit for intermediate and near vision (Figure 3).



**Fig. 3. Subjective visual quality with Bausch + Lomb ULTRA® Multifocal for Astigmatism lenses. Visual quality was rated in the exam room on a scale from 0 to 100, with 100 being the most favorable.**

**Table 4. Visual Acuity with Bausch + Lomb ULTRA® Multifocal for Astigmatism Lenses**

Testing Distance	Dispensing Visit		Follow-up Visit	
	Mean LogMAR	Snellen Equivalent	Mean LogMAR	Snellen Equivalent
6m	-0.08	20/17	-0.09	20/16
2m	-0.07	20/17	-0.07	20/17
1m	-0.03	20/19	-0.04	20/18
65cm	0.01	20/20	0.00	20/20
50cm	0.04	20/22	0.01	20/20
40cm	0.10	20/25	0.09	20/25

## Discussion

This study demonstrated that the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lenses have great performance characteristics for lens rotation, centration and movement as well as objective and subjective vision at key distances.

The lens maintained excellent rotational stability in primary gaze, comparable with the performance of Bausch + Lomb ULTRA® for Astigmatism lenses. In a study of the Bausch + Lomb ULTRA® for Astigmatism lenses, rotation of 5 degrees or less was found for 94% of eyes at dispensing vs. 95% in this study.<sup>6</sup> In all cases, lens centration was excellent or good, and movement was adequate.

The fitting process was straightforward and consistent with that of the Bausch + Lomb ULTRA® for Presbyopia contact lenses and the Bausch + Lomb ULTRA® for Astigmatism lenses. ECPs' successful experiences in fitting the Bausch + Lomb ULTRA® for Presbyopia and the Bausch + Lomb ULTRA® for

Astigmatism contact lenses can transfer to success in fitting the Bausch + Lomb ULTRA® Multifocal for Astigmatism lenses and help alleviate chair time and follow-up reservations associated with fitting a multifocal toric soft contact lens.

In a recent survey among multifocal contact lens wearers with astigmatism, the situations in which they found vision to be most problematic were driving at night, using a smartphone to view texts and email, working on a computer or tablet, watching television and reading paper books.<sup>4</sup> The six distinct distances evaluated in this study correspond to the range of activity distances represented by real-world presbyopic astigmatic patient experiences. The visual acuity measures and subjective visual quality ratings at the six distances indicate that the lens is well suited to meet the needs of today's presbyopic astigmats. The successful visual outcomes can also help alleviate ECP concerns regarding visual quality and probability of success concerns associated with fitting a

multifocal toric soft contact lens.

Further, the fact that visual quality ratings improved at near and intermediate between the dispensing and follow-up visits is suggestive of neuroadaptation to the multifocal correction in these patients. Other research supports adaptation to multifocal contact lens wear as measured by improved visual acuity, even over a relatively short (two week) timeframe.<sup>7</sup>

With presbyopic astigmatic patients' active, busy lives and dynamic visual needs, this study demonstrated that the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens has great promise for these patients. The simplicity in fitting and the established performance of the samfilcon A material and 3-Zone Progressive™ multifocal and OpticAlign™ toric designs also make this an excellent option for ECPs to capitalize on the interest of astigmatic presbyopes to wear contact lenses. ■

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*Robert Steffen, OD, MS, is the Senior Director of Clinical Affairs at Bausch + Lomb.*

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## FOOTNOTES:

\*Results of evaluations of practitioners fitting presbyopic patients and patients completing an online survey regarding lens performance

†Results of an online survey with patients who completed an evaluation program for Bausch + Lomb ULTRA® for Astigmatism contact lenses and wore their lenses for ≥4 days (n=426). Survey results include patients who strongly agreed, agreed, or slightly agreed (on a 6-point agreement scale) with the surveyed statement, with a margin of error ± 2.7%

# Bausch + Lomb ULTRA® Contact Lenses: A Long-term Study of Key Performance Characteristics

The results of this large, 12-month study demonstrate that the material properties of Bausch + Lomb ULTRA® contact lenses translate to exceptional clinical performance.

By Robert Steffen, OD, MS, William T. Reindel, OD, MS, Gary Mosehauer, MS, and Marjorie J. Rah, OD, PhD

Consistent comfort, visual performance and lens cleanliness throughout the wearing and replacement cycle are essential for patient satisfaction with contact lens wear. Dissatisfaction with comfort and vision in particular are strongly associated with contact lens discontinuation.<sup>1</sup>

The development of contemporary lens materials and designs has therefore been aimed at providing excellent comfort and vision, even under challenging conditions (low-humidity environments, low

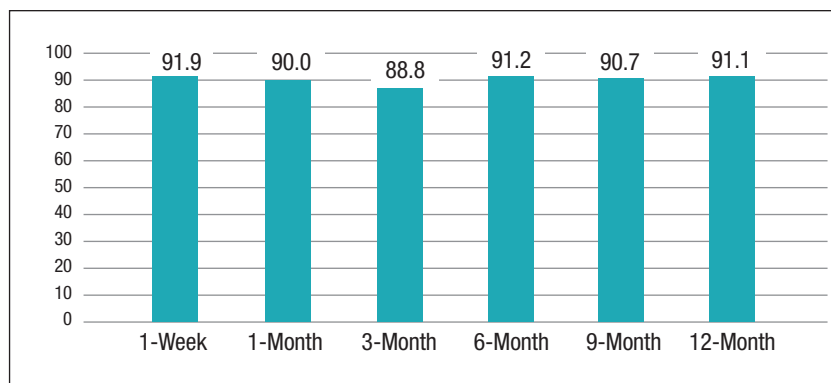


Fig. 1. Mean overall comfort rating through 12 months.

blink rate, tear film abnormalities) and reliable lens cleanliness and surface wettability, even after repeated wear and rub/rinse cycles.<sup>2-4</sup>

The Bausch + Lomb ULTRA® contact lens material was designed with these factors in mind, emphasizing desirable material and surface properties (oxygen trans-

missibility, moisture retention, smoothness and deposition resistance) that remain stable throughout the wearing and replacement cycle. This is achieved through a unique, two-phase manufacturing process. In the first phase, short- and long-chain silicone monomers are combined to provide a flexible backbone with channels that

Material Properties of Bausch + Lomb ULTRA® Contact Lenses	
Dk/t.....	163
Modulus .....	70
Water content.....	46%

facilitate oxygen permeability. In the second phase, the building blocks of polyvinylpyrrolidone (PVP) are added to the silicone backbone to provide enhanced moisture retention and surface hydrophilicity.<sup>5</sup>

The performance of the Bausch + Lomb ULTRA® contact lenses has been well established. This evaluation was intended to assess the stability of patient-rated comfort, vision, lens cleanliness and overall impression through 12 months of extended wear with monthly replacement.<sup>6</sup>

## Methods

A large patient sample was recruited to assess the performance characteristics of Bausch + Lomb ULTRA® contact lenses in a wide range of patients with different lens wear histories at 34 independent vision care practices located throughout the US.

In this 12-month evaluation, patients were instructed to wear the lenses for six nights/seven days and use only one multi-purpose solution for lens care (Biotrue® multi-purpose solution). Once per week, patients were instructed to remove, clean and disinfect their lenses at night and reinsert them the following morning.

**Table 1. Patient Demographics**

Eligible, Dispensed Patients	403
Sex	
Female	65.3%
Male	34.7%
Age (Mean)	29.8 years
Race	
Caucasian	80.9%
Black/African American	8.2%
Asian	3.7%
American Indian / Alaska Native	0.5%
Other	6.7%

Follow-up visits were scheduled for 1 week and 1, 3, 6, 9 and 12 months. At each visit, overall comfort, overall vision, lens cleanliness upon removal and overall impression performance attributes were rated using questionnaires on a 0 to 100 scale, with 100 being the most favorable.

The scores of each subject's right and left eyes were averaged by visit and outcome; paired differences were evaluated for equivalence using the two one-sided tests method with adjusted one-sided alpha risks of 0.05 and an equivalence margin of five points. The 1-week visit was com-

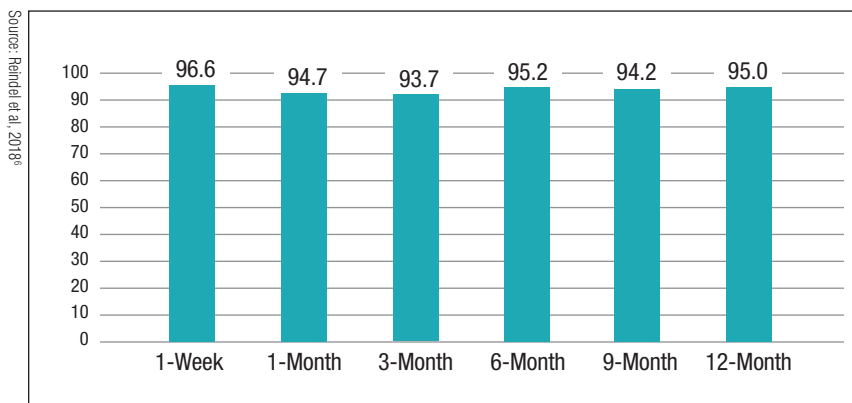
pared to the 1-month visit, and all pairwise comparisons were considered among the 1-, 3-, 6-, 9- and 12-month visits. Multiplicity was addressed using the Holm method.

## Results

Four-hundred three eligible patients were dispensed at the 34 sites, with an average age of 29.8 years; 65.3% of patients were female, and 80.9% were Caucasian (Table 1). Approximately two-thirds of the patients (62.3%) had previously worn lenses following a daily wear schedule (Table 2), and the most common habitual lens material was senofilcon A (30.8% of patients).

Mean ratings for each of the four lens performance characteristics of interest were consistent between the 1-week and 1-month visits: Mean scores for overall comfort were 91.9 at 1 week and 90.0 at 1 month; for overall vision, 96.6 and 94.7; for lens cleanliness upon removal, 94.3 and 91.8; and for overall impression, 92.4 and 90.2, respectively.

In addition to consistency through the monthly wear cycle, mean performance ratings



**Fig. 2. Mean overall vision rating through 12 months.**



# Clinical Performance

remained consistent across all subsequent visits through the 12-month follow-up (Figures 1-4). Each of the 44 comparisons yielded an adjusted p-value of < 0.001, demonstrating statistical equivalence for every pair of visits for each of the four performance characteristics.

