

# Review of

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# Cornea & Contact Lenses



JUNE 2009

# POWER

of the

# Patient

**Controversies  
in compliance  
and wearing  
schedules**

**IN THIS ISSUE:**

- Controversies in Wearing Schedules
- The Epidemiology of MK in Lens Wearers
- A New Dimension for Colors
- Nasal Allergies and the Eye
- Expand Your Contact Lens Profits

SUPPLEMENT TO

**REVIEW**  
OF OPTOMETRY

JUNE 2009



## IN THE NEWS

- **The TearLab Osmolarity System** from OccuLogix, Inc. ( dba TearLab Corporation) has **received FDA 510(k) clearance**. The TearLab Osmolarity System is intended to **measure the osmolarity of human tears**, aiding in the diagnosis of patients with signs or symptoms of dry eye. This clearance allows the TearLab to immediately **begin market activities in the U.S. to clinical facilities** categorized as high or moderate complexity under the Clinical Laboratory Improvement Act of 1988.

- **Reichert Inc.** introduces the new, larger, more comprehensive **ClearChart 2 Digital Acuity System**, which offers a variety of **improved features** with no increase in price. Features in ClearChart 2 include sine wave grating contrast sensitivity testing, three calibrated light levels for contrast sensitivity and ETDRS testing, pediatric fixation animation with sound and patient education slides for efficient communication. The red/green color tones are adjustable for compatibility with any refraction system.

- For the **first time**, a learning module on **prescribing anti-reflective technologies** will be included as part of the **required practice management curriculum** for all 17 colleges of optometry in the U.S. The Vision Council will provide an educational grant to the Association of Practice Management Educators (APME), which approved this new curriculum, to design and deliver these learning modules.

# The Power of Suggestion

**H**ave your spectacle sales declined since the onset of the economic downturn? How about your contact lens sales? According to a study on Enhancing the Approach to Selecting Eyewear (EASE), there is a great way to influence both.

EASE is a multi-center practice-based study that examined the effects of fitting potential lens wear candidates with contact lenses prior to showing them the spectacle display.

Participants were randomly assigned to either a test group or a control group. Subjects in the test group were offered to be fitted with contact lenses prior to spectacle dispensing, and subjects in the control group were not. Researchers found that of the patients in the test group, 88% agreed to be fitted. Because of the subjects' improved vision, they were able to better choose their glasses and spent 32% more than

those who were not offered contact lenses. One-third of these patients proceeded to purchase contact lenses along with spectacles. Even at three months post-dispensing, 33% of subjects in the test group had purchased contact lenses vs. 13% of the control group.

"For those who are on the fence about trying contact lenses, I often insert the lenses after numbing eye drops," says Jason Miller O.D., M.B.A., a private practitioner in Powell Ohio. "This typically results in easier frame selection and a more successful contact lenses fitting process."

So, before another spectacle-wearing patient squints while perusing the frames display, offer him a trial contact lens fit and see the difference a suggestion can make.

1. Atkins NP, Morgan SL, Morgan PB. Enhancing the approach to selecting eyewear (EASE): a multi-centre, practice-based study into the effect of applying contact lenses prior to spectacle dispensing. *Cont Lens Anterior Eye*. 2009 Jun;32(3):103-7.

## Parameter Expansion

SynergEyes, Inc., has expanded the parameters of the SynergEyes Multifocal hybrid contact lens for presbyopia in order to address the needs of emerging presbyopes.

The SynergEyes Multifocal lens is now available in a +0.75D add power in addition to the three add powers (+1.25D, +1.75D and +2.25D) previously offered.

This lens uses hybrid technology that combines a rigid center and soft lens skirt to give presbyopes clear vision, both near and far. The lathed surface of the SynergEyes Multifocal lens provides full correction of corneal astigmatism while concentrating the visual optics within two distinct focal ranges. the company says.

These lenses are available in sphere powers ranging from +4.00D to -8.00D in 0.25D steps and -8.50D to -9.00D in 0.50D steps, a base curve of 7.10mm to 8.00mm in 0.10mm steps, skirt curvature of 1.0mm (steep) or 1.3mm (flat), and add segment size of 1.9mm or 2.2mm.

For more information, call 1877-733-2012, or go to [www.SynergEyes.com](http://www.SynergEyes.com).

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## Bilingual Eye Exam Guide

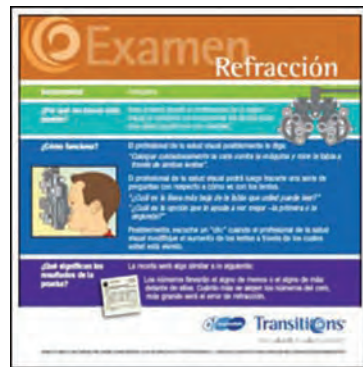
Transitions Optical has developed the "What to Expect: Bilingual Eye Exam Guide" to help facilitate dialogue between English-speaking eye-care practitioners and Latino patients during an eye examination. This free bilingual guide serves as a counter top waiting room display and illustrates key steps that will help reveal additional lifestyle-related information crucial to making the best possible recommendations for eye-care and eyewear.

The Bilingual Eye Exam Guide has twelve eight-by-eight-inch cards detailing each step of the eye examination process. The cards feature an illustration of how the test will be conducted and what equipment will be used. Also, the cards explain why the patient is taking the test, how each test works and what the results could mean to the patient's eye health.

The guide includes the following tests and exams:

- |                           |                       |
|---------------------------|-----------------------|
| <b>Preliminary Tests:</b> | <b>Examination:</b>   |
| • Near-Point.             | • Visual Acuity.      |
| • Color Vision.           | • Penlight.           |
| • Depth Perception.       | • Refraction.         |
| • Autorefractometry.      | • Biomicroscopy.      |
| • Visual Field.           | • Dilation.           |
| • Eye Pressure.           | • Goldmann Tonometry. |

To request the "What to Expect: Bilingual Eye Exam Guide," contact Transitions Optical Customer Service at 1-800-848-1506, ext. 7448.



## Larger Packaging

Odyssey Medical, Inc. announces that the Parasol non-sterile bulk pack of punctal occluders is now available in a large five-pair option. This new packaging configuration is available for those with uncommonly sized punctum.

The absorbable synthetic implant, Extend, is now offered in a 0.2mm size. This

size is available for those patients who would be better served by a small implant.

Also available is the Collagen Variety Pack, including 0.2mm, 0.3mm and 0.4mm sizes. To place an order or for more information, go to [www.odysseymed.com](http://www.odysseymed.com).



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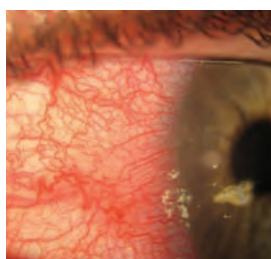
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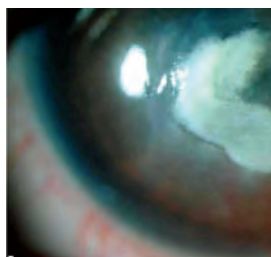
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# Power of the Patient

To what extent does a patient determine the replacement schedules for disposable contact lenses?

We know that the decision about the frequency of lens replacement ultimately rests in the hands of the patient, regardless of our recommendations. The battle waged by manufacturers and eye-care practitioners about adhering to a suggested replacement schedule has achieved some success, but data on the frequency of lens replacement show that patients will extend the life of their lenses, despite admonition from a whole host of sources.<sup>1</sup>

Most manufacturers recommend and strive for a monthly replacement schedule, while others still remain committed to the notion of “shorter is better.” Those advocating a monthly replacement cycle cite data that shows minimal benefit for replacement more frequently than once per month.<sup>2</sup> Other manufacturers strive for patient adherence to a two-week replacement schedule. The latter group cites data showing what a soiled lens looks like after more than two weeks of wear.

A plethora of studies show numerous advantages of discarding lenses on a monthly (or more frequent) basis, including comfort and better acuity, as well as fewer instances of red eye response, giant papillary conjunctivitis (GPC) and other deposit-related disease.<sup>2</sup>

And, daily-disposable lenses have not shown any absolute risk advantage for infectious keratitis in population-based studies.<sup>3</sup>

## The Latest Research

Upon investigation of practice patterns of eye-care practitioners' suggestions for replacement and a survey of patients in the U.S. to determine how frequently they replaced their disposable contact lenses, one study assessed the current recommendations for replacement frequency of silicone hydrogels and daily-disposable lenses and determined compliance levels with manufacturer-recommended replacement frequency.<sup>1</sup> Researchers also evaluated reasons for non-compliance and attempted to identify factors that influence patient compliance with recommended replacement schedules.

This study identified a relatively high level of non-adherence to recommended replacement schedules. Of significant interest is the eye-care practitioner's patient instructions and adherence to the manufacturer's recommended replacement schedule.<sup>1</sup> There was an almost 18% non-compliance rate by practitioners in their

recommendation to patients on how often they should replace two-week disposable lenses. Other important lessons learned from this study include:

- Doctor recommendations coincide the most with daily-disposable and monthly replacement lenses.
- Patients are generally less adherent than practitioners with manufacturer recommendations.
- Adherence rates with replacement frequency are highest with daily-disposable lenses and lowest with two-week lenses.
- Reminder systems appear to be conducive to helping patients to adhere to replacement schedules.
- Non-compliance is most likely to occur in younger patients, those with astigmatism, those who are less likely to have spectacles and those with late-day discomfort.

Researchers suggest that a reminder system may help patients remember when to replace their lenses. The majority of patients surveyed preferred a cell phone reminder (29%), and 26% preferred just to remember the same day of each month. Others preferred a counter on the case (22%), an e-mail reminder (21%) or a paper calendar (14%) to remember when it was time to replace lenses.<sup>1</sup> Most manufacturers have programs for reminder systems using patients' cell phones or e-mail addresses, as well as online tools, such as Facebook.

## Consistent Education

We have all come to love the ease and convenience of disposable lenses. The use of daily-disposable lenses continues to grow (an increase of 17% this past quarter).<sup>4</sup> Of particular note, daily-disposable lenses have the highest rate of patient compliance with doctor recommendation.<sup>1</sup> As stated in the opening paragraph, the patient ultimately determine replacement schedules; our role is to reinforce the clinical benefits on an as-intended basis. RCCI

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Joseph P. Shovlin, O.D., F.A.A.O., Clinical Editor



## Down on the Pharm

By Ernie Bowling, O.D., M.S., F.A.A.O., Dipl.

# Antimicrobial Agents

The ability to deliver a high concentration of antibiotics to the eye should make for a more effective antimicrobial therapy and a lower rate of bacterial resistance.

Effective application of antimicrobial therapy is required in the treatment of a wide variety of ocular surface infections, including blepharitis, conjunctivitis and ulcerative keratitis. Fluoroquinolone antibiotics are commonly used in the treatment of ocular bacterial infections. These drugs exhibit characteristics desirable in any drug, including minimal toxicity and discomfort, broad-spectrum activity against the wide range of organisms and excellent penetration into the anterior segment.

