Supplement to
RCCL
REVIEW OF CORNEA & CONTACT LENSES

Gas Permeables
Are You Making Good Use of Your Diagnostic Fitting Sets?

One Size Does Not Fit All
Making the Case for Custom Lenses

Custom Contact Lenses in 2015
Options Abound!

CRITICAL MEASUREMENTS
to Improve Scleral Lens Fitting

EARN 1 CE CREDIT
A Successful Specialty Contact Lens Practice Starts With An Experienced Specialty Lens Partner

If you want fitting specialty lenses to be a great experience, demand a partner that has great experience. Alden Optical® has been making outstanding specialty lenses for over 45 years. Just as important, our team has a combined 324 years of contact lens experience—a remarkable average of 18 years per employee.

From lenses designed to ensure great success, to service and support that intuitively meet your needs, to a small company ethos that knows and empathizes with your challenges, partnering with Alden Optical is an experience that delivers unparalleled value.

- Every single lens is backed by our exclusive 90-day EZ-Exchange™ warranty, including full cancellation privileges—even on Zenlens™
- All lenses manufactured in three days* or less
- Expert consultation and customer service

aldenoptical.com | 800.253.3669 | info@aldenoptical.com

*Please add 2-3 days for prosthetics and enhancement tints. Alden Optical, ASTERA, EZ-Exchange, NovaKone, and Zenlens are trademarks or registered trademarks of Alden Optical Laboratories.
# Review of Cornea & Contact Lenses  | September 2015

## contents

### Review of Cornea & Contact Lenses  | September 2015

## departments

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>News Review</td>
</tr>
<tr>
<td>6</td>
<td>My Perspective</td>
</tr>
<tr>
<td>8</td>
<td>Pharma Science &amp; Practice</td>
</tr>
<tr>
<td>10</td>
<td>Practice Progress</td>
</tr>
<tr>
<td>32</td>
<td>The GP Expert</td>
</tr>
<tr>
<td>34</td>
<td>Out of the Box</td>
</tr>
</tbody>
</table>

## features

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Making the Case for Custom Lenses</td>
</tr>
<tr>
<td>16</td>
<td>GPs: Are You Making Good Use of Diagnostic Fitting Sets?</td>
</tr>
<tr>
<td>22</td>
<td>Options Abound: A 2015 Report on Custom Contact Lenses</td>
</tr>
<tr>
<td>26</td>
<td>CE — Critical Measurements to Improve Scleral Lens Fitting</td>
</tr>
</tbody>
</table>

---

Cover design by Matt Egger
©iStock.com/Jobsonhealthcare

---

Becoming a Fan on Facebook
Become a Friend on Facebook
/ReviewedCorneaAndContactLenses

Become a Fan on Facebook
Follow Us on Twitter
#rcclmag

---

Review of Cornea & Contact Lenses  | September 2015

---

003_RCCL0915_TOC.indd  3
8/25/15 10:23 AM
**Study Links CL Wear with Increased MGD Risk**

Contact lens wearers, especially those who have worn lenses long-term, may be at increased risk for meibomian gland dysfunction (MGD), reports a study in the September 2015 Cornea. Researchers evaluated the meibomian gland health of 41 daily soft lens wearers vs. 31 age-matched non-lens wearers, using measurements of meibum expressivity and lid margin abnormality. Ultimately, the study conceded an incomplete understanding of lens care-related eye infections, part of the organization's Morbidity and Mortality Weekly Report.¹

The population-based study identified 40.9 million contact lens wearers (i.e., one sixth of the adult population) in the country, with 93% wearing soft contact lenses. Of the total respondents, most were white (64.5%) females (60.7%) aged 30-39 (24.8%) from the South (37.1%) with a high school level of education (31.5%) who live in metropolitan areas (87.1%). The study did not consider lens wearers under age 18. A subset of the contact lens-wearing population (n=1,000) also completed the CDC’s Contact Lens Risk Survey. Roughly 99% of the respondents reported at least one contact lens hygiene risk behavior associated with an increased risk for eye infection or inflammation. These include:

- Exposing lenses to potential water-borne contamination, either by swimming (61%), showering (84.9%) or rinsing in tap water (35.5%).
- Sleeping (50.2%) or napping (87.1%) in their contact lenses.
- Topping off disinfecting solution in lens cases rather than using new solution (55.1%).
- Not complying with lens (49.9%) or lens case (82.3%) replacement schedules.