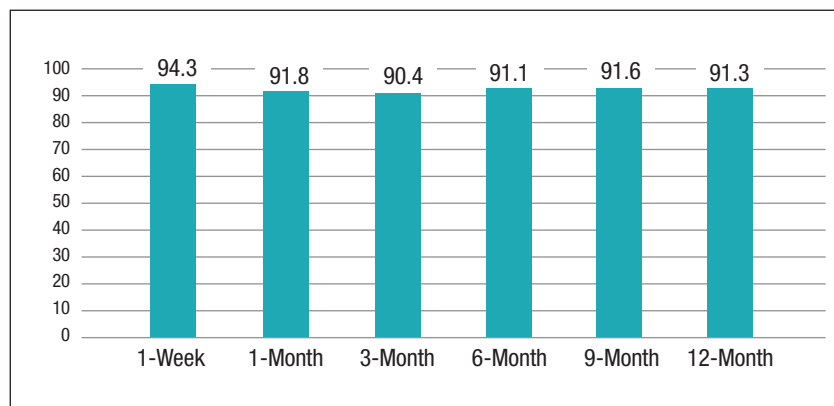
There were no serious adverse events in the study.

## Discussion

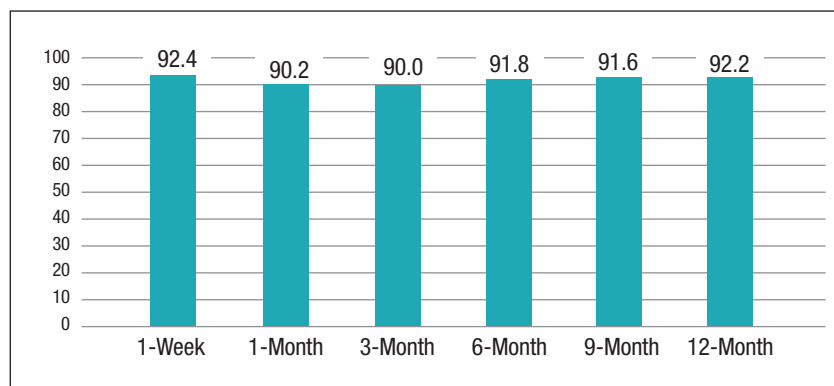
For ophthalmic compatibility, a contact lens must support a stable, continuous tear film, resist deposits, sustain hydration, maintain corneal metabolism and be non-irritating and comfortable.

Continuous wear, which presents the challenge of ophthalmic compatibility for prolonged, uninterrupted wear, represents a rigorous test of contact lens material performance.<sup>7</sup>

During the day, individual and lifestyle factors can challenge contact lens vision and comfort and put a lens material to the test. Lacrimal and meibomian gland abnormalities, incomplete blinking, low-humidity environments and sustained visual attention—to digital device screens in particular—can all compromise the integrity of



**Fig. 3. Mean lens cleanliness ratings through 12 months.**



**Fig. 4. Mean overall impression of lenses through 12 months.**

the tear film.<sup>8,9</sup> Tear film instability over the surface of a contact lens can result in greater visual compromise along with discomfort.<sup>10</sup>

The hydrophilic PVP through-

out the silicone matrix in Bausch + Lomb ULTRA® contact lenses enables both a high water content and consistent surface wettability, which helps ensure both comfort and optical clarity.<sup>5</sup>

A study comparing the clinical performance of Bausch + Lomb ULTRA® contact lenses with lenses made from senofilcon A, another PVP-containing material, found better wetting and stability of vision. Lens performance after 16 hours of wear was assessed using an “extended-blink test” to quantify the time between the end of a blink and the blur-out of a threshold letter on the acuity chart. Subjects rated visual quality on a 0 to 100 scale, and lens surface wetting was evaluated by an investigator.<sup>11</sup>

**Table 2. Habitual Lens Material and Wear**

Most Frequently Used Habitual Lenses	
senofilcon A	30.8%
lotrafilcon A	13.6%
samfilcon A	10.9%
comfilcon A	9.4%
lotrafilcon B	9.2%
Previous Wearing Schedule	
Daily Wear	62.3%
Extended Wear	31.3%
Flexible Wear	6.5%

# Building patient confidence to help improve outcomes in eye care

Communication is key when introducing patients to innovative technology



**Dustin Dixon, MS, OD**

Optometrist

Eye Specialists of Mid-Florida, Haines City, FL



**M**y patients come to me with a wide variety of eye care issues. Whether I'm prescribing contact lenses or treating an eye-related medical issue, I believe it's important to care for the overall well-being of each patient. Lifestyle, medical history, and personal preferences all inform the choices I make about their eye care. Listening for a few extra minutes can make a big difference in finding the prescription that fits the patient's needs. Paying attention to a patient's entire well-being builds trust and helps sustain a long-term professional relationship.

## Confident recommendations help motivate patients

Keeping up to date with contact lens technology is fundamental to good patient care. I make sure to stay current so I can recommend the best possible treatment for my patients. Whether a patient is getting contact lenses for the first time or looking to switch to new lenses, they appreciate that I do my research. Bausch + Lomb offers an innovative array of contact lenses and provides outstanding support to me as an eye care provider. I know I can recommend Bausch + Lomb products with confidence.

I try to instill that confidence in my patients as well. I share successful experiences that other patients have had, and I provide positive reinforcement to encourage my patients when they're starting out with a new set of lenses. By speaking with them on a personal level and giving them expert technical guidance, I help my patients approach their eye care with confidence.

## Setting a positive tone can help overcome barriers

I recently saw a woman in her mid-30s with -2.75 D of cylinder power in each eye who had previously been told she was not a candidate for wearing contact lenses. I asked her about the lenses she had tried and the advice that her providers had given

her. It seemed clear to me that she didn't have much confidence in those earlier attempts. She didn't just need different lenses—she needed support.

After talking further about her lifestyle and the professional demands on her eyes, I was optimistic that Bausch + Lomb ULTRA® for Astigmatism contact lenses could meet her needs. I told her about other patients of mine who had successfully switched to those lenses. I assured her that I'd be there to help with the fitting and follow-up, and that I could guide her through the process of getting accustomed to the lenses. It was a change of pace from the less hopeful messages that she had received in the past.

**“When she tried the lenses, I could tell she was impressed. The comfort, stability, and consistently clear vision surprised her.”**

When she tried the lenses, I could tell she was impressed. The comfort, stability, and consistently clear vision surprised her. Because of the optimized ballast design and the axis orientation mark, the initial fitting went smoothly, allowing for a good experience from the beginning. The ease of fitting boosted her confidence right away because she saw that with some practice, she'd be able to handle the contact lenses by herself.

I was pleased to help this patient get past her hesitation about contact lenses. I didn't give up on the option of contact lenses for her, and she was overjoyed with the results. Together we helped her develop the mindset that she could succeed. ■

Many patients believe that astigmatism is a barrier to contact lens wear—69% of eyeglass-only wearers with astigmatism who perceive potential problems with wearing contact lenses refer specifically to astigmatism as the reason.

## Bausch + Lomb ULTRA® for Astigmatism *OptiAlign* Design: Engineered for stability to help promote a successful first fit<sup>1</sup>

Demonstrated fitting success<sup>1</sup>

- ECPs rated the speed of fitting as “excellent” or “very good” for 92% of patients
- ECPs reported rotation at dispensing of 5° or less for 94% of patients
- ECPs agreed the lens delivered clear vision for 9 out of 10 patients

Bausch + Lomb ULTRA® for Astigmatism contact lenses are the only monthly toric lenses with a -2.75 D cylinder available as a standard offering in the fit set.

1. Results from a 7-investigator, multisite 2-week study of Bausch + Lomb ULTRA® for Astigmatism contact lenses on 157 current soft contact wearers.

## Building patient loyalty with a better patient experience

Bausch + Lomb ULTRA® for Astigmatism contact lenses give my patients an option that's comfortable, innovative, and easy to adopt. Offering great contact lenses aligns with my goal of providing outstanding communication and support. This personalized experience helps build confidence in my patients and keeps them coming back.

# Clinical Performance

The Bausch + Lomb ULTRA® contact lenses showed better visual stability via the extended-blink test ( $10.42 \pm 4.86$  seconds until blur vs.  $8.04 \pm 2.69$  for senofilcon A lenses,  $p=0.015$ ), and subjective visual

comfort throughout the day; and 90.3% of patients said they provided clear vision throughout the day and when driving at night.<sup>12</sup>

Comfort and vision play key roles in the success and continua-

lenses offer sustained comfort, vision and cleanliness performance for daily wear<sup>13</sup> and for 12 months of extended wear<sup>6</sup> with monthly replacement. ■

*Robert Steffen, OD, MS, is Senior Director, Clinical Affairs, at Bausch + Lomb.*

*William T. Reindel, OD, MS, is Executive Director, Medical Affairs, Vision Care at Bausch + Lomb.*

*Gary Mosehauer, MS, is Director, Biostatistics, at Bausch + Lomb.*

*Marjorie J. Rah, OD, PhD, is the Director, Medical Affairs, Vision Care, at Bausch + Lomb.*

**Mean ratings for each of the four lens performance characteristics of interest were consistent between the 1-week and 1-month visits: Mean scores for overall comfort were 91.9 at 1 week and 90.0 at 1 month; for overall vision, 96.6 and 94.7; for lens cleanliness upon removal, 94.3 and 91.8; and for overall impression, 92.4 and 90.2, respectively.**

quality was also higher at the end of the wear period (average rating of 84.6 vs. 74.4,  $p=0.049$ ).

Finally, after 16 hours of wear, significantly more of the Bausch + Lomb ULTRA® lenses showed a completely wettable surface (absence of any nonwetting areas): 70% of lenses versus 30% of the senofilcon A lenses ( $p=0.021$ ).<sup>11</sup>

The performance of Bausch + Lomb ULTRA® contact lenses has also been demonstrated in patients reporting both digital device use ( $\geq 3$  hours per workday) and bothersome blurriness/visual fluctuation and dryness symptoms in their habitual silicone hydrogel lenses.<sup>12</sup> These wearers rated comfort, cleanliness, and vision on a 0 to 100 scale, and all ratings improved between a baseline assessment and 2 weeks of wearing Bausch + Lomb ULTRA® lenses. Notably, 83.2% of these patients agreed that the lenses were comfortable in dry environments; 85.8% agreed that they were com-

fortable throughout the day.<sup>1</sup> For daily and particularly extended wear, it makes sense to look for a contact lens material with properties that support ocular surface health (oxygen permeability) and comfort and vision (wettability, modulus, moisture content).<sup>3</sup> Owing to their unique material chemistry and manufacturing process, Bausch + Lomb ULTRA® contact lenses feature high oxygen permeability and moisture content, and a surface that remains reliably smooth and wettable throughout the wearing period.<sup>5</sup>

The results of the current 12-month study build upon previous evaluations of Bausch + Lomb ULTRA® contact lenses. Subjects experienced exceptional and consistent comfort and vision and a high overall impression of the lens throughout the entire study period.