### The History

Reports of increasing bacterial resistance against earlier-generation fluoroquinolones led to the development of newer agents to counteract bacterial resistance.<sup>1-3</sup> The newer-generation fluoroquinolones—gatifloxacin, moxifloxacin and levofloxacin—provide enhanced coverage of both gram-positive and gram-negative organisms.<sup>2,4</sup> An examination of the historical data for ocular isolates indicates that the activity of levofloxacin against key pathogens, such as *Streptococcus pneumoniae* and *Haemophilus influenzae*, has remained consistently high, with susceptibility rates above 99%, suggesting that resistance to levofloxacin is not emerging.<sup>5</sup>

### A New Formulation

A higher dose formulation of levofloxacin, 1.5%, was approved by the FDA in 2004 for the treatment of corneal ulcers. This formulation, with the brand name Iquix (levofloxacin 1.5% ophthalmic solution,

Vistakon) has the highest concentration available for any ocular antibiotic. In its dual mechanism of action, Iquix kills pathogens in a mechanism similar to that of the fourth-generation fluorquinolones. In rare cases, resistance to levofloxacin due to spontaneous mutation in vitro is possible. Iquix is preservative free, and when tested in human cell cultures, levofloxacin demonstrated less cytotoxicity than other marketed fluoroquinolones.<sup>6</sup>

### Treatment Plan

Iquix is indicated for the treatment of corneal ulcers caused by susceptible strains of *Corynebacterium species*, *S. aureus*, *S. epidermidis*, *S. pneumoniae*, *Viridans group streptococci*, *P. aeruginosa* and *Serratia marcescens*.<sup>7</sup> During the first three days of treatment, administer one to two drops in the affected eye every 30 minutes to two hours while awake and approximately four and six hours after retiring. From the fourth day through treatment completion, instill one to two drops every one to four hours while awake.<sup>7</sup>

Iquix is contraindicated in patients with a history of hypersensitivity to levofloxacin or other quinolones or to any of the components in this medication. Prolonged use may result in overgrowth of nonsusceptible organisms, including fungi. Because levofloxacin has not been studied in pregnant women, it should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Safety and effectiveness in children below the age of six years have not been established. Patients should be advised not to wear contact lenses if they have signs or symptoms of corneal ulcer.<sup>7</sup> Iquix was well-tolerated in clinical trials; the adverse ocular events, occurring in only 1% to 2% of patients included decreased/blurred vision, instillation site irritation/discomfort, ocular infection and ocular pain/discomfort. Other adverse events, which occurred in approximately 8% to 10% of patients, were headache and taste disturbance.<sup>7</sup>

### A New Paradigm?

Investigational studies suggest that the ability of levofloxacin 1.5% to safely deliver a higher concentration of levofloxacin to the eye may allow for decreased dosing frequency while still maintaining therapeutic tissue levels and reducing the likelihood of emergence of fluoroquinolone-resistant organisms.<sup>5</sup> This represents a small but important step toward a possible new paradigm in the treatment of ocular bacterial infections. RCCL

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7. IQUIX Package insert. Vistakon. (May 09).



# Allergy Control

Help patients survive the allergy season without abandoning their contact lenses.

Clinicians experience an influx of allergic conjunctivitis patients as the pollen season persists, and itchy, red eyes are often particularly troublesome for contact lens wearers. Topical antihistamine/mast-cell stabilizers can provide relief of signs and symptoms, but because they contain the preservative benzalkonium chloride (BAK), they can only be used with contact lenses if patients wait at least 10 minutes after instilling the medication to insert their lenses.

For many patients, this delay in their morning routine is an unacceptable hindrance. Such patients resort to temporary lens discontinuation and over-the-counter (OTC) anti-allergy products, such as ketotifen or short-acting antihistamine/vasoconstrictor combination products, as the easiest remedy, and they may never consult their eye care provider. But the easiest solution isn't always the best. Both antihistamine/vasoconstrictors and the longer-acting ketotifen contain BAK, which, with chronic use, can damage the corneal epithelium. Antihistamine/vasoconstrictor products offer less than ideal control of allergic signs and symptoms—their duration of action is only two hours. It's then necessary to remove the contact lens, re-dose and after 10 minutes, re-insert the lens. Despite these limitations, with some precautions and tailored treatment, lens discontinuation isn't always necessary.

## Defining the Problems

In comparison to allergic non-wearers, allergic contact lens wearers experience intensified allergic

reactions as a result of the allergen-lens-tear film interaction. Speaking with your allergy-prone patients before the allergy season begins (and as it continues) can draw their attention to the problem and guide them toward the best solutions.

Contact lenses primarily exacerbate allergy through the tear film instability that inevitably results from their use. The conjunctival epithelium acts as a barrier against allergens. If this barrier is disrupted by the irritating effects of seasonal allergic conjunctivitis (SAC) or contact lenses, the allergic reaction may intensify. SAC patients have dramatically reduced tear film break-up times (TFBUTs) as compared to normal patients.<sup>1</sup> It's hypothesized that, as tight junction proteins (e-cadherins and zonula occludins) break down in response to the enzymatic activity of some allergens, the allergic threshold is lowered, allowing a smaller amount of pollen to provoke a greater reaction.<sup>2</sup> New agents that strengthen barrier integrity through direct activity on e-cadherins and zonula occludins are in development. In addition, through perturbation of the ocular surface, contact lenses instigate a mild inflammatory condition that aggravates the irritation caused by weakened barrier integrity.

## Treatment Options

When recommending an allergy medication, be sure to warn patients of the drying side effects of systemic antihistamines and the diminished effectiveness of vasoconstrictors with overuse.<sup>3,4</sup> If prescribing an antihistamine/mast-cell stabilizer or recommending

ketotifen, patients must follow the prescribing information for the drops. Patients who instill the antihistamine/mast-cell stabilizing drop before going into the shower can circumvent the 10-minute delay for lens insertion. It must be reiterated and emphasized, however, that lenses must be inserted after showering, so as to avoid the risk of *Acanthamoeba* infection. Alternatively, if a once-daily medication is prescribed, it may even be instilled after lenses are removed and before going to bed at night.

It's also important to make sure the rewetting solutions are used with the appropriate lens and cleaning solution. Contact lenses can absorb the preservatives in the cleaning solutions and slowly release them, which contributes to their toxicity and exacerbates ocular irritation.<sup>5</sup>

## Case-by-Case Basis

The most effective treatment paradigm for allergic conjunctivitis in contact lens wearers is the one that's tailored to the individual patient. If you take the time to carefully match the patient to the lens, solutions and antihistamine/mast-cell stabilizer, your patient will likely be able to wear contact lenses throughout the allergy season. RCCL

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# Simplify the Problem

Traditional lens designs are sometimes just what the doctor ordered.

My first contact with my patient “Steve” was 10 years ago. Steve was then 61 years old, and he’d undergone LASIK O.U. in 1997. His chief complaint was poor acuity when he saw me. His surgeon indicated that his best-corrected spectacle acuity after LASIK was 20/70 O.D. and 20/200 O.S. As can be imagined, Steve would have difficulty functioning with this level of acuity.

His preoperative subjective refraction was  $-7.25 - 4.75 \times 175$ , 20/30 O.D. and  $-7.50 - 3.50 \times 002$ , 20/40-50 O.S. At his first visit to my office, his subjective refraction was  $-2.25 - 4.00 \times 015$ , 20/60 O.D. and  $-3.25 - 3.00 \times 162$ , 20/80 O.S.

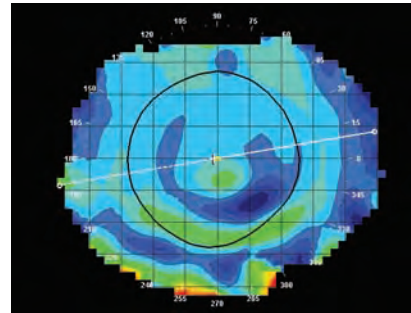
At the time, gas-permeable lens options included spherical lenses, reverse-geometry lenses, scleral GP lenses or a piggy-back combination of soft and GP lenses. Ultimately, I fit this patient with another option, an oblate aspheric GP lens. An oblate lens is steeper in the periphery, where a traditional prolate aspheric lens is flatter. The advantage of this design over a reverse-geometry lens is that the changes are very gradual, allowing the lens to more closely parallel the underlying cornea. The base curve was chosen to be the same as the flattest keratometry measurement. I calculated the eccentricity from measurements in the midperipheral temporal cornea with the goal of creating a small amount of lens touch in the midperipheral cornea. After some initial trial and error, good lens fits were achieved. Steve’s final best-corrected acuity

was 20/30 O.D. and 20/25 +3 O.S. He was able to wear the lenses during all of his waking hours.

Then, as happens all too often, Steve was lost to follow-up. But, after five years, Steve returned complaining of blurred vision near and far. Since I’d seen him last, he underwent cataract surgery and was seen by several very good contact lens clinicians that were geographically more desirable. Steve said that attempts had been made to refit him with oblate aspheric lenses, scleral lenses and large-diameter corneal lenses, but that he was never able to see well, discomfort was an issue, and his lenses tended to get “foggy.” His distance acuity with his current GP lenses was 20/50 O.D. and 20/60 O.S, and his lenses exhibited significant apical touch and excessive inferior edge lift.

Careful analysis of his corneal topography indicated that his corneas were now spherical or slightly prolate in shape. The topography of the right eye showed that the area near the apex was similar or slightly steeper than the midperipheral area, 4mm temporal and nasal (*figure 1*). Because his corneas were now a more “normal” shape, he was fit with a large-diameter corneal lens. The patient is now very satisfied with the comfort of his lenses and is able to wear them comfortably most of his waking hours. Currently his best-corrected distance acuity is 20/40 +1 OU.

Prior to returning to my practice, Steve had been treated by several very good contact lens



**1. The topography of Steve’s right eye is very symmetrical and nearly spherical across the horizontal axis.**

practitioners. Many of us, myself included, see patients who wear very special lens designs and assume that this design is the only option that will work for the patient. But often, careful analysis of topography may indicate that a less specialized lens design can satisfy the needs of the patient. In this case, the original fit (years earlier) was a very specialized lens design. But now, the easiest way to achieve a good three-point touch fit is with a spherical lens.

Steve’s current lenses exhibit near apical alignment with a light touch in the midperiphery along the horizontal axis. He wears his lenses virtually all of his waking hours with good comfort.

We all see some very irregular and unique corneas. Do not immediately assume that it will always be necessary to fit these patients with sophisticated lens designs. Begin with the simplest design that will provide good fitting characteristics. If these traditional designs do not satisfy you and the patient, only then move to the more complicated lens designs. RCCL





# Reality of Grandeur

Anything is possible when you raise your standards for yourself, your practice and your staff.

The average U.S. eye-care practice generates about \$550,000 in gross revenue annually.<sup>1</sup> Frankly, given our education, the risks we take, investments in our practices and the time we spend running them, I'm disappointed by that number! I believe it should be higher! I've written many columns on how to increase the number of patients you're fitting with contact lenses, and I know from your feedback that these ideas are working.

## Think Big

But now, it's time to pull out all the stops and think big. I mean *really* big. Instead of dreaming of ramping up your practice to say, \$1 million, let's really let our creativity get the best of us. Why settle for a mere million bucks when you can make 40 or 50 times more? What? You're really not up to the task of generating \$50 million dollars out of your 1,400 square foot office with the four staff members you have now? Why not?

As in many practice-building exercises we run with our clients, it helps to start with the end result in mind and work backwards. So, let's say you really do aspire to be that \$50 million practice. How will you do it? Sit down and start making a list of things you'll do, and get to work! Here's my short list to get you started:

- Start by fitting every single person who walks through your doors with the most profitable contact lenses you have. Vow to never again fit an old technology, lesser quality and less profitable lens. Of course,

each lens must still be clinically appropriate for each patient. But, if two lenses are tied for "clinical appropriateness," fit the more profitable one. And, remember how compliance figures into the profitability equation.

- Once and for all, fire "dead wood" staff members and get genuine superstars on your team. Pay them a lot of money. They're worth it (you have \$50 million coming through the door, so you can afford top talent).

- Remodel your office. Make it look less like a Holiday Inn Express and more like the Ritz Carlton. Guests at the Ritz Carlton expect to pay more than those staying at the Holiday Inn Express. Make sure you live up to that expectation.

- You still use a keratometer and manual phoropter? Really? Time to upgrade!

- Yellow Pages and coupons don't work, so stop using them. Advertising during the Super Bowl with a professionally articulated message will work better. It will be the best \$3 million you'll ever spend.

- Charge what you're worth. Charging \$30 extra for a "contact lens" exam was OK in 1974. It's not now.

## It's All About the Message

Right about now, you're probably thinking that I've lost my mind. Super Bowl advertising? Well, of course with your current level of business, you probably can't afford it. But, can you pare the concept down to something at your level? Can you fine-tune your current

cable TV ad and compose one that actually makes you money instead of loses you money? After all, if you were to spend \$3 million on one TV spot, you'd be pretty careful about the message you're getting across!

## An All-Star Team

Hiring superstars? How can you do that by paying babysitting wages? You say it can't happen? You're right! But, when you raise your expectations of whom you are willing to hire (and the salary you're offering), you will elevate the skill set and personalities of your team, which will lead to an increase in sales and profits.

## Keep Both Eyes on the Goal

Can't upgrade to a topographer and phoropter at the same time? Fine! Get one today and plan for the other next year.

The concept here is to set your goals much higher than you might have in the past. If you plan on being a mega contact lens practice, stay focused on that goal, and you'll eventually get there! cccl

1. The Power Practice. Data on file.

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# The Traveling Contact Lens Patient

Here's how you can prevent contact lens patients' travel-related ocular disasters.