“This population-based study admirably highlights the importance of proper lens hygiene,” says Joseph P. Shovlin, OD, a member of the CDC’s advisory panel. “There are many steps to compliance in caring for lenses; unfortunately, risky behavior remains a major risk for potentially sight-threatening experiences.”

The organization also undertook its second annual Contact Lens Health Week in late August to address these deficits in public knowledge of lens care. “The Contact Lens Health Week will help deliver the much-needed reminder to lens wearers that contact lenses are a medical device,” Dr. Shovlin says. “The message will undoubtedly help promote safe and effective lens wear.”

Go Ahead—Rock the Boat!
Steering a course toward technology and comfort with the
Bausch + Lomb ULTRA® contact lens

By
Andrew Paik, OD
Target Optical
Chicago, Illinois

In fitting contact lens patients, it’s easy
to fall into the habit of “not rocking
the boat.” If a patient is happy in their
contact lenses, it often seems expeditious
just to leave them in a lens that they al-
ready like, without necessarily doing too
much critical thinking. By doing this, are
we missing an opportunity to offer our
patients the latest in contact lens tech-
nology, which is a focus for many of us in
clinical practice?

One trend in the industry over the last
several years has been a shift  toward daily
disposable lenses. In my own practice,
we typically recommended daily dispos-
able lenses to most of our contact lens
patients, including patients who were
non-compliant in bi-monthly modalities.
In the past, for patients who were happy
in their current monthly lenses, we would
try to keep them in those lenses or else
recommend a daily disposable. All of that
changed with introduction of the
Bausch + Lomb ULTRA® contact lens,
which really has all of the features that
we’re looking for in a single lens – aspher-
ic optics, high dk/t, low modulus, and
high moisture content. Together these
features mean a lens with great comfort
and performance that we now off er con-
fidently to all of our monthly as well as
bi-monthly replacement lens patients.

Along with a shift in strategy in the
contact lens modalities I recommend has
also come a change in the focus of the
questions I typically ask my patients. Be-
fore, much of the conversation focused on
compliance. Now, in talking to patients,
I ask more specific questions about their
contact lens wearing experience. How
comfortable do your contacts feel at the
day’s end? How do your contacts feel
when you’re at your computer? If there’s
anything about your contact lenses you’d
like to change, what would it be?

Many patients have been wearing the

Our office prides itself in having the
latest in technology.”

same lens for many years so this is a good
way to at least get them thinking about
something new. Patients respond well to
this kind of questioning – they appreciate
that the doctor is taking an interest in the
quality of their contact lens wear.

One patient who comes to mind is a
38-year-old returning patient, who had
been wearing the same soft  contact lens
for almost 8 years; about a year and a half
ago we had fit her into a new monthly
replacement lens that she didn’t like and
had gone back to her previous bi-monthly
lens. At this point she was really skeptical
about trying anything new but I persuad-
er her to try the Bausch + Lomb ULTRA®
 lens. I expected that she would want to
wear the trial lenses for a week or two
but instead she put the lenses on, walked
around the store looking at sunglasses,
and came back after 10 minutes and said
“These lenses are amazing!” and ordered
a year’s supply. On subsequent follow-up
two weeks later, the patient was extremely
happy with the lenses, reporting better
end-of-day comfort and less dryness.

Our office prides itself in having the latest
in technology – EMR, automated phorop-
ters, retinal cameras – which show pa-
tients that we’re innovative and up to date
in terms of new technology. It’s some-
thing of a let-down after all that to leave
with the same contact lens prescription
the patient has been wearing for years.
Being able to offer patients an innovative
product like the Bausch + Lomb ULTRA®
 lens that sets a high standard for comfort
and performance is a much more positive
experience, one that’s in line with the im-
age we’re trying to present in the office as
a team. It’s helping to advertise that we’re
about change and improvement.

Bausch + Lomb ULTRA is a trademark of Bausch & Lomb Incorporated or its
affiliates. All other brand/product names are trademarks of their respective owners.
US/ZUS/15/0160

SPONSORED BY BAUSCH + LOMB
The Myopia Menace

The recent passing of Professor Brien Holden highlights the continuing need for myopia research and clinical intervention, especially with contact lenses.