This evaluation adds to the body of evidence demonstrating that the material and design properties of Bausch + Lomb ULTRA® contact

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**SAFETY FOOTNOTE:** Bausch + Lomb ULTRA® contact lenses are indicated for daily wear or extended wear of up to seven days. As with any contact lens, problems can result in serious injury to the eye, including loss of vision, and clinical studies have shown that the risk of serious adverse reactions is increased when lenses are worn overnight. It is essential that patients follow the eye care practitioner's direction and all labeling instructions for proper use of lenses and lens care products. Consult the package insert for complete information.





DRYNESS IS THE #1 REPORTED CONCERN FOR CONTACT LENS WEARERS<sup>1</sup>

A SOLUTION:

**Biotrue<sup>®</sup> MPS** provides up to 20 hours of moisture<sup>2</sup>

Of contact lens wearers who self-report dryness, nearly all agree that Biotrue<sup>®</sup> MPS:

**96%**  
AGREE

helps **prevent** contact lens **dryness**<sup>3</sup>

**97%**  
AGREE

keeps lenses **moist** and **comfortable** all day long<sup>3</sup>

**94%**  
AGREE

allows them to **forget they're wearing** lenses<sup>3</sup>



For contacts that are *almost too comfortable*, recommend **Biotrue<sup>®</sup> multi-purpose solution.**

**#1**

MULTI-PURPOSE SOLUTION<sup>™</sup>

<sup>1</sup>Highest household penetration among multi-purpose solutions; IRI Data MUL0 52 weeks ending 12/30/18.

**REFERENCES:** 1. The Multi-sponsor Survey's 2017 study of the US consumer contact lens market, December 2017. 2. In vitro studies evaluated the rate of release of sodium hyaluronate (HA), a conditioning agent in the Biotrue<sup>®</sup> multi-purpose solution, from both conventional and silicone hydrogel contact lenses over a twenty-hour time period. HA was absorbed on all traditional and silicone hydrogel contact lenses tested upon soaking in the solution overnight. HA is then released from the lenses throughout at least a twenty-hour time period when rinsed with Hank's balanced salt solution at a rate mimicking tear secretions. The in-vitro performance of Biotrue<sup>®</sup> multi-purpose solution suggests that it will provide lens conditioning throughout a twenty-hour time period. 3. Results of an online survey of contact lens wearers with self-reported dryness on a regular basis who completed an evaluation program for Biotrue<sup>®</sup> multi-purpose solution (n=348). Survey results include patients who strongly agreed, agreed, or slightly agreed (on a 6-point agreement scale) with a margin of error of +/- 2.1%.

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**BAUSCH + LOMB**  
See better. Live better.



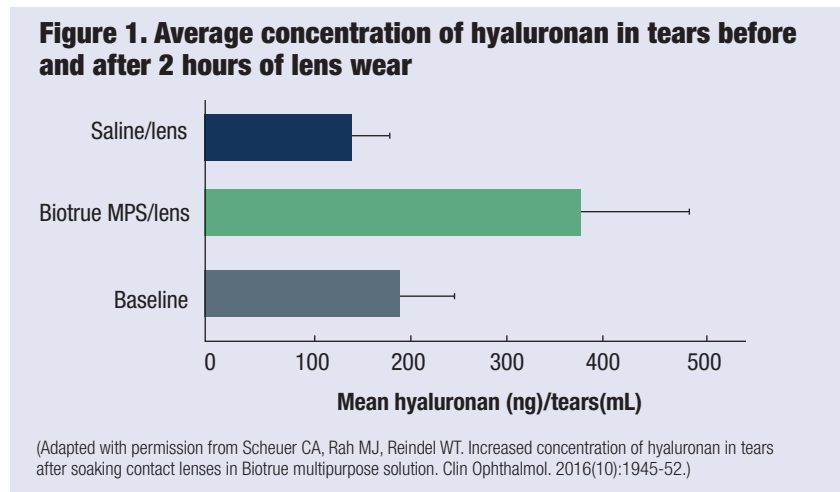
# Pair Frequent Replacement Contact Lenses with an Innovative Solution

A hyaluronan-containing multi-purpose solution keeps lenses moist and comfortable for patients with complaints of contact lens-related dryness.

By Kerry Giedd, OD, MS, and Marjorie J. Rah, OD, PhD

Contact lens wearers may be affected by a host of intrinsic, environmental, and lens/care-related factors that can contribute to symptoms of dryness and discomfort.<sup>1</sup> Insufficient tear volume, poor lens surface wettability and lens dehydration in particular are common problems that can lead to challenging contact lens wear, poor or variable vision, reduced comfort and lens wear times, and, ultimately, dropouts.<sup>1,2</sup>

Among modifiable contributors to contact lens dryness and discomfort, the lens care solution is often viewed as having limited clinical significance. When examining patients interested in contact lens wear, eyecare practitioners typically focus on general ocular health and visual needs, followed by the selection of the lens brand, fit and ideal wear and replacement schedules. It is often overlooked that a lens care solution which incorporates advanced technologies can support



comfort and lens performance and affect whether the lens-wearing experience will be successful.

## Hyaluronan

Biotrue® multi-purpose solution (MPS) was specially designed to address lens surface wetting and hydration. This unique formulation contains hyaluronan (HA) as a lens conditioning agent. HA is a natu-

rally occurring glycosaminoglycan found throughout the human body, for example, in the connective tissue of the skin, in synovial fluid in joints and in the vitreous, lacrimal glands, cornea, conjunctiva, and tears.<sup>3-7</sup> Due to its molecular structure, HA has unique water-retention properties and viscoelasticity, allowing each HA molecule to hold up to 1,000 times its weight in water.<sup>8</sup>

**Table 1. Ratings for performance of Biotrue® MPS (n=464)**

Attribute	Agreement
Comfort upon insertion	99%
Helps my lenses stay comfortable throughout the day	98%
Helps my lenses stay comfortable at the end of the day	97%
Allows me to forget that I am wearing contact lenses	95%
Helps my lenses stay moist throughout the day	97%
Helps my lenses stay moist at the end of the day	96%
Makes my lenses feel like new	97%

When the eye is open, HA is more viscous and coats the surface of the eye without draining, resulting in an improvement in tear film stability. During a blink, its viscosity is reduced, resulting in the spread of HA as the eyelids sweep across the eye.<sup>9,10</sup> In addition to a lubricating effect on the eye, HA may have a protective effect against oxidative damage caused by free radicals.<sup>9,12</sup> It may also have an impact on wound healing and possess anti-inflammatory properties.<sup>3</sup>

Hyaluronan has been successfully used in a wide variety of medical applications for five decades. The beneficial effects of hyaluronan as an ingredient in artificial tears is well documented. Numerous studies have shown that eye drops containing hyaluronan can thicken and stabilize tears, increase ocular surface lubricity and decrease tear evaporation.<sup>5,10,12-14</sup>

On the other hand, the addition of HA to a contact lens multi-purpose solution is a relatively unique application. Both laboratory and clinical studies have evaluated the benefits of HA in the formulation of Biotrue® MPS, including: (1) adherence of HA to the lens during overnight storage, (2) transfer of HA from the lens and slowly releasing into the tears upon insertion, and (3) comfort during the lens wearing period.

### Laboratory Evidence

There is strong laboratory support for the benefit of including hyaluronan in Biotrue® MPS for enhancing lens performance. In one study, Wygladacz and colleagues used confocal laser scanning microscopy and differential interference contrast microscopy techniques to characterize the interaction of HA with silicone hydrogel lenses.

In this study, the lenses were stored in Biotrue® MPS or a control solution for four hours, then stained with safranin dye to detect the presence of HA on the lens surface. The results demonstrated that after soaking lenses in Biotrue® MPS, hyaluronan adsorbed to the surface of silicone hydrogel lenses, surrounding the surface of the lenses in a uniform coating of HA.<sup>15</sup>

The adherence and release of hyaluronan from lenses were evaluated in a separate in vitro study.<sup>16</sup> Six different commercially available lenses (lotrafilcon A, lotrafilcon B, senofilcon A, galyfilcon A, comfilcon A and balafilcon A) were stored overnight in a fluorescein-tagged hyaluronan solution or a control solution. Following the soaking period, the lenses were continually rinsed to simulate tear secretion, and the rinsing solution was analyzed over time. The results demonstrated that hyaluronan from the MPS had

been adsorbed onto the contact lenses and slowly released for up to 20 hours.<sup>16</sup>

Taken together, these laboratory studies show that hyaluronan from Biotrue MPS adheres to lenses, which may have an impact on wettability.