Nearly every day, I am horrified by stories about traveling patients who pour their contact lens solution into three-ounce bottles to take on the plane, who float contacts in hotel room drinking cups, or who sleep in lenses for days or weeks at a time. These stories often don't end well, and I feel responsible for my patient who goes on the vacation of a lifetime only to return suffering with red, irritated eyes. Here are some of the best travel-related contact lens tips. Please pass them on!

### Know the Regulations

Contact lens solutions and rewetting drops are not part of the 3-1-1 rule. This means travelers are not limited in the amount or volume of lens care products that they may bring in their carry-on baggage. But, if the bottles exceed 3.4 ounces or are not contained in a one-quart, zip-top plastic bag, they still must be declared to one of the security officers at the checkpoint for further inspection.<sup>1</sup>

While travelers are encouraged to pack only as much solution as necessary for the trip, it does not mean that they have to bring so little of it that the solution will need to be inadequately "rationed out" over the course of the trip. Nor is it necessary to rely on whatever brand the hotel may decide to carry. Patients should be advised not to change brands without consulting their eye-care practitioner, because as we know, not all lenses and solutions are compatible.<sup>2</sup> International markets may have different solution options, so patients should bring enough of their own brand for the entire trip.

Relay these tips for getting through security quickly to your patients:<sup>3</sup>

- Separate contact lens care products from other liquids, gels and aerosols, and place them in their own clean quart-size zip-top bag.
- Declare these items to one of the security officers at the security checkpoint.
- Present these items for additional inspection once reaching the X-ray. They are subject to additional screening.

Manufacturers do supply two- to four-ounce bottles of contact lens solution for those still wary about TSA restrictions. But, in the absence of a manufacturer-supplied small container, do not transfer solution from one container into another. This could allow contamination, which could lead to a serious eye infection.

### Keep Lubricants Within Reach

Aircrafts are typically very dry—usually 10% to 20% humidity—but humidity of around 40% is considered optimal for eyes.<sup>4,5</sup> And, air ventilation systems and napping while traveling can lead to dry eye symptoms. This is why your patients, especially those who suffer from chronic dry eye, should be advised to bring their lubricating

drops with them in their carry-on bags, rather than checking them with their luggage.

Drinking water will help prevent dehydration, which occurs when there is a reduction in body weight due to fluid loss. Dehydration has also been linked to decreased tear production and dry eyes.<sup>6</sup> In busy travel situations, it is easy to forget to drink enough fluids and become unknowingly dehydrated. Tell patients to make sure and drink enough fluids so that their eyes do not demonstrate signs of dryness.

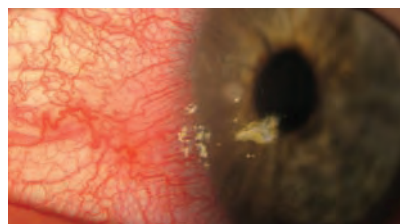
### Freshen Up Your Travel Bag

Many frequent travelers have a pre-packed travel bag that never gets unpacked and is only refilled as goods inside run out. But, unlike other items in the travel bag, solutions should be checked for expiration dates and replaced as needed. Solutions traveling in cargo holds or car trunks may be exposed to extreme temperatures (outside the recommended room temperature of 59°F to 86°F), which may alter their efficacy.<sup>7</sup>

Additionally, changes in elevation will cause pressure changes inside the bottle and may induce the bottle to leak. Along with fresh solution and a clean lens case, glasses should be readily available if the contact lenses must be removed for any reason.

### Wash Your Hands

In 2003, the American Society of Microbiology (ASM) found that many people who pass through major U.S. airports don't wash their hands after using the facilities. The researchers found that nearly one-



**Microbial keratitis in a patient with compromised care habits while traveling.**

**Table 1. Results of the Hand Washing Survey<sup>8</sup>**

	Male Washers	Male Non-Washers	Female Washers	Female Non-Washers
<b>John F. Kennedy Airport, New York</b>	63%	37%	78%	22%
<b>O'Hare Airport, Chicago</b>	62%	38%	85%	15%
<b>San Francisco International Airport, San Francisco</b>	80%	20%	59%	41%
<b>Dallas/Fort Worth Airport, Dallas</b>	69%	31%	92%	8%
<b>Miami Dade County International Airport, Miami</b>	70%	30%	79%	21%
<b>Toronto International Airport, Toronto</b>	95%	5%	97%	3%
<b>Total</b>	<b>74%</b>	<b>26%</b>	<b>83%</b>	<b>17%</b>

quarter of people who use airport restrooms in New York Miami Chicago, San Francisco, Dallas and Toronto neglect to wash their hands.<sup>8</sup> Lack of handwashing is associated with an increased risk for developing microbial keratitis.<sup>9</sup>

In the event that hand washing is not feasible, patients should stock up on pre-moistened disinfecting towelettes, which don't have to go in the airport security one-quart bag of non-medical liquids, to wipe hands off before handling contact lenses. Disinfecting towelettes are effective against microbes, although physical removal by rubbing with an antimicrobial soap is most effective.<sup>10,11</sup>

### Infection Rates in Different Locations

Research has demonstrated that severe contact lens-related microbial keratitis is more likely to occur in warmer, humid regions, but that small, peripheral corneal lesions are more common in cooler conditions.<sup>12</sup> There is also evidence that unusual infections, such as *Acanthamoeba*, are associated with seasonal and temporal variances with

trends toward disease onset in the warmer months.<sup>13</sup> And, the level of *Acanthamoeba* in domestic and foreign water supplies varies greatly, which may explain geographic variances in reported cases.<sup>14</sup> Since *Acanthamoeba* keratitis is strongly linked with water, it is highly encouraged to avoid showering or swimming in lenses.<sup>15</sup>

### The Single-Use Solution

Urge patients to consider daily-disposable contact lenses or to bring spare contact lenses when traveling. While studies have not shown a decrease in microbial infections with daily-disposable contact lenses, these lenses offer significant ease of care.<sup>8</sup> Travelers are often out of their normal routines—wearing lenses too long, sleeping in lenses, etc. Daily-disposable lenses offer a convenient way to lessen the burden of travel eye care by eliminating the need for contact lens care products.

### Raise Awareness

Whether your patients travel once every few years or on a weekly basis, it's up to you to instill a sense of lens

care responsibility while traveling. Take time to ask your patients about vacation plans or work travel to gauge their lens care habits. Most travel-related mishaps can be avoided when patients are educated on the simple steps they can take prior to traveling. With the summer just around

the corner, make sure your patients are well equipped for their time away, without taking a vacation from lens care. **RCCL**

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## What's The Solution

By Michael Slusky, O.D.

# “The Big Guns” of Contact Lens Solutions

Growing up in a family of healthcare providers, there were always a couple of brown bottles of hydrogen peroxide strategically placed throughout the house. Skin your knee playing in the yard? Douse it with peroxide.

So, naturally, when I began working with contact lenses in the mid 90s, peroxide was the system of choice for solving complex patients' problems. It was the “big gun,” something sacred, reserved only for the most challenging patients. More than a decade later, we are working with a different chemistry of lenses—namely, silicone hydrogel lenses. As the popularity of silicone-based products grows, we have to keep in mind the dynamics of our patients' physiology and biocompatibility, which continues to evolve with everyday lens wear. How do I choose today's “big gun,” and for whom should I prescribe it?

Our patients' eyes and their contacts go through a great deal of wear and tear throughout the day. For some, contact lens wear may be as dry and difficult as an excursion through the Sahara, with deposits accumulating on the surface that alter the natural physiologic state of the eye. At night, these folks remove their lenses with the assumption that their lenses will feel fresh and new the next morning. Such is the trust our patients have in the solutions we recommend to maintain their safe and comfortable contact lens wearing experience.

The three aspects of a successful contact lens solution are its ability

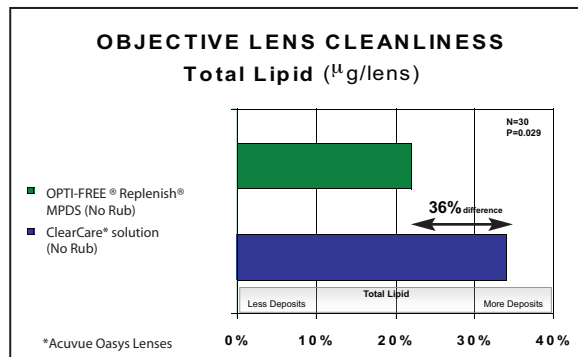
to kill unwanted microorganisms, clean the surface of the lens and promote comfort of the lens during wear. Our previous knowledge of peroxide as an excellent source of microbial disinfection may actually cloud our insight as to its kill power and duration in both one-step and two-step contact lens disinfecting systems. In fact, we see a dramatic drop in peroxide concentration from 3% to 0.9% in the first two minutes with some of the one-step peroxide systems.<sup>1</sup> OPTI-FREE® RepleniSH® MPDS demonstrates a continuous high kill rate of microorganisms when bathed in the solution.<sup>2</sup>

Pluronic 17R4 as the cleaning agent.<sup>6</sup> In appreciation of the roles that these agents play, we must keep in mind that it is not the peroxide that focuses on lipid removal, but rather separate agents.

In a recent clinical study, comparing the lipid-removing characteristics of OPTI-FREE® RepleniSH® and Clear Care with Acuvue Oasys (Vistakon), 36% less total lipids were seen with OPTI-FREE® RepleniSH® MPDS vs. the peroxide system.<sup>7</sup>

By managing the cleanliness of the surface, we are enhancing the comfort of the lens wearing experience for our patients.

Although peroxide systems have a place in some of today's lens care regimens, I choose OPTI-FREE® RepleniSH® MPDS as my “big gun” solution. I prefer the convenience of a multipurpose disinfecting solution that has high-level performance attributes. For these reasons, I prescribe OPTI-FREE® RepleniSH® for all of my contact lens patients.



**OPTI-FREE® RepleniSH® MPDS had significantly less lipid deposits than Clear Care on Acuvue Oasys lenses.**

Cleaning is a more complex issue that depends on the lens material (silicone or HEMA) as well as patients' tear chemistry. Silicone lenses have been known to be challenged more with lipid deposits, while traditional HEMA lenses have been challenged by proteins.<sup>3,4</sup> In the case of earlier peroxide systems, such as AoSept (CIBA Vision), MiraFlow (CIBA Vision) was used as a separate alcohol-based cleaner to emulsify lipids.<sup>5</sup> Today's Clear Care (CIBA Vision) 1-step peroxide system uses

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# Experience the Difference

Shake up your practice by creating a positive patient experience and reap the benefits a small change can make.

In our column, we have consistently focused on minimizing contact lens dropouts and maximizing new contact lens wearers. Through research, we have come to understand that many who wish to wear contact lenses are unaware that they may be candidates. We also understand that many are quietly complacent about their suboptimal contact lens wearing experience. Just as important as having a firm grasp on new technologies that help our patients wear contact lenses more successfully is understanding and optimizing the patient experience. This month, we will discuss optimizing the patient's office experience during the contact lens fitting process.

## What Is "The Experience?"

A patient's experience in your office depends on more than just the products or services you provide. Experiential marketing helps us understand this concept. This form of marketing focuses on enhancing the consumer experience. For example, wine served out of fine crystal at a fancy restaurant just might taste better than the same wine served in a plastic cup at a cafeteria.

A patient's level of satisfaction with all facets of eye care in your office boils down to their perception of the experience. Derrick Artis, O.D., M.B.A., describes the patient's experience using this formula: Patient Experience = Perception – Expectation.

A positive experience—where patients' perception is greater than that they expected—will help develop a beneficial doctor/patient

rapport that will encourage compliance and successful contact lens wear. Patients with a positive experience will often be more loyal, entrusting you with their eye care and that of friends and family, through referrals. Likewise, a negative experience (the patient's expectation is much higher than the perception) will lead a patient to go elsewhere for his or her eye care needs due to such factors as changes in insurance coverage, special deals or coupons seen in various media, or recommendations from friends and family.

There are four key factors in providing "The Experience:"

- Superior products.
- Superior service.
- Consistent communication through in-office materials and during the exam process.
- Positive change and continuous improvement.

Let's discuss each of these critical elements in further detail.