Over the past few decades, the prevalence of myopia has increased exponentially. In many populations—especially Asian cohorts—the morbidity associated with myopic progression can be devastating. Significant elongation of the eye often results in poor uncorrected acuity. Nearly as important, myopia is associated with increased risks for glaucoma, cataracts, peripheral retinal pathology (i.e., holes, tears and detachments) and myopic macular disease.

Ongoing research is evaluating several modalities to slow the rate of myopia. These include pharmaceutical intervention with antimuscarinics (low-dose atropine and pirenzipine gel), orthokeratology (ortho-K) and multifocal spectacles and contact lenses. Clinical trials of ortho-K have demonstrated that progression is slowed by about 40%. Soft multifocal contact lens designs have demonstrated similar results: by reducing near eso fixation disparity, bifocal contact lenses may improve near vision comfort and reduce accommodation lag. A certain degree of protection seems to be afforded by peripheral myopic defocus lens designs.

Professor Brien Holden: In Memoriam

Initially, I was planning to highlight Brien Holden’s fabulous work on myopia this month; I never expected to provide a memoriam honoring his memory. At this year’s British Contact Lens Association (BCLA) meeting, Professor Holden presented a marvelous review of (1) what should concern us with myopic progression, (2) what we have learned to date and (3) how we might slow its progression.

Key points raised in his BCLA presentation include: (1) outdoor activities are essential to delay the onset and perhaps even reduce the rate of progression, (2) most soft lens designs actually promote myopia because of their negative spherical aberration in peripheral optics, (3) the recognition that ortho-K actually works and (4) the fact that peripheral plus (multifocal) lenses also work. Professor Holden envisioned a day when a depth-of-focus lens would be custom designed for each patient with more than 0.50D of myopia.

So, is the time to act now, as Professor Holden believed? If your comfort level is adequate using lenses for a non-FDA approved indication, perhaps it is good to discuss contact lens options with parents whose children are showing myopic progression. Also, low-dose atropine (0.02%) may be a viable alternative for any patient unable or unwilling to wear either ortho-K or multifocal lenses. However, research has shown slower myopia progression, but not slowing of eye growth, so the mechanism of myopia control remains a mystery.

Ortho-K and multifocal contact lenses appear to have significant benefits when fitted early in myopic patients. Thus, we call upon manufacturers to seek approval for novel designs, as in a stepped anti-myopia and extended depth of focus lens approach. In the meantime, I urge you to consider the exciting treatment modalities available to us today after careful and adequate education of parents and individuals who may benefit most when using these lenses. Professor Holden’s positive and lasting impact will most definitely live on.


The Giant Among Giants

The eye world lost an amazing individual in July. His resume reads like a novel: 275 refereed scientific articles, more than 450 abstracts and more than 125 keynote addresses. Over a career that spanned more than four decades, Professor Holden received 30 international awards from diverse organizations around the world for his endless contributions to research, clinical science, public health and philanthropy. He served as a mentor to so many of us and we’ll certainly have a story or two to tell about how he enjoyed life.

What many of our readers may not know is that Brien Holden’s PhD thesis was on the development and control of myopia, a passion he pursued tenaciously right up until his death. Professor Holden holds 10 patents with an additional nine pending, many of them related to slowing myopic progression.
An easy fit for you and your presbyopic patients.

CooperVision Biofinity® multifocal lenses combine a high-performing 3rd generation material with a streamlined fitting process. Now even your most challenging presbyopic patients can enjoy the freedom of all-distance clarity and lasting comfort.

**Balanced Progressive™ Technology** enhances vision near, far and intermediate. It also allows for an individualized fitting for each wearer and each eye.

**BIOFINITY MULTIFOCAL LENSES**

CooperVision Biofinity® multifocal lenses combine a high-performing 3rd generation material with a streamlined fitting process. Now even your most challenging presbyopic patients can enjoy the freedom of all-distance clarity and lasting comfort.

**Download your Biofinity multifocal 3-step fitting guide at coopervision.com/fitting-guide**

©2014 CooperVision, Inc.
Pregnant Pause

Updates to the FDA’s pregnancy drug categorization system mean changes for your practice. What should you expect?