### Clinical Evidence

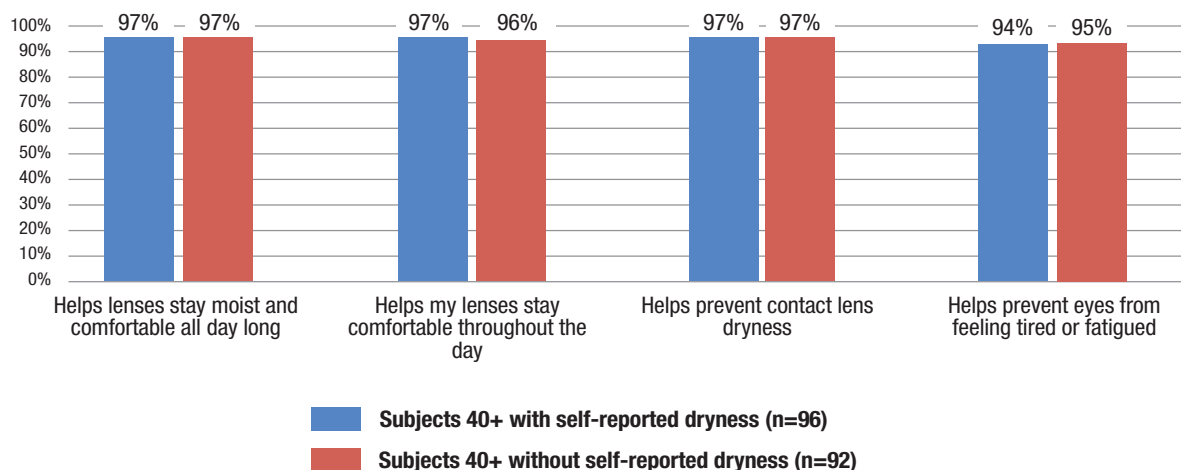
Clinical studies of Biotrue® MPS have confirmed the laboratory results. The concentration of HA released from contact lenses into tears was evaluated in a controlled, randomized study that included twenty-five patients (12 habitual lens wearers and 13 non-lens wearers) matched for age and gender.<sup>16,17</sup> At baseline, patient tears were analyzed to measure the presence of endogenous hyaluronan. Patients inserted one lens that had been previously soaked in Biotrue® MPS for 14 hours and a contralateral lens stored in a control solution per a randomization schedule.

After two hours, tear samples

**Figure 2. Ratings for performance of Biotrue® MPS when using digital devices (n=464)**

- 97%** Helps my lenses stay moist and comfortable all day long
- 97%** Helps my lenses stay comfortable throughout the day
- 97%** Helps prevent contact lens dryness
- 96%** Helps prevent eyes from feeling tired or fatigued

**Figure 3. Performance ratings for Biotrue® MPS while using digital devices, among subjects 40 years and older with and without self-reported dryness symptoms**



were collected and analyzed. There was a statistically significant increase in the hyaluronan present comparing baseline (natural) tears and the tears collected after exposure to a Biotrue® MPS-soaked lens ( $p=0.01$ ). There was also a statistically higher concentration of hyaluronan in tears sampled from eyes wearing the Biotrue-soaked lenses versus lenses soaked in a saline control ( $p=0.03$ ) (Figure 1).<sup>16,17</sup>

In another study, a sample of experienced contact lens wearers currently using a multi-purpose solution other than Biotrue® MPS

were interviewed.<sup>18</sup> To be eligible for study enrollment, patients had reported a strong intent to imminently drop out of contact lens wear because of comfort and dryness complaints. The 153 eligible patients were instructed to use Biotrue® MPS with their current lenses. After two weeks, there was an 80% decrease in the proportion of patients reporting they were likely to drop out of lens wear. When asked to compare Biotrue® MPS to their habitual lens care solution, 86% of subjects rated their lenses as more comfortable and 87% agreed that their lenses

felt moister throughout the day.<sup>18</sup> To confirm these findings, the same patients were contacted again after six months. Ninety-three percent said they were still wearing contact lenses at least once per week and 86% had reduced their likelihood to discontinue lens wear. These results suggest that changing the MPS could have a short- and long-term impact on satisfaction among patients susceptible to dropping out of contact lenses.<sup>18</sup>

A recent survey evaluated the performance of Biotrue® MPS on a daily basis and while using digital devices. After using Biotrue® MPS for seven days with a fresh pair of contact lenses, patients were asked to complete an online survey to provide feedback on vision and comfort.<sup>19</sup> The overall study population included 464 patients, with an average age of 38.5 years and of whom 63% were female. Patients reported wearing their lenses an average of 12 hours per day and 6.5 days per week; and reported spending an average of 7.5 hours per day using a computer, smartphone, or tablet.

**Table 2. Ratings for performance of Biotrue® MPS for Bausch + Lomb ULTRA® contact lens wearers (n=65)**

Attribute	Agreement
Comfort upon insertion	100%
Helps my lenses stay comfortable throughout the day	99%
Helps my lenses stay comfortable at the end of the day	100%
Allows me to forget that I am wearing contact lenses	99%
Helps my lenses stay moist throughout the day	99%
Helps my lenses stay moist at the end of the day	99%
Makes my lenses feel like new	100%

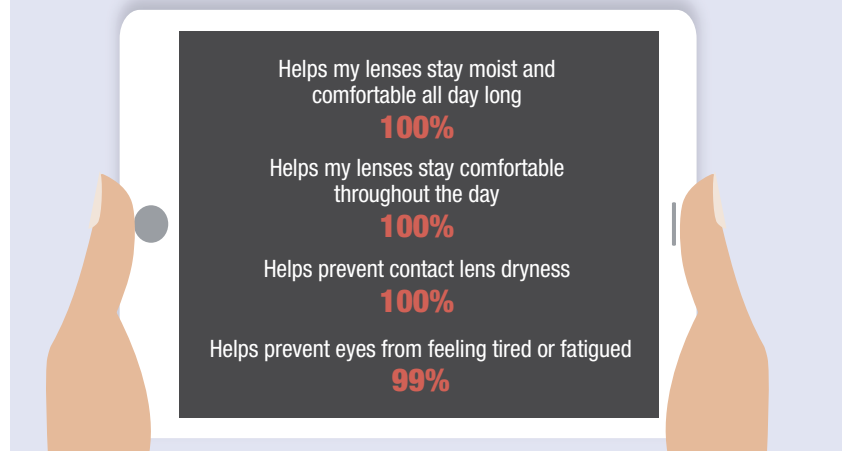
The results showed high ratings across various comfort and vision attributes, even when using digital devices (Table 1 and Figure 2).

In addition, a subgroup of 188 patients who were aged 40 years and older were evaluated. Of the 40+ subgroup, 92 had self-reported habitual symptoms of dryness and 96 did not. Surprisingly, the self-reported dryness subgroup reported similarly high levels of satisfaction with their lens wearing experience as the rest of their age cohort. Notably, attributes surrounding the comfort and moisture of contact lenses on insertion and throughout the day, including when using digital devices, were similar in the self-reported dryness group when compared to those who did not habitually report dryness (Figure 3). These results indicate that the use of Biotrue® MPS may be of measurable benefit to wearers who experience symptoms of dryness with their contact lenses.<sup>19</sup>

Similarly, performance of Biotrue® MPS was particularly high for the 65 subjects in this study who reported habitually wearing Bausch + Lomb ULTRA® lenses. Nearly all Bausch + Lomb ULTRA® lens-wearing subjects agreed that using Biotrue® MPS helped their lenses “feel like new” and helped lenses feel comfortable at the end of the day (Table 2). Even when using a computer, smartphone, or tablet for long hours, patients wearing Bausch + Lomb ULTRA® contact lenses agreed that Biotrue® MPS helped their lenses stay comfortable throughout the day, helped prevent lens dryness and helped lenses stay moist all day long (Figure 4).<sup>19</sup>

In total, these clinical studies demonstrate that hyaluronan is successfully transferred to the eye from lenses that have been soaked in Biotrue® MPS, and that Biotrue®

**Figure 4. Ratings for Biotrue® MPS for Bausch + Lomb ULTRA® contact lens wearers, when using digital devices (n=65)**



MPS confers exceptional surface wettability, resulting in comfort and moisture retention throughout the day, and consequently, a lower likelihood of contact lens discontinuation.

## Conclusions

Symptoms of dryness are frustratingly common among contact lens wearers; these symptoms can lead to a suboptimal wearing experience and ultimately to contact lens dropout. For patients wearing frequent/planned replacement contact lenses, recommending a lens care solution that could impact lens hydration and surface wetting is very valuable. These studies demonstrate that Biotrue® MPS, which contains hyaluronan as a key ingredient, can benefit lens performance and improve patient satisfaction. ■

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*Marjorie Rah, OD, PhD is the Director, Medical Affairs, Vision Care, at Bausch + Lomb.*

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## Highlights from a Roundtable Discussion About a Long-awaited Innovation

A group of leading optometrists convened to talk about how the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens will impact their patients and their practices.

### Roundtable Participants



**Paul M. Karpecki, OD, FFAO**

Kentucky Eye Institute  
Lexington, KY  
Gaddie Eye Centers  
Louisville, KY



**Gina Wesley, OD, MS, FFAO**

Complete Eye Care  
Medina, MN



**Arthur Epstein, OD, FFAO**

Phoenix Eye Care  
The Dry Eye Center of Arizona  
Phoenix, AZ



**Kerry Giedd, OD, MS, FFAO**

Eola Eyes  
Orlando, FL



**Mile Brujic, OD, FFAO**

Premier Vision Group  
Lima, OH



**I. Ben Gaddie, OD, FFAO**

Gaddie Eye Centers  
Louisville, KY

By Jill Saxon, OD, FFAO, and Marjorie Rah, OD, PhD

Anticipating the introduction of the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens, a roundtable discussion was held in January 2019. The wide-ranging conversation drew from participants' years of experience in clinical practice and coalesced around three themes: the limited contact lens options for presbyopic astigmats; key characteristics of the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens; and recommendations for incorporating it into practice.

### The Need – Contact Lens Options for Presbyopic Astigmats

Dr. Karpecki moderated the discussion and opened by highlighting the disparity between the number of people with astigmatism (over 66 million) and the number currently being corrected with toric contact lenses (only about 8.6 million).<sup>1</sup> Among adults age 40 and older who require multifocal vision correction, only about 13% are ever offered contact lenses by their eyecare practitioners—and for many of those patients, rather than multifocality, the offer is for monovision.<sup>2</sup>

Presbyopic astigmats represent a portion of the population that is by no means uncommon—indeed, according to US Census data and projections based on market research analysis, there are approximately 32 million presbyopic astigmats eligible for contact lens wear in the US today.<sup>3,4</sup> This group is certainly not overlooked by ECPs either, said Dr. Wesley; but historically there have been few readily available contact lens options for them.

Several in the group acknowledged that early toric and multifocal soft contact lens designs were often inconsistent and troublesome to fit. However, while lens material and design improvements have changed the technology available, in many cases, practice patterns have not changed. Dr. Wesley suggested that many ECPs may be unfamiliar with the technology used in contemporary toric and multifocal contact lenses—even if they know, in theory, that advances have been made. Additionally, she pointed to the fact that there may be a lingering perception that these lens types

simply take too much chair time, preventing some ECPs from even trying to work with them.