## Offer Superior Products

Opinions differ when it comes to selecting the "best" products to offer patients, but certainly staying abreast of new technologies will help eye-care practitioners to offer superior options. Silicone hydrogel lenses have become the lens of choice for many practitioners. Research and manufacturers continue to look for better ways to provide optimal vision while making the contact lenses even more comfortable. And, there are many modalities to choose from, along with a multitude of multifocal and toric contact lens designs. Hybrid technology lenses

are also proving to be a valuable addition to many practices. Make sure to visit the major manufacturers' Web sites regularly for updates on the newest technologies.

Additionally, selecting care systems that offer superior lens cleaning and wetting is extremely important. Unless your recommendations are reinforced, patients will most likely choose their care system based on price. Certainly, include daily disposable lenses in your armamentarium, especially for part-time wearers and habitually non-compliant patients.

## Superior Service

Superior service begins with the patient's initial contact with your office. When patients call to schedule an appointment, they should feel like they are calling a practice that emphasizes contact lenses. What we do at our office is tell those who wear contact lenses to bring in all solutions, drops, cases and anything else they use to care for their contact lenses. Patients are also reminded of this when they are called the day before their appointment. Through a process like this, you get a clearer picture of what your patients' contact lens wearing habits are really like. This will also set the patient's perception of your office as contact lens-oriented.

Next is the experience in your office, beginning with the greeting at the front desk and time spent in the reception area. One of the most effective tools that we have implemented is a flat-screen TV with a video loop that contains information about contact lenses.

Information in the reception area regarding new technologies will also set your services apart.

Pretesting is the next step in the process. Although much of the time here will be spent taking measurements that are crucial to the exam process, it is also a valuable time for your assistants to offer important information concerning new contact lens technologies. For example, if a contact lens wearer undergoing a 40-point visual field screening complains of dryness, the assistant could then proceed to tell the patient about new lenses that may help with dryness and that he or she would be certain to tell the doctor. This immediately sets the stage for the discussion of new and improved contact lens technologies in the exam room.

The exam, although it is simply one step in the process, may be the most important. This is where the practitioner makes recommendations regarding the best contact lens option for the patient. If the patient has had a positive experience so far, presenting new contact lens options is a breeze for the practitioner. Additionally, this sets the stage for the final process, the transfer of care from the doctor to the staff member responsible for any final instructions and dispensing of the contact lenses.

This final process is the patient's final impression of the office. What we have found works extremely well in our office is calling those patients who are new to contact lens wear a few days after their appointment to see how they are doing with their new lenses. This extra step ensures that they are clear on their wearing schedule or care regimen (if applicable). This gesture will also create a small,

personal “wow” factor that will add to patients' positive experience with your office.

## Communication

Communication is vital. Constant communication between staff members will enable them to work together in growing the contact lens business. Each staff member should extend the office philosophy through each patient encounter, delivering a consistent message. This doesn't mean that everyone in the office needs to be an expert in contact lens duties; rather, they should be kept aware of the fitting process and new technologies. For example, if a staff member does not like to do contact lens insertion and removal training classes, they should still perform another task, such as discuss the improved peripheral vision and the advantages contact lenses may provide during sporting activities. This way, each staff member performs the duties he or she is comfortable with, creating a harmonious environment within the practice.

Many of these practice goals and topics on positive culture concerning contact lenses can be discussed during staff meetings. Staff members will realize future growth areas for themselves and the practice and will be able to promote contact lenses and help cultivate a strong contact lens-wearing population. This is key to creating a positive experience.

## Continuous Improvement

For some, changing habits is a challenge. Consistent improvement and positive change are necessary to keep your eye-care

practice contemporary. We are fortunate—there is usually little to no expense to the practitioner to offer the newest in contact lens technology to their patients. So, offering the newest in lens technologies to patients will be part of what keeps your contact lens practice current.

But, there is more you can do. For instance, you could take advantage of rebates available for annual supply orders of contact lenses. Another consideration that offices should make is to have a supply of commonly prescribed contact lenses in stock to make dispensing of contact lenses a seamless process for the patient at the time of the exam.

## Don't Fear Change

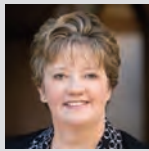
We'd like to encourage everyone to take a step back and evaluate their contact lens business—the protocol of fitting and dispensing contact lenses. In a recent study from the U.K., researchers analyzed the fitting process with non-contact lens wearers. They concluded that fitting all suitable patients with contact lenses prior to spectacle dispensing (ostensibly, so that patients could see the frames they tried on) not only makes the frame selection process easier, it's also a good way to get patients interested in contact lenses. In fact, 88% of those who were fitted with contact lenses ended up purchasing them.<sup>1</sup> This study shows us that incorporating just one new step into an old routine can really make a difference. Imagine the possibilities when you follow the formula for a positive patient experience. [rcccl](#)

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# Controversies in Wearing Schedules

Understanding the current market trends and compliance patterns enables practitioners to make appropriate recommendations to contact lens-wearing patients.

By **Glenda Secor, O.D., F.A.A.O.**



*Dr. Secor is in private practice in Huntington Beach, Calif. She is a Fellow of the American Academy of Optometry, a Diplomate in the Section on Cornea and Contact Lenses, and Past Chair of the Section on Cornea and Contact Lenses.*

The current recession has greatly affected the world economy, all the way down to the contact lens market. But, despite this difficult time of economic uncertainty and product recalls, contact lenses have maintained a slow, positive growth. Even though patients may dictate the lens type and their preferred wearing and replacement schedules, our job is to recommend the best treatment option and minimize the risk of adverse events. There have been controversies in contact lens wearing schedules that baffle practitioners and confuse patients, but trends indicate that the industry is working toward a more collaborative effort to improve contact lens wear safety.

We safeguard our patients from potential morbidities associated with the use of contact lenses. The most severe complication is microbial keratitis, and numerous studies have attempted to determine the associated risk factors.<sup>1-3</sup> Unfortunately, even with the advent of newer care products and more oxygen-transmissible silicone hydrogel lenses, little impact has been made on the actual risk of the infection.

## Risk Factors

Luckily, the overall occurrence rate of microbial keratitis is low, and the risk of this potentially sight-threatening infection appears to be consistent worldwide.<sup>2-5</sup> The dominant risk factor for contact lens-related corneal infections continues to be overnight wear, regardless of lens material. The hyper-oxygenated silicone hydrogel lenses indicate that oxygen alone does not protect the wearer from infection, should the conditions become less than ideal. Rather, bug “binding” to the lens surface appears to be the primary source of the problem.

Such factors as recent ocular trauma—whether external or self-induced by lens manipulation combined with poor personal or contact lens hygiene—can result in problems that range from lens comfort issues to potentially severe, sight-threatening microbial keratitis. Exposure to contaminated water, either by rinsing of lenses or swimming in them, also adds to the potential for infection.

Trauma to the cornea can occur with simple lens insertion and removal. Some lenses may be harder

to handle than others, due to the stiffness of the modulus of the lens material. Abrasion can also occur during removal of lenses that are slept in, if even for a short time.

Personal hygiene studies have indicated that young, smoking males may have behavior patterns that put them at an increased risk.<sup>1</sup> A lax attitude and noncompliant behavior combined with poor hand hygiene may also cause problems.

Case contamination can also be an important part of the infectious cascade. Although it is probably an unrealistic expectation, patients should replace their lens cases with each new solution bottle they purchase. Biofilm formation can occur when cases are inadequately cleaned, regardless of the care product used. Entrapment of microorganisms occurs when solution is left in the case. When this happens, evaporation concentrates the residue, and the resultant sludge acts like sticky fly paper for debris and resistant bugs. While all agree that cleaning the lens case is key, there is a lack of consensus as to the most effective way to clean it. It appears as though daily scrubbing with hot

tap water, followed by air-drying and combined with weekly boiling of the open case and caps for five minutes is a reasonable attempt.<sup>6</sup>

It is well established that water exposure and activities such as swimming in contact lenses leaves wearers vulnerable to potential contamination. The recent *Acanthamoeba* outbreak has created public health concerns about regulatory changes in drinking water treatment. Some believe that these changes may also be a contributing factor to *Acanthamoeba* keratitis exposure. Charlotte Joslin, O.D., one of the original researchers on this issue, reported that Environmental Protection Agency regulations decreased the levels of disinfectant in the water supply, and this may have led to an increase in the microbial load that contact lens solutions must kill in order to prevent disease.<sup>7</sup>

### Patient Compliance

Compliance issues occur in all aspects of health care. Diabetics don't take their insulin consistently, glaucoma patients don't use their eye drops in a timely fashion, and contact lens patients don't replace their lenses on the prescribed basis. Compliant behavior could save lives, protect sight and reduce the risk of an eye infection. But, until patients realize that their behavior dictates their success and safety with contact lens wear, we will continue to see patients with keratitis.

No single replacement schedule works best for all patients. The best replacement schedule is customized for patients based on their lifestyle, interest and anticipated behavior. Regardless of what we tell them, we must expect patients to sleep in their lenses at some point. Several studies on avoidance of corneal hypoxia indicate that silicone hydrogel lens materials have addressed the issue of

adequate oxygen transmissibility.<sup>8-10</sup> Additionally, the reduction in ocular dryness experienced with these materials helps practitioners in the medical decision making process. And, the introduction of various new silicone hydrogel materials with multiple parameters has given tremendous fitting options within this family of lenses.

Single-use or daily-disposable contact lenses appear to offer much needed relief for patients who are "care-product challenged" by either confusion or allergies. They also serve as a perfect option for occasional or part-time wearers who want lenses for special occasions, sports or recreation. The question of whether single-use lenses are actually safer than other modalities is somewhat controversial. Because patients may be noncompliant and wear their lenses for more than one day, the perception of safety may be the same as with reusable lenses. In a perfect world, and with strict compliance of only single-daily usage, it appears the elimination of care products and storage cases may reduce problems.<sup>11</sup> The future introduction of a single-use silicone hydrogel lens may be the best combination for providing the oxygen the cornea needs combined with the convenience of a disposable lens. Vistakon has already launched 1-Day Acuvue TruEye in Europe and will presumably release it in the U.S. in the future.

We all have those grossly abusive patients who wear their two-week disposable lens for months or their monthly replacement lens for years. Fortunately, most patients overwear only for a few days, and compliance is fairly close, overall. Studies vary as to the exact behavior of patients, but we do know that they almost always wear their lenses longer than we prescribe.<sup>12-15</sup>

### Patient Behavior Patterns

We know that our recommendations don't reflect what happens in the real world, so we must expect that two-week replacement lenses will be replaced less frequently than doctors expect. When queried in a non-clinical environment, only 32% of patients will report that they are actually compliant, and 48% of patients self-report that they change their two-week disposable contacts somewhere between three and five weeks. Fortunately, only a small percentage, 19%, wear disposable lenses for longer than five weeks.<sup>15</sup>

Monthly patients appear to be a little more compliant; they typically replace their lenses somewhere between three and five weeks of wear. Approximately the same percentages (9%) of patients overwear and underwear their monthly lenses. This means that a small minority of monthly lens patients change lenses actually more frequently than the recommended monthly schedule.

The information being reported by patients can be confirmed by calculating the amount that manufacturers report in their sales volume.<sup>15</sup> Sales reports indicate that most two-week lens-wearing patients purchase 5.2 boxes for an annual supply, rather than the prescribed eight boxes needed for biweekly usage. As with disposable overwear, monthly wearers tend to purchase 3.7 boxes for their annual supply, which would optimally be four boxes.<sup>15</sup>

### Promote Compliance

One of the most effective ways to encourage patient compliance is to recommend an annual dispensation of contact lenses as a one-time purchase. Rather than selling just a box or two at each visit, have patients purchase their annual supply. This encourages compliance and ultimately results in healthier contact lens usage.<sup>15</sup> The marketing concept



of “pantry loading” indicates that consumers will use a product more frequently when they have ample supply on hand. When the supply is depleted, the user will stretch their existent product until the “pantry” is restocked.<sup>15</sup>

Plus, with the single annual supply purchase, patients enjoy the availability of manufacturer rebates. The advantage to the prescriber is the additional revenue. The current economic environment may preclude the purchase, but offering it as an option is certainly prudent, and explaining the value may encourage compliance.