A pregnant patient presents to your office requiring a topical antibiotic for a corneal ulcer. Another patient comes in with bilateral uveitis and needs a topical steroid. A third patient complains of debilitating ocular allergies. What do these patients all have in common? They are all in their first trimester of pregnancy. So, keeping this in mind, what criteria do you use to guide your selection of medications?

Many practitioners have relied heavily on the longstanding FDA pregnancy labeling system for prescription medications to make this call. First instituted in 1979 in response to the thalidomide disaster of the early 1960s, in which thousands of babies were born with severely deformed extremities after the drug was marketed as a preventative for morning sickness, the system is comprised of five categories: drugs are labeled A, B, C, D or X based on a series of predetermined FDA risk factors, with A being considered the safest category. Each category was defined by the absence or presence of data in animals and/or humans and the study results.1 Additionally, categories D and X included information about the drug’s benefits for the mother, along with potential fetal risks. The FDA also determined safety data could be omitted for drugs that are not systemically absorbed as well as for drugs without sufficient studies to demonstrate risk.2

In the years since the labeling system’s institution, however, many shortcomings have been identified; this month’s column will provide a brief overview of the impetus for change and what the change involves.

MAKING THE CHANGE

There are approximately 6.5 million pregnancies annually in the United States, with an estimated yearly pregnancy rate among women ages 15 to 44 at 11%.3 In a retrospective study on the prevalence of prescription drug use among pregnant women, researchers found that approximately 64% of women are prescribed a drug during pregnancy; of those receiving a prescription medication, 50% of the drugs came from category B, 37.8% from category C, 4.8% from category D and 4.6% from category X.2 Other data has suggested that as many as 80% of women receive prescription medications during pregnancy, with an average of 3.1 prescriptions per person.2 Approximately 66% of all prescription medications were labeled as category C.2

The FDA realized as early as 1997 there were problems with the 1979 labeling, but it has taken almost two decades for change to occur. Known problems include oversimplification of drug use during pregnancy, the incorrect assumption that all drugs in a particular category share the same risks, and that supporting test data is not clearly distinguished as to whether it is from animals or humans.1,3

To overcome these concerns, the FDA proposed the Pregnancy and Lactation Labeling Rule (PLL) in 2008 and, after minor changes, the final PLLR was adopted effective June 30, 2015. The most striking difference between this and the old labeling system was the elimination of the pregnancy letter categories. In addition, the content and format for the labeling of prescription drugs and biological products has been reorganized with changes in titles and headings:

• Section 8 on every package insert now addresses prescription drug use in specific populations.
• Section 8.1 will now be called “Pregnancy” and will now include a section on labor and delivery.
• Other subcategories will include “Pregnancy Exposure Registry,” with directions to include contact information for enrollment if applicable; “Risk Summary” and “Clinical Considerations and Data.”

The latter two sections will be required to clearly delineate if the findings were from human, animal or pharmacology studies.

• Section 8.2 will now be called “Lactation, including Nursing Mothers,” which was formerly Section 8.3. This section will also contain subsections on risk and clinical considerations and data, with similar requirements to Section 8.1.

• The revised Section 8.3 is now labeled “Females and Males of Reproductive Potential.” This section will address whether pregnancy testing and/or contraception are recommended in conjunction with the drug therapy. Also addressed in this section will be any human or animal data that suggests drug-related infertility.4,5

Prescription drugs submitted to...
the FDA for approval after June 30, 2015 will immediately use this new formatting. Labeling for over-the-counter medicines, however, will not be affected by the PLLR and thus will not change. Drug applications approved after June 30, 2001 will have three years to make labeling changes. Drugs approved prior to June 30, 2001 will not be required to reformat the labeling to be consistent with the new content, but will be required to remove the pregnancy risk category (i.e., A, B, C or D or X) within three years.2,7

Overall, the PLLR is expected to provide the practitioner with a better understanding of the risks associated with prescription medications during pregnancy and lactation. It will equip the clinician with better information including a summary of the risks of using a drug, data supporting that summary and relevant information which will help when selecting medications and allow for better communication to the patient about the risks/benefits to the patient and the fetus. Additionally, more comprehensive information will be available as well for patients of reproductive potential who may be contemplating pregnancy. Though simplicity has been eliminated, our pregnant patients who need prescription drugs will still benefit from these significant changes.  