Dr. Giedd and others in the group agreed that proactively offering contact lens wear as an option is not only good for patients, but can also be a strategy for growth and differentiation of the practice. However, in the past, not all presbyopic patients with astigmatism who might be interested in and otherwise eligible for soft contact lenses have had a readily available choice.

Dr. Brujic agreed, noting that although his practice focuses on offering contact lenses to anyone who is a candidate, the additional hurdles perceived to be involved with specialty contact lens prescribing have often meant that presbyopic astigmats are left out. The group also observed that smaller barriers, such as whether a patient is classified as a “spectacles-only” wearer in the electronic health record (EHR) system, or whether or not a visit is explicitly scheduled as a “contact lens exam,” can negatively impact the perception before the patient even walks into the office, shaping who may be offered contact lenses.

Beyond specialty contact lenses, complex options and compromises have often been necessary to help presbyopic astigmats wear contact lenses with some degree of success. As Dr. Giedd shared, for many presbyopic patients the use of soft multifocal contact lenses has grown as the lens modality of choice over the past decade or so. However, for presbyopes with astigmatism, it has been necessary to “revert back” to options such as monovision, a combination of single-vision toric contact lenses and reading glasses, or spherical equivalent multifocal lenses for patients with a relatively low cylinder correction. Each of

**Table 1. Bausch + Lomb ULTRA® Multifocal for Astigmatism Design and Lens Parameters**

MATERIAL	samfilcon A
LENS MATERIAL TECHNOLOGY	MoistureSeal® technology
WATER CONTENT	46%
OXYGEN PERMEABILITY	114 Dk
LENS DESIGN TECHNOLOGIES	3-Zone Progressive™ design OpticAlign™ design
BASE CURVE	8.6 mm
DIAMETER	14.5 mm
SPHERICAL POWERS	+4.00D to -6.00D in 0.25D steps
CYLINDER POWERS	-0.75D, -1.25D, -1.75D
AXES	10° to 180° in 10° steps
ADD POWERS	Low: +0.75D to +1.50D High: +1.75D to +2.50D
VISIBILITY TINT	Light blue
WEAR SCHEDULE	Daily wear and up to 7 days extended wear
REPLACEMENT SCHEDULE	Monthly

these options presents a level of compromise, where patients do not receive the opportunity to fully correct their vision at all distances with contact lenses.

Recognizing the importance of this correction often comes with truly understanding the impact on patients’ lifestyles. Entering the presbyopic population herself, Dr. Giedd reiterated that presbyopes are active, professional people who are no more willing to compromise their vision than they were in their teens, 20s or 30s.

### The Lens – Proven Material, Straightforward Fitting

As a whole, the group expressed enthusiasm about having the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens available to their patients. Marrying a specialty lens technology with the ease and convenience of a familiar silicone hydrogel lens material, said Dr. Brujic, can overcome barriers for practitioners and patients.

The utility of a full fitting set could hardly be overstated by the roundtable participants. The

“instant gratification” of a lens that can be fit right away—versus having to give patients a lengthy explanation of the process—should remove many of the conversational barriers, and the entire group anticipated a positive conversion rate to contact lenses as a result.

Dr. Giedd, who prides herself on being able to talk to contact lens patients about something different each year, felt especially gratified to finally be able to offer an innovative, readily accessible contact lens option to the presbyopic astigmats in her practice. Drs. Epstein and Karpecki again highlighted the opportunity for practice differentiation: Any novel, long-anticipated technology like this, said Dr. Karpecki, has the potential to create excitement among practitioners, staff, and patients alike.

Dr. Epstein also praised the MoistureSeal® technology as an innovative approach to managing contact lens surface moisture and moisture retention. He noted that any level of tear film instability is likely to be a challenge to successful lens wear.<sup>5</sup> However, he also pointed out that Bausch + Lomb ULTRA®

## Bausch + Lomb ULTRA® Multifocal for Astigmatism Fitting Guide

### Initial Fitting

- STEP 1: Update spectacle refraction and Add power
- STEP 2: Select toric lens power (adjusted for vertex distance, if necessary)
- STEP 3: Select Add power according to the following guideline:

SPECTACLE ADD	BOTH EYES
+0.75D to +1.50D	Low Add
+1.75D to +2.50D	High Add

### Evaluating

- Allow trial lenses to equilibrate for at least 10 minutes before assessing fit and vision
- Confirm axis orientation
- Evaluate distance and near vision binocularly in normal room illumination
- If vision at distance and near are satisfactory, dispense lenses and schedule follow-up exam within 1 to 2 weeks

### Refining

If refinement is needed, confirm the axis orientation, determine eye dominance, and follow the guidance below:

		NEAR VISION		DISTANCE VISION		
		DOMINANT EYE	NON-DOMINANT EYE		DOMINANT EYE	NON-DOMINANT EYE
IF PATIENT IS WEARING:	TWO LOW ADDS	<b>Initial Lens</b>	Low Add	Low Add	<b>Initial Lens</b>	Low Add
		<b>Refinement 1</b>	Low Add	High Add	<b>Refinement 1</b>	Bausch + Lomb ULTRA® for Astigmatism
	<b>Refinement 2:</b> If vision is still unsatisfactory, make small changes by adding +0.25D at a time to non-dominant eye (wearing High Add lens) using hand-held lenses, and continue evaluating vision binocularly in normal room illumination. Adjust contact lens power when vision is satisfactory.			<b>Refinement 2:</b> If vision is still unsatisfactory, make small changes by adding -0.25D at a time to dominant eye (wearing Bausch + Lomb ULTRA® for Astigmatism) using hand-held lenses, and continue evaluating vision binocularly in normal room illumination. Adjust contact lens power when vision is satisfactory.		
	TWO HIGH ADDS		DOMINANT EYE	NON-DOMINANT EYE		DOMINANT EYE
<b>Initial Lens</b>		High Add	High Add	<b>Initial Lens</b>	High Add	High Add
<b>Refinement 1</b>		High Add	Add +0.25D to the non-dominant eye	<b>Refinement 1</b>	Low Add	High Add
<b>Refinement 2:</b> If vision is still unsatisfactory, make small changes by adding +0.25D at a time to non-dominant eye using hand-held lenses, and continue evaluating vision binocularly in normal room illumination. Adjust contact lens power when vision is satisfactory.			<b>Refinement 2:</b> If vision is still unsatisfactory, make small changes by adding -0.25D at a time to dominant eye (wearing Low Add lens) using hand-held lenses, and continue evaluating vision binocularly in normal room illumination. Adjust contact lens power when vision is satisfactory.			

contact lenses combine material and manufacturing technologies that facilitate both remarkable surface wettability and moisture retention.<sup>4</sup> Patient comfort while wearing Bausch + Lomb ULTRA® lenses and ECP familiarity with the material in sphere, toric and multifocal products will provide a good foundation of what to expect from the Bausch + Lomb ULTRA® Multifocal for Astigmatism lenses.

This advantage of familiarity extends to the optical properties as well. Stability is the key with any toric contact lens, said Dr. Brujic, who pointed to the established performance of the OpticAlign™ design used in Bausch + Lomb ULTRA® for Astigmatism lenses.

Dr. Gaddie added that the speed of fitting has been truly impressive with the Bausch + Lomb ULTRA® for Astigmatism lens.

Everyone has different barriers to entry, Dr. Brujic acknowledged, particularly for toric contact lenses. In the past, practitioners may have not corrected, or used spherical equivalent, for cylinder power of less than a diopter in a presbyopic patient. However, with the availability of the -0.75D cylinder power in a multifocal option within a fit set, he said, the barrier of availability is reduced, and it becomes almost imperative to at least try (Table 1). A lower barrier to entry will mean more presbyopic astigmats who have a chance of full refractive cor-

rection in contact lenses, which could translate to more happy patients.

Familiarity with optics could also be considered related to consistency of vision across all distances, recognizing the importance of the need for lens performance at near, intermediate and distant targets.

The 3-Zone Progressive™ design used in the Bausch + Lomb ULTRA® for Presbyopia lens has been used in the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens as well. Several in the group observed that the 3-Zone Progressive™ design has made multifocal contact lens fitting predictable and pointed to a track record of success in their non-astigmatic patients.

As Dr. Giedd noted, this multifocal design has demonstrated in practice that a wide range of add corrections can be addressed with just two add powers. The ability to extend that technology, broadening it to the toric platform, she said, is tremendously exciting.

### The Rollout – Preparing to Put Innovation into Practice

The group's enthusiasm about bringing these material and design technologies together was palpable. On the other hand, recognizing that even the best technologies can have little impact without people to champion them, moderator Dr. Karpecki shifted the group's attention to how each of the participants would think about incorporating the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens.

Dr. Gaddie reemphasized the importance of practice-wide commitment from staff and collaboration in conversations about contact lens wear. Particularly for patients who may have been told in the past that they are not candidates for contact lens wear, or perhaps dropped out due to a lack of options, it is necessary for the ECP and practice staff to initiate the conversation. To be most successful, practitioners and their staff have to engage with common language as they explain to patients that there are options for presbyopia and astigmatism correction.

For Dr. Gaddie, the process starts when an appointment is made, when staff routinely ask whether the patient is wearing contact lenses or is interested in doing so; and moves on to the check-in and waiting process, where staff can ask questions about visual needs and interests, and where materials about contact lens options for presbyopia are displayed. While these could



### In Their Own Words: Our Panelists Share Their Thoughts

**Paul M. Karpecki, OD, FAAO:** “Our industry has seen an incredible number of advancements in the last few years. Everything from silicone hydrogel lens modalities to expanded parameters for astigmatism and presbyopia. We have so many things that are available to us now to help our patients. So you look at that and then when you start looking at the statistics, you realize there are a lot of opportunities.”

**Arthur Epstein, OD, FAAO:** “There’s a sweet spot of a subset of patients who have both astigmatism and presbyopia, and many of these patients also have ocular surface challenges and would like to get back into contact lenses. I think the technology has finally gotten to the point where we can answer those problems.”

**Gina Wesley, OD, MS, FAAO:** “As we look at the opportunity to be able to help these patients, it’s a tremendous opportunity for our profession. And when you have advancements in lens technology that can meet those needs, it elevates us all, and I think that’s really exciting.”

**Mile Brujic, OD, FAAO:** “The reality is that nearly every presbyopic patient requires some type of refractive correction. Yet, when you look at the number of people who are presbyopic who are wearing contact lenses, it is infinitely small compared to the number of individuals that potentially can be or should be at least offered contact lenses.”