### Current Market Trends

Although contact lenses are still in high demand, the downturn in the global economy has impacted the contact lens industry and eye care in general in different ways. We have seen patients use their glasses longer and not replace their old frames as often—even when new lenses are needed. The overall sales volume of contact lenses has been negatively impacted, as the overall growth in new patients has declined.<sup>16</sup> But, refitting existing contact lens patients into new modalities has continued to be a substantial portion of the market.

Due to their success and benefits, silicone hydrogel lenses have maintained a healthy portion of the contact lens market and now make up 68% of new patient fits.<sup>16</sup> Their market share has steadily increased over the past year, and it is expected to continue to rise as new modalities become available.

Daily-disposable or single-use lenses appear to remain fairly stable at 15% of new fits, and the industry anticipates a slow, modest growth from year to year.<sup>16</sup> Toric lenses also seem fairly stable as a representative of approximately 26% of the new fit market.<sup>16</sup>

Philip B. Morgan, Ph.D., M.C. Optom., F.A.A.O., F.B.C.L.A., and colleagues have been studying international contact lens prescribing patterns for the past seven years. Their prospective information can give us insight into the worldwide market. They report that the majority of contact lens patients are female, and their average age is approximately 30.<sup>17,18</sup> As anticipated, 70% of the patients fit with new lenses are existing wearers, which explains the slow overall growth of the market over the past seven years. In the international arena, gas-permeable lenses still account for less than 10% of fits, but there are a few areas, such as Japan and the Netherlands, where the markets are substantially higher.<sup>17,18</sup>

It's no surprise that soft lenses dominate the world marketplace, and depending upon the location, can make up approximately 70% of the market or even more.<sup>17,18</sup> Single-use or daily disposable dispensing also varies across the world, as acceptance and usage expands. Worldwide toric fits account for slightly over 20%, and multifocal lenses are still a very small, under-utilized portion of the market.<sup>17,18</sup>

So, how does the U.S. measure up? Domestic trends in prescribing of silicone hydrogel lenses may exceed the majority of the world.<sup>17,18</sup> And, as additional designs and parameters become available, this trend is expected to continue to dominate prescribing.

### The Weakest Link

As with any medical modality, patient compliance with the recommendation seems to be the weakest link for contact lens success. The manufacturers have given us outstanding products with tremendous potential, but patients must be properly matched with products. The Ophthalmic Devices Panel of

the FDA Center for Devices and Radiological Health has challenged lens care companies to come up with formulations and care regimens that are more reflective of real-world scenarios. This has yet to be finalized based on the meetings and the recommendations from the panel. We realize that past FDA testing had unknown limits of effectiveness, and the future of the testing process is yet to be determined.

Hopefully, armed with more patient-proof products and more expansive lens options, the future for all of us will include healthier, happier contact lens patients. RCCL

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# The Epidemiology of MK in Lens Wearers

Have contemporary lens types and modalities had an impact?

A series of recent international studies have endeavored to estimate the incidence and risk factors for presumed microbial keratitis and vision loss associated with the disease among contact lens wearers. In particular, they aim to examine the impact of contemporary lens types, such as silicone hydrogel and daily-disposable contact lenses, on the disease and its outcome.

A range of study designs have been used, and while some differences in results have been observed, there is general agreement that:

- Microbial keratitis and vision loss occur more frequently when sleeping in lenses compared with daily use.<sup>1-3</sup> Occasional overnight lens use is also associated with an elevated risk compared with strict daily use of lenses.<sup>3</sup>

- The incidence of microbial keratitis with overnight use of silicone hydrogel lenses is about 20 cases per 10,000 wearers a year, with two to four cases per 10,000 experiencing vision loss of two or more lines. Among the general contact lens-wearing population, where daily wear predominates, six per 100,000 wearers a year develop

sight-threatening disease.<sup>3</sup>

- Daily disposability appears to be the safest soft lens modality for more severe disease.<sup>1-3</sup> Disease severity is associated with the recovery of environmental pathogens from the cornea and a delay in receiving appropriate treatment.<sup>4,5</sup>

### The Issue of Overnight Wear

Prior to these new findings, it was hypothesized that silicone hydrogels would protect against the risk of microbial keratitis. The findings of continued increased risk in overnight wear—even in silicone hydrogel products—have been published in peer-reviewed literature in 2008.<sup>1-3</sup>

From a public health perspective, if contact lenses are not worn overnight, the number of cases of microbial keratitis could be reduced by close to 50%.<sup>3</sup> Population surveys have shown that approximately 27% of contact lens wearers habitually or occasionally sleep in their lenses.<sup>3</sup>

While the absolute incidence of disease appears to be unchanged, there is some evidence for a reduction in disease severity with overnight use of silicone hydrogel

lenses compared with hydrogel lenses, either in reduced clinical severity score or a shorter duration of disease.<sup>1,4</sup> The risk of microbial keratitis in overnight wear of second-generation silicone hydrogels remains to be explored. But, with the introduction of new silicone hydrogel lenses designed specifically for daily use with overnight storage, growth in the silicone hydrogel market has largely been in daily wear.

### The Role of Case Contamination

Most contact lens wearers use soft lenses, and the vast majority (up to 90%) of wearers use lenses on a daily-wear basis.<sup>3</sup> The importance of adequate contact lens disinfection during storage is becoming more and more evident. Indeed, frequent contact lens storage case contamination continues to be reported during contemporary contact lens wear and has been associated with recent outbreaks of disease.<sup>6</sup> National studies in Australia and New Zealand show that poor storage case practice, including not air-drying the case following use and not replacing the case regularly, significantly

and independently increase the risk of severe microbial keratitis.<sup>7</sup> The benefit of daily-disposable lens wear, which doesn't require lens storage, may be evidenced by the low incidence of severe disease and low risk of vision loss in patients who choose this modality.<sup>2,3</sup> Please note: the recent epidemics of fungal keratitis and *Acanthamoeba* keratitis were shown to be associated with particular storage solutions.<sup>8,9</sup>

### The Silicone Hydrogel Advantage

All things considered, the absolute risk of contact lens-related microbial keratitis appears to be unchanged with the introduction of first-generation silicone hydrogel and daily-disposable contact lenses and modalities. To date, technological improvements in lens material and care solutions and strategies to improve wearer compliance have not had an impact on absolute disease risk. However, there is evidence to suggest that disease severity and the risk of vision loss may be reduced with silicone hydrogel lenses—when worn, cared for and disposed of correctly—as compared with hydrogel contact lenses and daily disposable contact lenses.<sup>2,3</sup> Disease outcomes can also be improved by early appropriate treatment, and limiting disease severity may be an area amenable to both practitioner and wearer education.

### Disinfection Strategies

While contact lens replacement frequency and contact lens cleaning

practices have not consistently impacted disease risk, recent evidence points to the importance of lens storage case practice.<sup>3</sup> Both more frequent case replacement and air-drying of cases were strongly associated with a reduced risk of severe disease. Again, these potentially modifiable risk factors may be useful targets for education and ongoing research. Currently, only limited data are available on the impact of commercially available antimicrobial strategies, such as silver on contact lens storage case, for example. Given the relevance of storage case contamination in microbial keratitis, it would seem important to further explore both commercially available and new technologies and develop appropriate practitioner and wearer guidelines for their use. [RCCU](#)

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**Table 1. Summary of Study Design for Recent Epidemiological Studies**

Study	Epidemiological Data	Design
Australia and New Zealand <sup>3</sup>	Incidence, risk factors.	Prospective. National surveillance of ophthalmic practitioners.*
Manchester <sup>1</sup>	Risk factors, indirect estimate of incidence.	Prospective. Hospital-based case control.#
London <sup>2</sup>	Risk factors, relative risk.	Prospective. Hospital-based case control.**
USA <sup>10</sup>	Incidence.	Prospective. Multi-site, practice-based cohort study of a single lens type and modality.


\* Control data derived from community telephone survey.

# Control data derived from sales data and prescribing trends.

\*\* Control data derived from contemporaneous hospital controls and community telephone survey.

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# A New Dimension for Colors

What you can do for patients with ocular disfigurements: a guide to fitting therapeutic and prosthetic contact lenses.

By **Sunny M. Sanders, O.D., F.A.A.O.**



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**E**yes play a major role in body language by communicating important nonverbal messages in everyday life. When an eye is scarred or disfigured, not only are the patient's self esteem and quality of life diminished, but there is an impact on that person's communication with others.

Colored contact lenses can serve as excellent cosmetic and therapeutic tools, if they are designed and fitted for that purpose. They can be very helpful in the cosmesis of patients who have experienced damage or disfigurement of one or both eyes as a result of medical conditions or trauma. The ability to create and provide these unique lenses offers great benefits to the patient and the contact lens specialty within a practice.

The actual process of creating a contact lens to enhance the appearance of disfigured eyes or unusual cosmetic situations has always presented unique challenges. Currently, we have tinted and colored contact lenses that can be used as prosthetic devices, but these are not commonly associated with an eye-care practice. But, eye-care practitioners are uniquely positioned within the health care system to use their knowledge and training in contact lenses, optics, physiology and anatomy to design and create these special lenses.

Let's take a close look at the techniques used to create some of the prosthetic and therapeutic lens designs for patients with various acquired and congenital disfigurements.

### Indications

The list of conditions that can be considered for treatment with prosthetic contact lenses is practically endless. But, the most common

prosthetic contact lens usages require masking of all or parts of eyes that may be either sighted or non-sighted through congenital or acquired causes.

Some conditions that can be considered for treatment using these devices are:

- Albinism.
- Corneal scars or abnormalities.
- Leukomas.
- Microcornea.
- Bullous keratopathy.
- Chronic uveitis with band keratopathy.
- Keratorefractive surgery.
- Amblyopia.
- Iris abnormalities.
- Aniridia.
- Coloboma.
- Heterochromia iridis.
- Lens abnormalities.
- Globe abnormalities.
- Vitreoretinal abnormalities.
- Extraocular muscle disorders.
- Systemic disorders.

Other symptoms or complaints that require consideration of a prosthetic contact lens may include diplopia, amblyopia, photophobia, misalignment of the eyes, mismatched eye appearance (color or size) and emotional stress due to a patient's eye appearance or condition.

Ideally, we need to match or recreate the patient's natural appearance and address the needs expressed by the patient. Along with the resolution of as many of the patient symptoms and complaints as possible, duplication of the natural pupil, iris and scleral appearance is the ultimate goal of therapeutic or colored contact lenses. But, remember that any visual enhancement should also be accomplished within the capabilities of the eye and lens parameters.

### Colored Lens Options

It is common for an eye-care

practice to have opaque cosmetic contact lenses available. These fitting lenses are used to assess the fit of a particular brand and to provide the patient with an alternative to their natural eye color. If we take the concept one step further, most practices may keep opaque contact lenses for prosthetic use as well. If you stock one or two plano fitting lenses of all the opaque colors available from the few manufacturers who fabricate these products, you will have created a "ready" fitting set.

Additionally, to make the lenses into prosthetic lenses, they can be used plano, as they are, if the color and effect are satisfactory. Or, they can be trial fit, piggy-backed over a solid iris mask lens

### Contact Lens Tinting and Coloring Companies

#### Specialty Tint

2525 Nabel Street  
Escondido, CA 92025  
1-800-748-5500

#### Adventure in Color

1511 Washington Street  
Golden, CO 80401  
1-800-537-2845  
[www.techcolors.com](http://www.techcolors.com)

#### Crystal Reflections, Inc.

170 N. LaCanada,  
Ste. 80  
Green Valley, AZ 85614  
(520)-648-6425  
[www.crystalreflection.com](http://www.crystalreflection.com)

#### Custom Color Contacts, Inc.

55 W. 49th St  
New York, N. 10020  
1-800-598-2020  
[www.customcontacts.com](http://www.customcontacts.com)

## Specialty Lens Manufacturers

### **CIBA Vision Special Eyes Program**

333 E. Howard Avenue  
Des Plaines, IL 60018  
1-800-488-6859  
[www.specialty-lenses.com](http://www.specialty-lenses.com)

### **CooperVision**

200 Willowbrook Office Park  
Fairport, NY 14450  
1-800-341-2020  
[www.coopervision.com](http://www.coopervision.com)

to create the final effect. Iris mask lenses with a clear pupil or black pupil can be made in-office using a soft lens tinting system or ordered from a contact lens tinting company. Once the desired effect is created, the final design can be ordered from the manufacturer, modified in-office using the tinting system, or ordered from a contact lens tinting company. Or, if this seems too complicated, ready-made prosthetic fitting sets that contain a variety of opaque iris colors and pupil options are also available.