**I. Ben Gaddie, OD, FAAO:** “Being able to just tell the patient, ‘I have something I want you to try,’ and you go and grab the lens and put it on the patient without having to go through a big explanation of what you’re doing; and instead of having to order a lens, have a patient make a financial commitment just to get started with the fitting process—to have that lens and put it on and say, ‘What do you think?’ I think your conversion rate is going to be high.”

**Kerry Giedd, OD, MS, FAAO:** “There is this huge population of people that has astigmatism, they’re presbyopic, and, historically, I felt like I had nothing to say to them. It’s been the case that there really hasn’t been anything new, different, readily available or easily accessible for these patients. And so to have an option coming to market that is available is just a complete game changer in my practice.”



# Roundtable Highlights

## Key Takeaways

- There is a need for more contact lens options for presbyopic astigmats
- Like presbyopes generally, presbyopic patients with astigmatism are active and have dynamic visual needs—their expectations are high
- The Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens combines proven material and optical technologies to offer wettability and moisture retention, stability, and speed of fitting
- To successfully incorporate the lens into practice:
  - Focus on staff and patient education
  - Consider using the EHR to identify good candidates, including low astigmats
  - Use the fitting guide

seem like small details, he expressed some urgency around the issue: as he put it, if patients don't feel that their vision-related needs or desires can be met through the practice, they are likely to look elsewhere.

When introducing a lens, Dr. Wesley starts with staff education, and noted that she uses her EHR system to help identify patients who may be appropriate candidates for the Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens. Having these patients identified before they come in, she and her staff are prepared to introduce the lenses and communicate the features and benefits. Dr. Brujic suggested that patients with relatively low astigmatism would be excellent first candidates. In his practice, he has already been setting the stage for low astigmats currently wearing the Bausch + Lomb ULTRA® for Presbyopia lens, showing them the cylinder correction with a loose lens and letting them know that a lens like this would be available soon.

Dr. Giedd agreed, saying she

would encourage practitioners to start getting comfortable with the existing Bausch + Lomb ULTRA® for Presbyopia as well as the Bausch + Lomb ULTRA® for Astigmatism lenses, as this would provide a natural on-ramp to using the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens.

With just a little experience, the Bausch + Lomb ULTRA® family of lenses are easy and very straightforward to fit, Dr. Epstein shared.

## Setting Up for Success

Dr. Karpecki asked the roundtable participants what they thought success would look like with use of the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens. Dr. Wesley cited patient satisfaction, pointing to the importance of education on the front end, and letting patients speak for themselves. Dr. Brujic suggested that after fitting a few patients with the lens, practitioners would start to become comfortable with the fitting process and develop reasonable expectations of performance.

Dr. Gaddie expects a success rate similar to what he has experienced with the Bausch + Lomb ULTRA® for Presbyopia contact lens. Dr. Epstein agreed, pointing in particular to the straightforward fitting.

Indeed, as Drs. Epstein and Karpecki emphasized to the group, the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens should shatter the misconception of toric multifocal contact lenses as being especially complex. While the optical and material technologies going into the lens may in fact be complex, a great deal of work has gone into helping ensure that the fitting process is not. As a corollary, Dr. Giedd brought up the fitting guide—a well-developed but often underutilized tool. Contact lens fitting guides, she indicated, are honed with clinical trial

experience and expert input, and not only can using the fitting guide increase the likelihood of success, it may also reduce the level of intimidation felt by a practitioner just starting out with a lens.

The Bausch + Lomb ULTRA® Multifocal for Astigmatism contact lens can change the landscape for presbyopic astigmats, said Dr. Giedd. She noted that while there is tremendous competition out there, fitting and prescribing a lens like this one can remind patients of the importance of the ECP as the expert in fitting the most appropriate contact lenses while evaluating and maintaining one's overall ocular health.

In closing, the discussion returned to the real opportunity—maximizing the patient experience, for those patients who believe they are ineligible for contact lenses, for those who have tried contact lens wear in the past but have dropped out, and for those who need to be offered contact lenses as an option by their ECP. The addition of the Bausch + Lomb ULTRA® Multifocal for Astigmatism lens to the Bausch + Lomb ULTRA® family of contact lenses is expected to help provide an innovative option and exceptional experience for presbyopic patients with astigmatism. ■

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# Skill-building helps patients commit to healthy contact lens habits

It takes both innovative technology and education for patients to get the most out of contact lenses



**Mile Brujic, OD, FAAO**  
Partner, Premier Vision Group  
Bowling Green and Lima, OH

**A**s eye care providers, we are our patients' window into the world of contact lens care. Since most patients aren't well versed in contact lens technology, they rely on us to recommend products that suit their needs. It would be wonderful if every patient acted on our advice and completely committed to our eye care recommendations, but the reality is that education is ongoing—our patients need reminders at every visit.

I frequently advise my patients to use specific contact lens care products, only to find out a year later that they ended up using something else. When it comes to patient follow-through on my recommendations, I've learned to trust what patients show me, not what they tell me. That's why I ask patients to bring in their contact lenses and lens care products at each visit. If I see what they use, it helps me address their specific challenges as I guide them toward enhancing their experience.

With each recommendation, I try to give my patients skills as well as knowledge. It's not enough for me to ask my patients to take my word for it, or even to explain my reasoning. Many patients also need specific instructions to help them gain confidence in handling contact lenses. Some may need help developing hygienic habits that contribute to eye health; others may need help staying motivated to follow through with contact lens wear. My goal is to send each patient home with a mental checklist of daily tasks to help them build a solid contact lens care routine.

## The benefits of Biotrue® multi-purpose solution

When I talk to my patients about contact lens care, I frame the conversation around what it means to them. I point out that today's contact lenses and care solutions are more advanced than in the past.

Biotrue® multi-purpose solution is optimized to work with today's innovative contact lenses. Its pH matches that of healthy tears, and its bio-inspired technology contains hyaluronan, a lubricant found naturally in the eyes. It keeps healthy tear proteins active to promote tears' antimicrobial properties. Of course, I phrase all of that differently to my patients.

My patients are happy to hear that Biotrue® multi-purpose solution helps promote healthy and comfortable contact lens wear. Combining the solution with Bausch + Lomb ULTRA® contact lenses provides comfort on insertion that lasts all day. Patients enjoy the experience so much that they almost forget the lenses are in their eyes.

**My goal is to send each patient home with a mental checklist of daily tasks to help them build a solid contact lens care routine."**

One benefit of Biotrue® multi-purpose solution can get overlooked: it comes in a clear bottle. This allows patients to see how much solution is left, so they can plan to buy a new bottle before the old one is empty. Opaque bottles can result in patients running out of solution unexpectedly, leaving them without solution until they have time to buy more. People with busy schedules appreciate this small but meaningful detail.

## One change can simplify the everyday routine

A 35-year-old nurse recently asked me for guidance with her monthly replacement contact lenses. She told me that the time she spent on computers at work was taking its toll on her eyes. She was experiencing dryness with her contact lenses, and her busy workday at the hospital didn't allow her to stop and remove her contact lenses until she got home.

I asked to see the lens care products she was using, and she brought out a plastic bag containing several half-empty bottles. She was using a brand of solution that I hadn't recommended, along with multiple kinds of drops, and her contact lens case was several years old. The whole collection was an unhygienic mess.

I asked her why she was using so many different products. She said that each item had worked for her at one time, so she had kept them all. I gently suggested that she

## Bio-inspired innovation helps promote healthy and comfortable lens wear

Biotrue® multi-purpose solution

- Matches the pH of healthy tears (7.5) to enhance the efficacy of the dual disinfectants
- Keeps lysozyme active, helping maintain tears' inherent antimicrobial activity
- Contains hyaluronan (HA), a lubricant found naturally in the eyes
  - a. Stabilizes the tear film and reduces friction
  - b. Attracts moisture to the lens surface to envelop the lens in a moisture-rich cushion
  - c. HA remains on the lenses for up to 20 hours

## Empowering patients through communication and direction

By giving my patients the right tools, I can help them tackle their unique challenges. I ask questions and listen, and then I help patients define specific goals with targeted instructions to help achieve them. Narrowing their focus can help patients see the path to success. With this kind of support and Bausch + Lomb products, patients can move toward exceptional eye care with confidence.

try Biotrue® multi-purpose solution and Bausch + Lomb ULTRA® contact lenses. I also gave her a specific recommendation for rewetting drops and discussed the importance of replacing her lens case on a regular basis. At that visit, we disposed of all the other products she was using.

At her follow-up, she told us that the combination of Bausch + Lomb ULTRA contact lenses and Biotrue® multi-purpose solution was extremely comfortable. She thanked me and expressed confidence that she could commit to her new plan. Using innovative contact lenses with Biotrue® multi-purpose solution not only provided her with all-day comfort, it also helped simplify her routine.





# Dry Eye: It's a Vision Disease

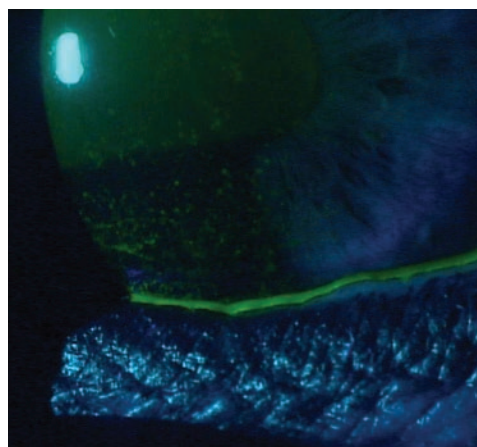
A compromised tear film can have a significant effect on patient satisfaction, most notably in contact lens wearers. **By Paul M. Karpecki, OD**

As decades of research have revealed, the tear film is exceedingly complex, and maintaining its integrity is essential to visual quality. The precorneal tear film forms the primary refracting surface for light entering the visual system, with the air-cornea interface accounting for around 40D of the optical system's power.<sup>1,2</sup>

Let's explore what we know about how dry eye impacts vision and consider how to minimize the additive challenges imposed during contact lens wear.