### **Tint It Yourself**

An in-office tinting system is an economical and effective way to create prosthetic and therapeutic contact lenses for a variety of conditions. Be sure that the tinting system used has FDA certification for quality assurance, and follow the procedures per instructions to comply with the certification.

Lenses can be tinted with transparent, natural enhancing colors. The dyes used for this process penetrate the contact lens material, and because they do not coat the surface of the contact lens like a "paint" pigment can,

the colored dyes generally remain transparent and result in lighter colors. These dyes become more opaque as you allow an increased amount of dye to permeate the lens polymer. The most common colors used cosmetically are aqua, blue, green and amber, as evidenced by the industry-available enhancing eye color choices. Based on my own experience, special use and prosthetic colors are generally brown, brown-black, magenta, purple, pink, orange and yellow. These colors are used for more dramatic appearance or realistic results.

Obtaining this tinted effect is cost-effective and is simplified with the help of an in-office soft contact lens tinting system. The alternative is to order tinted lenses from a contact lens tinting company, which impacts delivery time and makes color determination less predictable. The system used in the Eye Care Center of the Southern California College of Optometry is the Softchrome Lens Tinting System (Softchrome, Inc.). This easy-to-use system allows the tinting of most hydrophilic materials with transparent colors, either to enhance an iris color or to modify it.

Additional benefits of tinting contact lenses in-house is being able to apply a tint, either for cosmetic or therapeutic purposes, to lenses of any available power combination and preferred replacement schedule, making "customized" tinted lenses for each specific patient.

To create a prosthetic effect, these tints can be intensified to mask many ocular conditions. By using black dye—which is more opaque than other colors—the contact lens can be tinted to provide an opaque pupil or iris. Occluder contact lenses can also

be used outside the prosthetic arena for amblyopia and diplopia occlusion therapy. The size of the opaque zone can be modified through the use of various templates. For instance, iris-sized templates can create an effective aniridia-correcting pattern. And, providing a normal-sized pupil effect can significantly help these patients. Depending on the needs of the patient, we have the ability to create an opaque black mask the size of an iris with a variety of pupil aperture sizes.

Tinted lenses for color deficiencies can also be created easily by adding colored dyes to contact lenses, which can help patients discern colors and shapes. The various color options like yellow, amber, aqua-teal, gray and red have been used to filter specific wavelengths of light to sharpen images, depending on the lighting conditions or environments. Often, the result is color enhancement, reduced glare and shadows, an increase in contrast sensitivity and compensation for some color deficiencies. Sports enhancements are also an option, as the addition of teal/green tints help tennis players and athletes who compete in water, yellow tints are used in baseball and hunting, and blue and violet tints are beneficial for snow sports. Similar colored tints have been used in spectacle and contact lens designs by industry and specialty care practices.

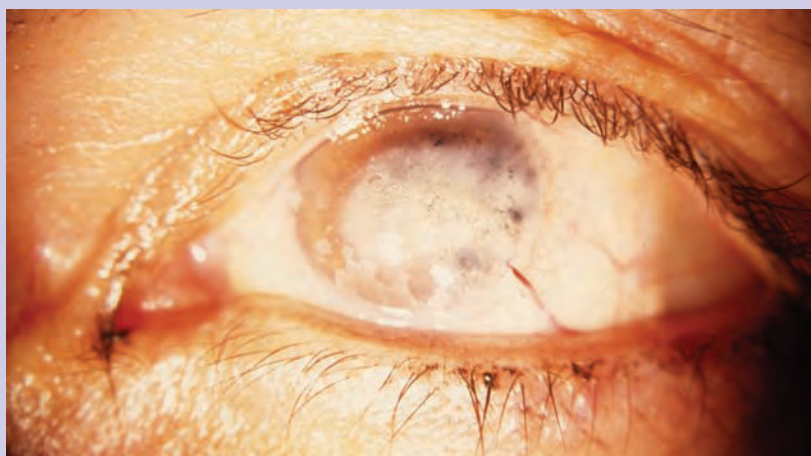
As with any therapeutic and prosthetic contact lens types discussed, the tinted lens should be worn on a daily-wear schedule with an appropriate care system. Generally, stock prosthetic and tinted lens designs require either chemical or oxidation care systems. According to recommendations from the lens painting companies as well as personal experience,

## Tint and Color to Match

A 57-year-old Asian female presented with leukomatous corneal scarring secondary to a penetrating corneal injury to the left eye, which she experienced at age five. The eye was non-seeing. The patient was unhappy with the eye's appearance and also complained of symptoms associated with dry eye.

The patient was fit with a high-water content, ionic polymer contact lens (Kontur 55) to determine if she could successfully wear it. She was able to wear the plano powered 55% methafilcon lens comfortably for 10 to 12 hours per day. She reported that the eye did not seem "dry" as compared to pre-fitting symptoms. The fitting relationship of the contact lens was acceptable, and the underlying tissue health remained unchanged.

The lens was tinted using the Softchrome Lens Tinting System and was colored to mask the disfigured eye and match the natural eye. The tinted lens was worn successfully on a daily basis. The patient uses Complete Multi-Purpose Solution (Abbot Medical Optics) and replaces the contact lens on an annual basis.



The patient's left eye prior to fitting a tinted hydrophilic contact lens.



Her left eye fitted with Kontur 55 hydrophilic contact lens, which has been tinted to match natural eye color, masking the scarred cornea.

hand-painted lenses must use an oxidation system, and sorbic acid or potassium sorbate solutions are not recommended.

### Ready-Made Colored Lenses

Stock or ready-made opaque prosthetic contact lenses are manufactured with standardized designs. These lenses can be ordered with set parameters and iris colors. The colors are applied to the front surface of the contact lens as an opaque "paint."

The stock prosthetic designs should be diagnostically fit using the colored fitting sets available from the manufacturers. Since these lenses are generally not returnable once ordered, it is prudent to diagnostically fit a clear lens of the same material and required power prior to ordering the final prosthetic lens for the patient. This step assures wearing success. Once the patient has successfully worn the diagnostic lens, the final colored version can be ordered.

If the standard colors are not acceptable to the patient, however, you may need to turn to custom hand-painted colored prosthetic lenses. In addition to the specific iris color, other traits to consider include pupil size, base curve and power.

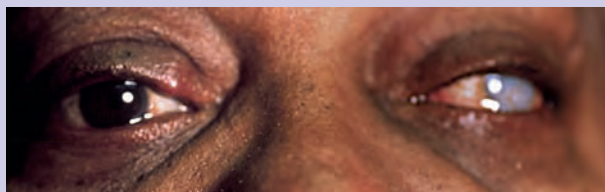
### Hand-Painted Lenses

A more complex—but very effective—prosthetic contact lens effect can be achieved with custom hand-painted designs. Hand-painted prosthetic soft

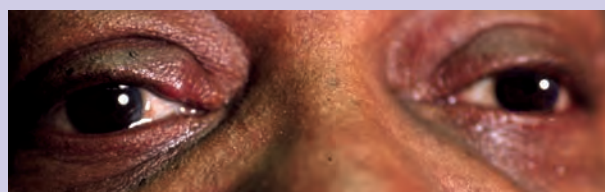
## Ready-Made Does the Trick

A 62-year-old black female presented with a leukoma secondary to cataract surgery complications in the left eye. This was a blind eye, and the patient was unhappy with the eye's appearance.

Due to the close color match available with a ready-made prosthetic contact lens, this type of lens was ideal. The patient was happy with the accuracy of the color and detail as compared to the natural eye. The brand of ready-made lens used in this case was the Durasoft 3 (CIBA Vision) made of phemfilcon A 55%. The plano lens had a 3.7mm pupil and was chestnut brown. The lens-to-cornea relationship was acceptable, and the underlying tissue health remained unchanged. The patient continues to successfully wear this lens on a daily basis for 10 to 15 hours per day and replaces the lens about every year. She uses the Opti-Free RepleniSH (Alcon) care system.



**The patient's appearance prior to the prosthetic contact lens fitting.**



**The same patient wearing her CIBA Vision Durasoft 3 prosthetic hydrophilic contact lens.**

contact lenses are an ideal choice when trying to match light or unusual iris colors or when special effects are necessary. More precise iris color tones and even sclera colors can be created with this technology. Hand-painted contact lenses generally require the use of the methafilcon or ocu-filcon, because these materials are best for the adherence of the pigments used for the hand painting.

The process involves hand-painting pigment on the front surface of the soft contact lens; the pigments bind to the front surface. A number of companies specialize in this process. Since the lens is hand-painted, and the position of the iris must be determined prior to applying the hand-painted pigments, the iris and pupil position must be specified. This is particularly helpful when a misaligned eye must be perceptually corrected.

By decentering the iris position on the contact lens to create the effect of a correctly positioned iris, any misalignment can be hidden.

When fitting hand-painted

lenses for therapeutic or cosmetic application, it is important to precisely measure and/or document the following parameters on the natural eye:

- Iris diameter in the horizontal and vertical planes.
- Iris details, such as flecks or spokes.
- Pupil sizes in dim, bright and normal room illumination. The pupil size chosen is based on the room lighting level the patient is most frequently in.
- Limbal ring details, such as thickness and color.
- Color and details of the sclera.

The final specifications should result in as close a match to the natural eye as possible.

If a misaligned eye is to be fit, I suggest you use a large-diameter prism-ballasted (scleral) soft lens. This type of lens can be obtained large enough to cover a part or the entire ocular tissue surface, masking the misaligned eye. Once applied to the lens surface, the prism-ballasted design will hold the contact lens in position, eliminating rotation and displacement

of the artistry. The lens must be fit uncolored first. With the successful clear lens design settled on the patient's eye, dot the location of the created "center of the pupil" position on the front surface of the contact lens with a permanent ink marker. With this position marked, remove the lens and store it dry to preserve the pupil location mark. Then ship the lens to the contact lens laboratory for the application of color. Specify to the lab the lens orientation and significance of the ink dot.

Another advantage to custom hand-painted lenses is the availability of vision-correcting prescription power ranges both for spherical and cylindrical components. This allows for the correction of most refractive errors in this custom therapeutic device.

As mentioned earlier, it is crucial that a clear contact lens of the chosen material and correct power be diagnostically fit prior to adding the final color. This step ensures lens wear success. Once the clear design is successfully



fit, it is time to apply the color detail. There are a few ways to document accurate color matching, but most contact lens painting laboratories request digital photographs of the natural eye. This can be achieved using a simple point-and-shoot camera that can focus within about 12 to 16 inches from the patient's face.

If a more sophisticated SLR digital camera with a macro-lens capability is available, the detail can be enhanced, but this is not essential. If colored trial contact lenses or a prosthetic eye fitting set are available, you can use these tools as "color chips" and send them to the lab as examples.

Many hand-painted lenses require the use of an oxidizing care system, but exact care instructions should be obtained from the lab performing the hand painting. Hand-painted lenses are to be worn on a daily-wear basis only and should be replaced annually.

### Professional Gratification

The success of any lens type discussed in this article depends on the wearability and preservation of eye tissue health. Instruct patients on proper care and handling of the lens with the appropriate care system and gradually building the wear schedule up to

the accepted level. All prosthetic contact lens follow-up visits should encompass the accepted standards of contact lens care.

The quality-of-life improvements that patients enjoy with this type of treatment are incredible, and the professional and personal rewards that practitioners can experience are beyond measure.

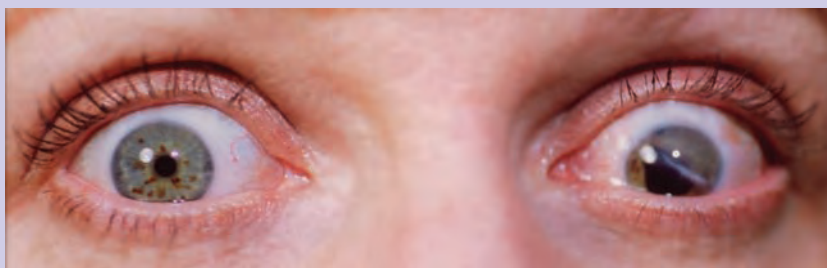
In general, all eye-care patients appreciate the care they receive, but ocular prosthetic patients are extraordinarily appreciative, grateful and loyal to the doctors who have helped them through their ordeals. Professionally, what can be more meaningful than that? [RCC](#)

## Custom Hand-Painted Lens

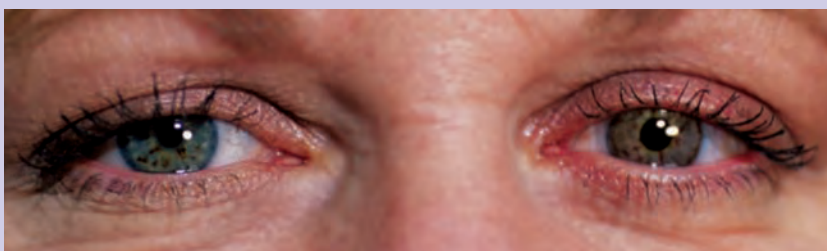
A 41-year-old white female presented with a history of a penetrating globe injury to the left eye at age seven, followed by multiple eye surgeries and cataract removal at age 14. A pear-shaped abnormality of the left pupil and a large central and pericentral full-thickness corneal scar resulted.

The patient felt that the left eye caused eyestrain and was unhappy with its appearance. There is perception of light in this eye, but no useable vision. Due to the unusual color and detail of the patient's natural iris, a custom hand-painted hydrophilic prosthetic contact lens option was chosen. The initial lens fitting used a clear 53% ocufilcon material. This lens was not comfortable to the patient; only one to two hours of wear were possible. A diagnosis of dry eye resulted, and therapeutic measures were initiated. The treatment plan included 1000mg of omega 3 and 6 essential fatty acids b.i.d. and lens lubricants q.i.d.

The Kontur 55 sphere, made of methafilcon 55%, was the lens that could be worn comfortably after this treatment plan was implemented. The patient was able to wear the lens for up to eight hours successfully. The hand-painted contact lens was color matched using digital photos. The patient uses Clear Care Cleaning and Disinfecting solution (CIBA Vision). She replaces the lens about every 18 months.



Patient appearance prior to lens fitting.



Hand-painted hydrophilic contact lens worn on the left eye masking the disfigured eye.



# Nasal Allergies and the Eye

What role do allergic rhinitis, allergic conjunctivitis and sinusitis play in your practice?

By Elyse L. Chaglasian, O.D., F.A.A.O.



Dr. Chaglasian is an associate at The Mack Eye Center, a cornea referral practice in Hoffman Estates, Ill.

As the seasons change, more and more patients are presenting to our offices with the common complaints and classical signs of allergic conjunctivitis. The mechanism behind ocular allergy is well understood, and treatment is generally straightforward, uncomplicated and successful. The eye's close proximity to the nasal passages and sinus system allows the primary eye-care practitioner to identify allergic rhinitis as well as sinusitis and then make appropriate recommendations or treatment referrals.

While they are often dismissed as benign nuisance conditions, the fact remains that ocular allergy, allergic rhinitis and chronic sinusitis are pervasive, significant and frequently debilitating. It is especially critical to be aware of the signs and symptoms of a sinus infection that can become sight- or even life-threatening, in some instances.

In this article, we will examine the diagnosis, management and

treatment of these insidious and interrelated conditions.

## Interconnectivity

In mathematics, the principle of transitive relations says that if "a=b, and b=c, then a=c" This seems particularly appropriate when discussing the triad of allergic conjunctivitis, rhinitis and sinusitis. The first two so commonly co-exist that they are often termed "rhinoconjunctivitis." At least 40% of seasonal allergic rhinitis patients also suffer from symptoms of allergic conjunctivitis.<sup>1</sup>

The latter two are so closely associated that the term "rhinosinusitis" has likewise come into popular use. The literature indicates that concordance of allergy and sinusitis ranges from 25% to 70%, supporting the theory that allergy is an important predisposing factor in sinusitis.<sup>2</sup>

With the interconnectedness of these conditions, it is no wonder that patients seek out medications that will treat the maelstrom of nasal and

ocular symptoms from a single source, whether it is topical ophthalmic drops, antihistamine pills or intranasal steroid sprays. As we will see, each has its place in our armamentarium, with varying degrees of success and side effects.

Both rhinosinusitis and rhinoconjunctivitis account for millions of outpatient and emergency room visits; they're also responsible for loss of productivity at work and school and a decrease in patients' quality of life. Rhinosinusitis affects 35 million people a year in the U.S. alone and accounts for close to 16 million office visits per year.<sup>3</sup> In 1996, Americans spent over \$3 billion on treatment.<sup>4</sup> So, if the old mathematical axiom is to be believed, the eye-care practitioner must be as familiar with the signs, symptoms and treatment of rhinosinusitis as we already are with rhinoconjunctivitis, especially since sinusitis can have serious ocular and orbital complications.

The nose and the eye share a close physical proximity and a direct link via the nasolacrimal duct, so logic dictates that a compromise of one organ can alter the functioning of the other. Allergens that collect in the tear film, such as dust, dander and pollen, easily drain into the nose and provoke nasal irritation. The sensitized immune system produces antibodies to these allergens, which cause histamines to be released into the bloodstream, causing itching, swelling of affected tissues, mucus production, hives, rashes and other symptoms. Conversely, it has been demonstrated that patients who were nasally challenged demonstrated ocular symptoms of itchy, watery eyes.<sup>5</sup> Clinicians frequently find success in treating ocular allergy with topical antihistamines, mast cell stabilizers or combination products, such as olopatadine or

epinastine, with few reported side effects. Nasal formulations of popular ocular anti-allergy drops, olopatadine and azelastine, are available for the treatment of allergic rhinitis and work in a more timely fashion than intranasal steroids, though with potential patient complaints of bitter taste.<sup>6</sup>

Intranasal steroids—such as mometasone, beclomethasone, flunisolide, budesonide and triamcinolone—have also found a place in the treatment of allergic rhinitis and allergic conjunctivitis, where they have all been found to provide relief for ocular complaints of itching, tearing and redness, with a good safety profile.<sup>7-10</sup> But, there has been some debate concerning their systemic availability and their effect on growth in children and osteoporosis in postmenopausal women. Additionally, some studies assert that intranasal steroids (e.g., fluticasone propionate) had the same effect as placebo.<sup>11,12</sup> There has also been concern that, like oral corticosteroids, intranasal steroids might cause adverse ocular effects, such as increased intraocular pressure and risk of cataract development, though this has not been conclusively proven.<sup>13-15</sup>

### Nasal Anatomy

The paranasal sinuses are air-filled cavities located in the bony structures adjacent to the nose, surrounding the orbit on three sides. The four paired sinuses are the frontal, ethmoid, sphenoid and maxillary. The frontal sinus is separated from the orbit by the orbital portion of the frontal bone. The orbital plate of the ethmoid is the thinnest of the orbital bones, and the pituitary body and the optic nerves lie above the sphenoid sinuses, with the cavernous sinus located laterally.

The sinuses move mucous via movement of the cilia into the osteomedial complex and then into the nasopharynx. When this process is impeded, symptoms of sinusitis become apparent. Sinusitis is classified as acute, subacute (lasting four to twelve weeks, and similar to though less severe than acute), chronic and recurrent (three or more infections within a year), based upon the duration of the condition. For the purposes of this article, we will focus on acute (lasting less than four weeks) and chronic (lasting longer than eight weeks).

### Acute Sinusitis

Acute sinusitis is a presumptive diagnosis, based on history and physical examination. Studies conducted in primary care practices suggest that 37% to 63% of patients presenting with acute sinusitis do not have a confirmed diagnosis.<sup>16-19</sup> It is most commonly a result of a viral upper respiratory infection, with just 0.5% to 2% complicated by bacterial infection.<sup>20,21</sup> Rhinovirus is most commonly the culprit, but adenovirus, enterovirus and influenza A or B can also be involved. In one study, viral infection was detected in 81.6% of patients with sinusitis, while no significantly increased levels of antibodies to bacteria were detected, and all patients recovered within three weeks without antibiotic treatment.<sup>22</sup> In fact, 40% of acute rhinosinusitis cases resolve spontaneously, and a previous diagnosis of rhinosinusitis is not a predictor of acute bacterial rhinosinusitis.<sup>23</sup> These statistics support the contention that bacterial sinusitis is widely overdiagnosed. This means that unnecessary antibiotics are prescribed at a cost of billions of dollars each year—and with the risk of side effects as well as increased antibiotic resistance.<sup>24,25</sup>



**Advanced maxillary and ethmoid sinusitis with erosion of the orbital floor just medial to the infraorbital canal.**

As stated previously, sinusitis involves obstruction of the natural sinus ostia and prevents normal mucous drainage. When the retained mucous becomes infected, the common viral sinusitis morphs into the less common bacterial sinusitis. A bacterial infection should be suspected if symptoms worsen after five days or remain longer than 10 days. The most common pathogens isolated from maxillary sinus cultures in patients with acute bacterial rhinosinusitis include *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, *Streptococcus pyogenes* and *Staphylococcus aureus*.<sup>26</sup>

Presenting symptoms of acute sinusitis include nasal congestion and discharge, cough, headache, post nasal drip, facial pressure or pain and fever. Signs may include sinus tenderness with palpation, nasal and pharyngeal secretions and periorbital edema. As mentioned, it is usually a self-limiting condition, and palliative measures include hydration, steam showers, warm facial packs and rest. To alleviate symptoms, patients also seek out over-the-counter products, such as oral antihistamines, decongestants and nasal sprays. Primary eye-care practitioners are keenly aware of the side effects of some of these products—most notably,

drying of the ocular surface. Second-generation oral antihistamines, such as Zyrtec (cetirizine hydrochloride, Pfizer), Clarinex (desloratadine, Schering Corporation), Allegra (fexofenadine hydrochloride, Sanofi Aventis), and Claritin (loratidine, Schering Corporation) have less propensity for induced drowsiness than their predecessors, but they can still cause ocular drying by diminishing the aqueous portion of the tear film due to their antimuscarinic action.<sup>27,28</sup> Over-the-counter nasal decongestant sprays can bring short-term relief of symptoms, but with it comes a cycle of overuse, rebound hyperemia and “rhinitis medicamentosa,” in which the self prescribed treatment aggravates the original condition.<sup>29</sup> Acute angle-closure glaucoma has also been associated with use of over-the-counter decongestants due to their mydriatic effects.<sup>30</sup>

These facts should serve as a reminder that we need to take a thorough history of all the medications a patient is taking—both short- and long-term, whether over-the-counter or prescribed—at each and every office visit. This is especially important with our contact lens wearing patients, as they may experience decreased comfort and wearing time and not understand the cause. The number one reason for contact lens dropout is discomfort, so eliminating causes of dry eye symptomology allows us to keep happy patients safely wearing their lenses.

Intranasal steroids have been investigated as beneficial in the treatment of acute sinusitis, yielding mixed results. Some studies have not shown them to be effective, either alone or in combination with antibiotics.<sup>31</sup> But, results from other controlled trials have shown that intranasal corticosteroids—used in combination

with antibiotics or as monotherapy—can provide significant symptom relief and resolution of acute rhinosinusitis by controlling the inflammation of the sinuses as compared to placebo.<sup>32-35</sup>

While acute sinusitis is generally associated with the common cold and is self-limiting, all practitioners must be aware of the more serious signs and symptoms of acute sinusitis: orbital swelling or pain, swelling of forehead, diplopia, abnormal eye movements, proptosis, altered mental state, headache, fever, seizure, vomiting, hemiparesis or cranial nerve sign, which are all suggestive of intracranial complications.<sup>36</sup> Acute sinusitis can lead to grave conditions—such as orbital cellulitis, orbital abscess and cavernous sinus thrombosis—which are lethal in 5% of patients, and blindness occurs in up to 11% of cases.<sup>37</sup> This is especially true with children. One retrospective study describes 12 children between the ages of 16 months and 16 years.<sup>38</sup> Of these, five developed preseptal cellulitis, five had orbital cellulitis, one had an epidural abscess and one had a cavernous sinus thrombosis and meningitis. One of the five children with orbital cellulitis lost vision permanently in one eye.<sup>38</sup>

Indeed, it is because of the sinus and orbit relationship that we need to be mindful of the complaints of “blurred vision” for those individuals with sinus history or complaints. Preseptal cellulitis is a bacterial infection of the eyelid, anterior to the orbital septum. It is commonly caused by an infection in the neighboring ethmoid sinus. While preseptal cellulitis can be managed effectively with oral antibiotics, it is critical to differentiate it from the more serious infection posterior to the septum, the treatment of which involves an

urgent MRI or CT scan, hospitalization and intravenous antibiotics. Surgery to decompress the orbit or drain an abscess may also be indicated.<sup>39</sup>

## Chronic Sinusitis

Most cases of chronic sinusitis are actually acute sinusitis that have not been resolved. The symptoms of both conditions are the same, with two important exceptions: in chronic sinusitis, there is no fever or facial pain.