## The Tear Film and Vision

The tear film is composed of three layers: a mucin layer, an aqueous layer that forms a progressive matrix and a thin, external lipid layer.<sup>3,4</sup> The lipid layer, which is typically 90nm or more in a healthy eye, is less than



**This patient has significant incomplete or partial blinks that exacerbate their symptoms of dry eye.**

1/30th the thickness of the entire tear film.<sup>5</sup> This layer in particular is vitally important to vision and, unlike the aqueous, is more continuous and naturally resists evaporation.<sup>1</sup>

In healthy eyes, the tear film provides a smooth surface over the cornea between blinks; in dry eye patients, the tear film becomes unstable more quickly, often prompting patients to unconsciously make the inter-blink interval shorter.

This useful diagnostic clue is easy to miss. During standard visual acuity testing, patients can compensate for unstable vision by blinking more frequently, even allowing them to read the 20/20 line. Although temporarily clearing vision by blinking is an effective way to pass a vision test,

it's not practical in daily life from a functional standpoint. When acuity is measured after the patient suspends blinking for several seconds, those with dry eye perform significantly worse.<sup>6</sup>

## Contact Lenses and the Tear Film

Tear film integrity is more complicated—and critical—in contact lens wearers. Not surprisingly, contact lens wearers have a two- to threefold increased risk of developing dry eye.<sup>1</sup>

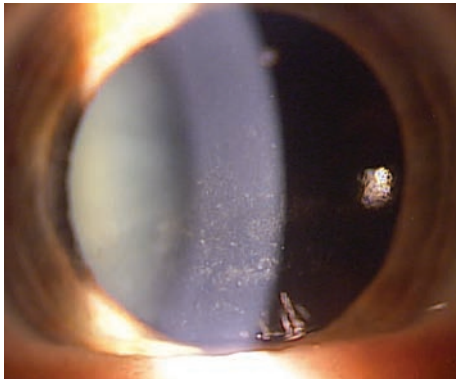
This is because, generally speaking, the tear film is more unstable over the contact lens surface than it is over the cornea.<sup>7</sup> The lens splits the tear film into a pre- and post-tear film, and the usual 7µm thickness on a healthy eye becomes only about 1µm to 2µm in the pre-lens tear film.<sup>8</sup> The post-lens tear film consists of a thinner lipid layer, which induces increased evaporation and reduced tear volume compared with an uninterrupted tear film.<sup>9</sup>

With lens wear, the tear film undergoes extensive biophysical and biochemical changes that can influence both tear function and contact lens tolerance.<sup>1</sup> One study found three months of hydrogel lens wear led to an increase in osmolarity from approximately 284mOsmol before lens wear to roughly 313mOsmol after.<sup>10</sup> Other researchers note soft lens wear can reduce tear break-up time from 15 to 30 seconds before

**Table 1. Dry Eye Assessment<sup>18,19</sup>**

Initial Questions
<ul style="list-style-type: none"> <li>• How do your eyes feel (i.e., any burning, stinging, dryness, grittiness or tearing)?</li> <li>• How do you feel your eyes look (i.e., are they red or irritated)?</li> <li>• Have you noticed any blurred or fluctuating vision?</li> <li>• Do you use or feel the urge to use artificial tears or re-wetting drops?</li> </ul>
Follow-up Testing for Any Positive Responses
<ul style="list-style-type: none"> <li>• Assess risk factors (e.g., digital device use, certain medications, smoking, age, systemic diseases, previous ocular surgery and contact lens wear)</li> <li>• Validated questionnaire (e.g., DEQ-5, OSDI and SPEED)</li> <li>• Global dry eye assessment test (e.g. corneal staining, TFUT and osmolarity)</li> <li>• Subtype the dry eye such as evaporative by expressing and examining the meibomian glands</li> </ul>





**This patient has significant corneal staining and ocular surface dryness.**

lens wear to less than 10 seconds with the lenses—and this was independent of lens material or replacement regimen.<sup>11</sup>

As a result, visual performance degrades as the tear film breaks up over the contact lens surface.<sup>12</sup> Likewise, changes in tear film quality, contact lens hydration or both can lead to visual performance variations.<sup>12</sup> Finally, contact lens wearers experience dry eye symptoms sooner than non-wearers in part because they need about twice as many meibomian glands yielding liquid secretions.<sup>13</sup>

From a material standpoint, the refractive index of a contact lens is related to its water content.<sup>7,14</sup> As such, tear film loss in the regions of tear break-up can dehydrate local areas of a contact lens, increasing the local refractive index.<sup>7</sup> Interestingly, studies suggest that in the area of tear break-up, the local residual tear film demonstrates osmolarity spikes that can alter the refractive index of the tear film and affect vision.<sup>7,15</sup>

### Intervention Begins with Prevention

In clinical practice we rarely consider the tear film from a refractive standpoint, but we should, especially in our contact lens wearers. A thorough assessment of the tear film prior to prescribing contact lenses can provide

valuable information about the patient's ocular health and chances of success in contact lenses (Table 1).<sup>16,17</sup>

Armed with this information, clinicians can make informed decisions on each patient's lens choice and care system, both of which can affect the dry eye patient's visual experience.

**Lenses.** Consider how long the contact lens material can retain moisture—not just in the short term, but throughout the day.

This differs for every lens, so it is important to be familiar with the marketing materials for the lenses you are prescribing. And if patients are already experiencing blurred or fluctuating vision, consider a lens upgrade with a different material, replacement schedule or both. Pay close attention to presbyopic and menopausal patients who are already at a greater risk of developing visual symptoms.

**Contact lens care system.** Make sure patients understand that not just any solution will do. Studies show that blink frequency is increased from 15.5 blinks per minute to more than 20.3 in patients with dry eye and contact lens-related dry eye symptoms.<sup>8</sup> Fortunately, some care solution wetting agents can help restore a normal blinking frequency, possibly because the polymeric agents adsorbed onto the contact lens surface gain a longer residence time at the ocular surface.<sup>12</sup>

Our understanding of dry eye has grown immensely in the past decade, and we now have a much better grasp on how to address inflammation and concurrent meibomian gland disease. However, far less attention has been paid to the tear film as it relates to visual quality. This may be the next frontier in dry eye care, as the latest innovations in contact lens technologies, such as new lens materials, surface

coatings and cleaning solutions, have been developed specifically to address these concerns. ■

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**Lid expression is another critical clinical step to determining early potential lens issues.**





# A New Generation

Astigmatic patients who are in need of multifocal contact lenses can look toward soft lenses with greater confidence. **Edited by Joseph P. Shovlin, OD**

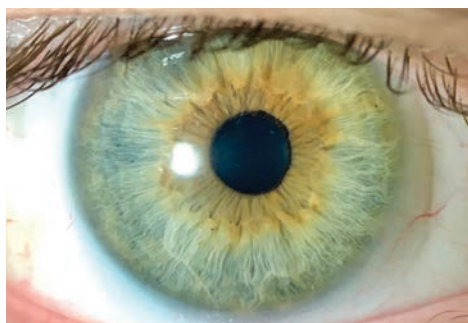
**Q** I've had trouble fitting multifocal contact lenses in the past, so I reserve them for "easy" cases like early presbyopes with spherical refractive error. However, I would like to expand and reach more patients. How should I begin the work-up of an astigmatic patient who also needs near vision correction? And if the prescription requires an adjustment to the cyl or the add, how can I improve one without compromising the other?

**A** "Fitting complex contact lens patients is part of the 'art' of clinical optometric practice," says Glenda Secor, OD, of Huntington Beach, CA. "The 'science' gives us tools, but practitioners are constantly challenged to meet unmet needs and exceed expectations. As in any special case, success delivers exceptional praise, and anything less is often disappointing."

## A Changing Market

Historically, presbyopic astigmatism has lacked easy opportunities to achieve success with contact lenses, according to Dr. Secor. While multifocal gas permeable and hybrid lenses offer outstanding optics, the learning curve is high and these options aren't always patient-friendly. Soft lenses provide excellent comfort but age causes physiological changes to the tear film, compromising the ocular surface. Finally, doctors and patients alike find custom orders frustrating.

Dr. Secor says the chances of finding success with multifocal



Soft lenses are an option for patients who require multifocals and astigmatism correction.

Photo: Alex Nikon, OD and Erin Ruffin, OD

presbyopic contact lenses, however, are increasing with new generations of lenses approaching the market that should simplify the fitting process. She notes that positive outcomes with these lenses largely depend on clinicians' enthusiasm, optimism and willingness. She adds that meeting your patients' needs, not your own, should be the backbone of the management plan so that you're able to optimize your patients' outcomes and achieve success as *they* define it using your clinical guidance and expertise. Following the manufacturer fitting guides and adhering to a few simple steps is often enough to help you get over any bumps in the road, she says.

## Switching Things Up

Practitioners typically recommend a monovision approach or supplemental spectacles over astigmatic contact lenses for patients who are accommodatively challenged, according to Dr. Secor. Rather than recommending monovision or reading glasses, however, she says

applying a balanced technology approach and using our experience with enhancing non-astigmatic multifocal contact lenses can help.

Dr. Secor says simple first steps should include taking a refraction vertexed for the spherical and cylindrical components. She suggests starting with the least minus or most plus spherical powers and the least cylinder correction from

the spectacle lens in the initial diagnostic lens.

She also recommends making add powers the lowest powers to meet your patients' needs. In today's age of digital device overload, she says intermediate vision is critical for patient acceptance. She adds that rotational axis compensation for a toric multifocal is the same as any toric lens and is necessary for best acuity.

Fortunately for today's patients, almost all current toric soft lenses are highly stable and reproducible. Using binocular vision testing with real-life visual tasks, making incremental changes to your approach and allowing patient adaptation all enhance the contact lens wearing experience. And in the event that a patient is struggling, following the manufacturer fitting guides will increase your chances of success.

Regardless of your past experience, new modalities give you more options to work with and offer patients another chance at success with contact lenses. Don't miss that opportunity. ■

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<sup>1</sup> McLaurin E, Cavet ME, Gomes PJ, Ciolino JB. Brimonidine ophthalmic solution 0.025% for reduction of ocular redness: A randomized clinical trial. Optom Vis Sci. 2018;95(3):264-271  
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# One Step Forward For Presbyopes

An innovative monthly contact lens could benefit both patients and practitioners alike. First, we have to do our job and put it on each candidate's radar.

By Mile Brujic, OD, and David Kading, OD

While contact lenses that aim to correct presbyopia and astigmatism simultaneously have existed for some time, they are a currently made-to-order option and usually take a few weeks to arrive. The initial lens parameters must be chosen without the benefit of an on-eye trial. Once the lenses come in, an optometrist can only hope they've ordered the right parameters for a successful fit for their patient. Otherwise, we have to place another order for a whole new set of lenses, which drags the process on even longer.

Clearly, time is not on our side with these backlogged contact lenses for patients who need them in a matter of days, not weeks or months. It's also a process that's clearly not on par with the vast majority of our other lens fitting protocols. Nearly all other contact lens patients can benefit from the real-time experience of trying the lenses that they're considering during the exam and initial fit.

Hoping to fulfill this unmet need and give these patients the best chance possible, Bausch + Lomb designed a monthly replacement multifocal toric lens that will be available in-office for patients to be fit with. Instead of being beholden to a custom lens order's timeframe and having to schedule two separate visits—one for the initial examination, and another

for the lens dispensing and fitting—practitioners will be able to complete this process from start to finish in one session, saving time and money.

It will also give us a leg up in achieving a successful fit for the patient. By waiting to fine-tune these contact lenses until after a patient has adapted and tried them at home in real-world scenarios, practitioners are able to further cut chair time that would be spent prematurely adjusting the lens parameters before the patient even left the office.

## Widening Horizons

Optometrists tend to shy away from prescribing specialty contact lenses unless a patient has an atypical prescription or amount of astigmatism, due to the lengthy timeline they entail. Most manufacturers consider less than 1D of cylinder their sweet spot for soft lenses; for example, patients with 0.75D of cylinder during their non-presbyopic years can usually still wear traditional multifocal designs without astigmatism correction, even though these modalities dramatically reduce their clarity of distance and near vision. So, many patients with astigmatism who could stand to benefit from multifocal contact lenses haven't been offered them as an option and may not even know that they exist in the first place. This won't be the

case with this monthly contact lens, which will be readily available for stocking in the office.

The lens will give practitioners the ability to help patients who have been seeking a better fit for their lifestyles but haven't been able to achieve it with existing vision correction options, such as single vision soft lenses and spectacles. Just because contact lenses may not have worked for someone in the past, however, doesn't mean they won't work for them now. Innovations in contact lens technologies and designs are allowing us to address issues, such as discomfort and dry eye, that were deal-breakers in the past. This is a conversation we should have right off the bat with our patients so they're aware that their old problems can be solved by new solutions.

## Presenting All Options

The first, and most important, step you should take is changing the way you frame patient discussions so that you're able to educate all patients on the full scope of their options, which may include glasses, contact lenses or even refractive surgery. Even more advanced options could include ortho-K and, maybe one day, eye drops.

Every patient who doesn't have ocular health issues predisposing them to additional risks is a candidate for contact lenses and should be aware of it. Not sharing all op-

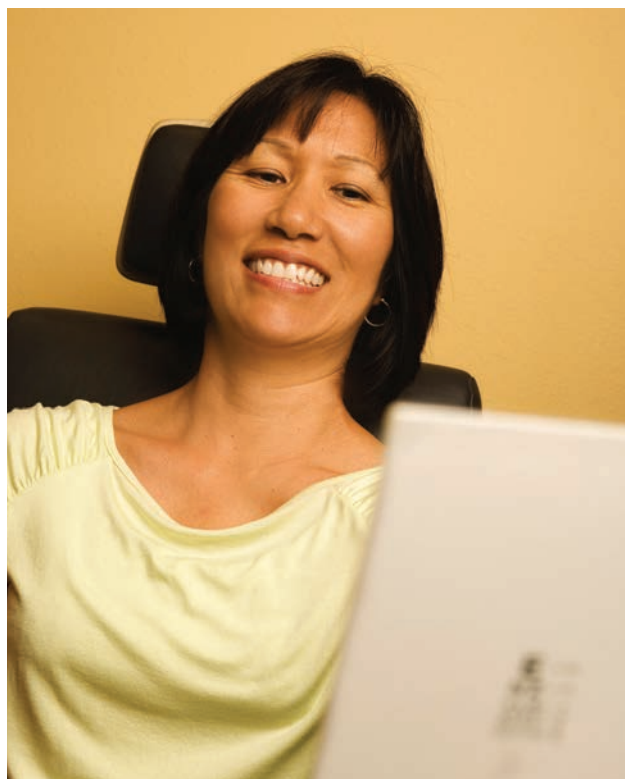


tions with them would be doing them an injustice. If you're able to think of contact lenses as a *treatment*—not merely a product—it starts to become clear that you as the practitioner have an obligation to discuss all options available for managing refractive error and presbyopia, just as you would talk about the entire range of management options available for, say, AMD or dry eye.

When patients don't hear about contact lens options from us, they may find out elsewhere and then question why we weren't the ones to offer them in the first place. But even more likely is that they won't hear about it at all and contact lenses will completely escape their notice without our input.

The biggest roadblocks that have kept us from having these necessary conversations with patients and recommending better, though more costly, treatment options are the uncomfortable nature of discussing fees and the worry that we are 'selling' something to our patients. While talking about pricing can be awkward at times, we must realize it is presumptuous to decide whether a patient can afford or will be interested in a certain product or service based on how much it costs and to then exclude it from the conversation altogether. Our job is to educate—and listen.

It's worth noting that, oftentimes, patients aren't so concerned about pricing once they understand the value of the product



Getty Images

**Contact lens advancements are allowing more multifocal patients to read comfortably without glasses.**

or service they could potentially receive. Unfortunately, ODs too often focus more on price than value when discussing contact lenses. Concentrate on the goal—good vision—and let the patient decide which avenue is worth pursuing.

It's also crucial for our patients' success that we don't view what we're doing as selling something but rather as educating the patient and giving them agency in their treatment decisions.

### Adaptation Issues

The conversation for and against contact lenses differs for each and every patient. While some who switched from contact lenses to glasses say they did so because the lenses were a nuisance, the exact opposite is true for some who now wear glasses. Many want to switch

to contact lenses because of the added convenience and aesthetics. Clinicians can overcome many complaints about contact lens wear by addressing any underlying issues, such as dry eye or an uncomfortable fit.

But for a new presbyopic patient who has never worn glasses or contact lenses, it can be incredibly challenging to adapt to a pair of progressive addition lenses of any kind. Glasses add an extra layer of adaptation with the look and feel of the spectacles themselves. This is where Bausch + Lomb's monthly disposable toric multifocal contact lens can play a unique role. With contact lenses, the patient only has to overcome the "mental hurdle" of placing something on their eye

and to adapt to the optics, and can sidestep any potential aesthetic issues.

### Ready and Waiting

The current market is much more primed for contact lenses than we tend to think it is. While most patients were motivated to wear contact lenses for cosmetic purposes in the past, today's options have made lenses invaluable for their mental health aspects (how we feel and are perceived) as well.

As front-line clinicians, it's up to us to make sure our patients are receiving the best care for their eye health and vision. With modern advancements in contact lens technologies, we can now serve those who have both astigmatism and presbyopia to the best of our abilities. ■



# Capture the Opportunity

There are literally millions of astigmatic presbyopes in the US alone. Here's a snapshot of one archetype you may encounter. How will you respond?



**Patient profile:** Rochelle is a 49-year-old engineer. She spends most of her workday in front of the computer and says she is “addicted” to her smartphone. When not working, she loves to watch her son out on the hockey rink. In the summer, she golfs as much as she can, and she’s an avid reader.

**History:** Rochelle’s medical and ocular histories are unremarkable. Though she is slightly myopic and astigmatic, she had gotten by without wearing glasses until she felt the onset of presbyopia. Now, she needs vision correction full time and wears glasses; she has never tried contact lenses.

Her eye care provider had prescribed progressive addition spectacle lenses (PALs), but despite wearing them dutifully for two weeks, Rochelle found herself unable to adjust. She said she felt nauseated throughout those two

weeks, and was bothered by the visible edges of her frames and the need to constantly move her head to see clearly.

**Current vision correction:**

Rochelle now uses a few different pairs of single-vision eyeglasses depending on the task at hand (ie, distance-only for driving or watching hockey; intermediate only for the computer; and near only for reading).

Her current Rx is:

OD:  $-0.50 -0.75 \times 180 +1.50$  add

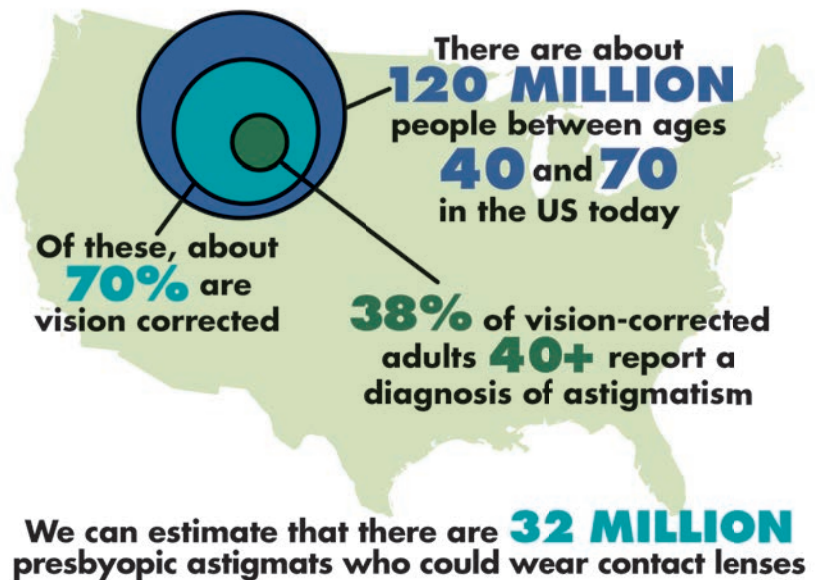
OS:  $-0.75 -0.75 \times 180 +1.50$  add

Her right eye is dominant.

Rochelle is frustrated with her current vision correction and

wishes she no longer had to keep track of multiple pairs of glasses. Although she is very interested in contact lenses, she is worried that they will be uncomfortable and that she will feel them in her eyes all day. Given what she understands about multifocal contact lenses, Rochelle is hopeful that she could wear multifocal contact lenses and not experience the issues she had with PALs.

**Question:** What would you recommend for Rochelle? How would you approach the conversation with her? Would you consider fitting her with a multifocal toric contact lens? ■



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