Certain conditions may predispose a patient to chronic sinusitis; these include anatomical abnormalities of the ostiomeatal complex, allergic rhinitis, nasal polyps, gastroesophageal reflux disease (GERD), periodontal disease, environmental pollution, immunodeficiency, cystic fibrosis, smoking and primary ciliary dyskinesia.

While the researchers of one study grew bacteria from all tissue obtained during sinus surgery, fungal infection was rare and accounted for less than 5% of cases.<sup>40,41</sup> Fungal infections are more common in people with diabetes and those who are immunocompromised.<sup>41</sup> Yet, treatment with oral antibiotics does not achieve long-term control of sinusitis, leaving many unanswered questions concerning the exact etiology of sinusitis, as well as many unhappy and suffering patients.

Radiology has moved away from the plain film X-ray to more high-resolution sinus computed tomography (CT) and magnetic resonance imaging (MRI), which allow for visualization of normal anatomy as well as pathology. Use of CT is typically reserved for difficult cases and prior to sinus surgery to define bony anatomy. MRI is used to differentiate soft-tissue structures.

## A Collaborative Effort

As eye-care physicians, we are the gatekeepers for our patients' allergic complaints. We must be mindful that the ocular symptoms and signs we see are part of a larger physiological picture. Because of potential severity and associated morbidity of sinusitis, it behooves us to ascertain, through pointed case history questions and clinical analysis, the possibility of this condition. When a red flag is raised, it is crucial to involve patients' primary care physicians, allergists and/or otolaryngologists in their care. Going that extra mile allows us all to breathe easier at night! ACCC

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# Expand Your Contact Lens Profits

How private practitioners like you can reap the rewards by adopting the strategies used by business giants. **By Angel Alvarez**



Mr. Alvarez is the chief executive officer of ABB CON-

CISE Optical Group. ABB CONCISE serves more than 15,000 eye-care practitioners. It also publishes Soft Lens Retail Price Monitor, a quarterly audit of pricing for more than 30 leading contact lens brands.

Business analysts concur that much of Walmart's phenomenal success is attributable to its ability to slash the hidden transaction costs involved in sourcing, shipping and processing inventory, as well as selling the products it markets. As an early adopter of information technology and a relentless fighter against waste and redundancy, the corporation has realized enormous efficiencies in supply logistics. This enables Walmart to pass along its savings in the form of lower consumer prices. Lower transaction costs are the principal Walmart competitive advantage, and other retailers have been forced to adopt more efficient distribution methods to survive.

Walmart's alliance with 1-800 Contacts can be considered yet another initiative to drive down its distribution costs. In this instance, Walmart adopts the Internet technology and central warehouse distribution system of 1-800 Contacts to deliver contact lenses efficiently and conveniently to customers.

Over the past decade, 1-800 Contacts has developed a sophisticated Internet system to take contact lens orders. Much more than half of its business today is transacted entirely on the Internet, instead of the more costly method of live telephone orders. The site's database enables electronic communication with customers to remind them to reorder

lenses. It also has one of the largest and most comprehensive inventories of soft lenses in North America. So, the alliance enables Walmart to utilize these efficiencies, reduce transaction costs and offer a more attractive value proposition to contact lens wearers.

## Transformation of Traditional Retailing

The choices available to consumers at traditional brick-and-mortar retailers are just a fraction of the total goods available in the global economy. Space limitations constrain the selection available in stores, but not on the Internet, where virtually anything made anywhere in the world is available to consumers. Internet retailers capture a share in a growing market in many product categories by offering options that are inaccessible to traditional retailers. Online ordering allows for lower marketing and order processing costs, filters and search engines that make it easy for consumers to find what they need, and 24/7 business hours.

Growth in the frequency of Internet purchases of contact lenses is one of the most important trends that impact independent eye-care practitioners. It is impossible for Walmart or any other traditional optical location to stock the dozens of brands and millions of lens parameters needed by contact lens wearers. By

harnessing the Internet and order processing efficiency of 1-800 Contacts, Walmart can deliver virtually any contact lens order rapidly and reliably with transaction cost savings to consumers.

To the extent that independent eye-care practitioners do nothing to neutralize Walmart's new "convenience" advantage, it is inevitable that private practitioners will experience a slow loss of contact lens sales as their patients seek easier ways to purchase replacement lenses. There is a new urgency for practitioners to focus on lowering their contact lens transaction costs.

### Transaction Costs Matter

Walmart's management team has paid a lot of attention to transaction costs. The company minutely analyzes its costs to ship products to locations, the amount of product in its supply pipeline, the space needed to inventory products, its out-of-stock ratios and its inventory management costs. They know precisely the time spent by store personnel to accept, unpack, sort and stock products and to assist customers in selection, payment and handling returns.

Eye-care practitioners who sell contact lenses do most of the same things Walmart does to deliver lenses to patients. But, they are much less aware how their transaction costs erode their contact lens profitability.

ABB CONCISE has analyzed the time and motion required for practitioners to fulfill soft lens orders. An estimated 28 minutes of staff time is needed to complete a typical soft lens transaction that involves a prescription order placed with a contact lens supplier. With an average staff cost per hour of \$16.40,

that translates to \$7.65 in administrative costs to fill an order.<sup>1</sup> Many orders also incur shipping and handling charges; these are typically around \$5.95. And, that's not the end of the hidden transaction costs. Others are associated with carrying in-office inventory, managing the burgeoning stock of trial lenses, handling returns and reconciling supplier paperwork. These can add another \$3.00 to \$4.00 in cost to a transaction fee.

The most common order quantity placed by practitioners is two boxes, which accounts for over 60% of transactions.<sup>2</sup> The average gross profit earned on a two-box

**“ To the extent that independent eye-care practitioners do nothing to neutralize Walmart's new “convenience” advantage, it is inevitable that they will experience a slow loss of contact lens sales as their patients seek easier ways to purchase replacement lenses.”**

order of soft lenses is \$34.34. For spherical lenses, the average gross profit is \$29.30. Transaction and shipping costs can consume \$13.60 of the gross profit—40% to 46% of the margin an eye-care practitioner earns from re-selling soft lenses.<sup>3,4</sup> But, it does not need to continue this way. Practitioners can lower transaction costs and significantly improve profitability by implementing new strategies in their offices.

### Dispensing Habits Dictate Transaction Costs

ABB CONCISE has analyzed order patterns and determined which are most and least profitable. The table on the next page compares the cost per box to order two-week disposable lenses (which 70% of patients wear) by quantity, how they are ordered and method of dispensing.

The most cost-effective method

of ordering lenses is to let the patient do the work and order their contact lenses through your practice via the Internet. The distributor margin is built into the cost-of-goods the practitioner pays. The same cost applies to patient Internet orders etc. The practitioner sets the price that patients pay for lenses when distributors fulfill Internet orders and receives a monthly check for the difference between cost-of-goods and selling price, less than a small credit card fee. When your Internet order system is linked directly to your lens supplier—which collects the selling price and remits the normal gross profit margin to you—no administrative time is lost, and there aren't any inventory costs. Lenses are shipped directly to patients with no handling by your office. This is the ideal way to dispense replacement lenses. So, why aren't the patients

who come to your office for an exam and new contact lenses ordering lenses this way?

The next most cost-effective way to dispense lenses is to place an annual supply order during the patient's visit and have the lenses shipped directly to his or her home. This method completes the transaction during a single visit with no inventory cost. It spreads transaction costs across a larger order, increasing the profit margin per box. This also eliminates the need for a telephone call to inform patients that their lenses have arrived and the time necessary to fulfill the order during a second office visit. Another benefit of this approach is that it takes care of no-shows—patients who order lenses but fail to pick them up, perhaps because they have found a cheaper source.

But, surveys show that patients

**Table 1. Order Pattern Profitability**<sup>5</sup>

	<b>Box Quantity</b>	<b>Order/Dispensing Method</b>	<b>Staff/Inventory Cost Per Box</b>	
	<b>Least Profitable</b>	2	Individual Rx to supplier, dispensed in-office.	\$3.83
		2	Dispensed in-office from inventory.	\$2.18
		8	Individual Rx to supplier, dispensed in-office.	\$0.96
		8	Dispensed in-office from inventory	\$0.75
		8	Individual Rx to supplier, direct ship to patient.	\$0.40
<b>Most Profitable</b>	Any	Patient Internet order.	\$0.00	

appreciate the instant gratification of receiving their lens supply at the time of their exam.<sup>6</sup> This is the preferred method of dispensing spherical lenses. So, it's still practical to inventory the lenses that you prescribe frequently, because a high annual turnover is achieved, lowering inventory costs per box.

The least cost-effective method of ordering and dispensing lenses is to sell two boxes that the practice orders for individual patients. Unfortunately, this is also the most common dispensing method, accounting for over half of the orders received by ABB CONCISE. The administrative cost of selling lenses this way totals nearly \$4.00 per box, not including the shipping and handling charges that can add to another \$3.00 of cost per box. Another major defect of this dispensing pattern is that it encourages patients to stretch the time between lens replacements, allowing time for patients to shop for replacements at alternate suppliers. The results are lower lens usage and sales, and a lower capture rate of patients' annual lens consumption.

Over the course of a year, lowering transaction costs has a big impact on practice profits. A typical

practice dispenses 2,500 boxes of lenses per year. A savings of \$3.00 per box in transaction costs equals \$7,500 in savings, not including shipping and handling cost reduction.<sup>7</sup>

### Time to Reconsider?

In the past, eye-care practitioners have resisted direct-to-patient shipment and patient Internet ordering because they feared loss of control. They rationalize their decision by noting that patients seldom complain about making a separate trip to the office to pick up lenses. And, few ever heard a patient complain that it was inconvenient to be forced to reorder lenses during office hours.

But, the truth is that today's Internet-savvy consumers are less willing to tolerate these inconveniences. They may not complain, but they may simply shop elsewhere.

Distributors have large inventories of all the leading soft lens brands, ready for next-day or second-day delivery in many regions. This eliminates the complexity of using multiple sources for specific lenses.

Distributors are equipped to fulfill direct-to-patient shipments,

completely removing the eye-care practitioner's responsibility of handling lenses. This is advantageous because a digital record of patients' prescriptions, e-mail addresses and shipping information can be created when orders are shipped; this provides a way to notify patients when it's time to reorder and to facilitate Internet-based reorders.

Tools on ABB CONCISE's [www.yourlens.com](http://www.yourlens.com) provides Internet reorder functionality that is easy to graft onto existing practice Web sites in a transparent manner. The service can also be used as a stand-alone Internet reorder site, enabling patients to order lenses from their practitioner for home delivery at the clinician's customary retail pricing.

Practices that enroll their patients in the online store service ([www.yourlens.com](http://www.yourlens.com)) find that they create an annuity for themselves that lives on and on. Every month, checks arrive for soft lens orders that the office never touches, apart from authorizing a prescription. Recently, one ABB CONCISE customer suffered a fire in his practice and was out of business temporarily; he told us how delighted he was that the soft lens orders kept coming during the disruption, as if nothing had happened.

The Walmart/1-800 Contacts alliance is a wake-up call to private practice practitioners. It's time for you to focus on lowering contact lens transaction costs and upgrading patient convenience, which in turn will ensure great benefits for your patients and longevity for your practice. RCL

1. Management & Business Academy. Data on file. 2008  
 2. Health Products Research. Data on file.  
 3. ABB CONCISE. Data on file.  
 4. Soft Lens Retail Price Monitor. Data on file  
 5. Management & Business Academy. Data on file. 2008.  
 6. Vistakon. Data on file.  
 7. ABB CONCISE. Data on file.