Meet the Candidates

More patients can wear contact lenses than you might think. Custom designs can turn missed opportunities into success stories.

With the year rolling along, have you taken the chance to evaluate the progress of your contact lenses business? Is your growth where you would like it to be, or are you experiencing the all-too-familiar feeling of just treading water? We all are aware of the often-cited statistic that about 16% of contact lens patients drop out of lens wear each year, essentially eliminating the gains we might have experienced from new patients entering the modality. Many practices end the year with the same number of contact lens patients they started with. What will it take to break the cycle? A broader view of who’s a candidate for contact lens wear.

Many practices rely on everyday wearers as their primary source of contact lens revenue—they’re easy to fit and easy to please—but forgo considering specialty and custom contact lens wearers. Patients with unique visual demands and/or more challenging ocular anatomy to contend with have often been told they cannot wear contact lenses, due to an irregular cornea or high amount of astigmatism. Others who wore contact lenses previously may have given up due to discomfort or fit issues. While these patient types will take a bit more effort and expertise than a garden-variety -3.00D myope with healthy eyes, when handled correctly they can be your biggest catalysts for growth.

In this newly retooled column, now called Practice Progress, we’ll focus on strategies for growth as well as retention. Success in a contact lens practice requires more than just “derailing dropouts;” the topic we addressed for the last eight years. It also takes a willingness to embrace new ideas, lens technologies, and challenges. Custom-fitting contact lenses for challenging cases is the perfect place to start.

SPREAD THE WORD
The first step to getting these patients on your side is making them the offer of custom lenses. It sounds simple, but many patients have preconceived notions that they cannot wear lenses. Once the patient expresses interest in trying a custom lens, record their history, including their occupation, hobbies and daily visual requirements, and discuss suitable lens options with them.

Technology can aid with determining the correct lens option for each patient. Topography is a must for corneal mapping, while anterior segment OCT can aid in fitting vaulted lenses. Newer OCT applications can image the tear film to get a better sense of tear dynamics, so even borderline dry eye patients can wear contact lenses.

Custom contact lens offerings comprise a large number of lens types, including those for high and irregular astigmatism, keratoconus, post-traumatic and post-refractive corneas, myopia control, poor visual acuity and ocular surface disease. Because of the uncommon nature of some of these lenses, fitting these patients often takes more time and energy; thus, many practitioners don’t even make the offer. Below, we review a few patient populations who have custom lens options to consider.

HIGH ASTIGMATIC PATIENTS
These patients offer a good opportunity to add a significant number of underserved contact lens wearers to your office. While there are many toric options available in the soft contact lens market, on-eye lens stability can sometimes be a challenge for those with moderate to high levels of astigmatism, especially of the irregular variety. Uncorrected astigmatism and the subsequent distorted vision results in frustration, headaches and eye fatigue.

For these patients, gas permeable (GP) lenses provide more stable vision than traditional soft lenses and mask corneal irregularities. Though GPs typically require longer adaptation times, spherical GPs are often a great starting lens. However, patients with significantly higher astigmatism (i.e., more than 3.00D cyl), may need a back toric or bitoric GP lens to further ensure lens stabilization.

ASTIGMATIC PRESBYOPES
Another great opportunity to improve the patient’s contact lens experience is the high astigmat with presbyopia. GPs can often be fit empirically for these patients and typically provide the greatest range of clear vision at all focal lengths near to distance. GP multifocals are often the best way to ensure good visual function. These lenses are typically customized to the patients’ specific cornea shape and visual needs. Note that some lens movement is necessary, but signifi-
cant movement will impede visual function.

Soft toric multifocals are another good option for these patients. To properly fit these lenses, fit the toric aspect first and adjust for rotation and instability before fitting the multifocal aspect. As with any lens, be sure to discuss appropriate visual expectations and the importance of follow-up care. For this technology, on-eye stabilization is key.

Hybrid lenses are a third possibility for patients who desire the clear vision of GP lenses with the comfort of soft lenses, as the soft skirt surrounding the rigid center helps reduce lens awareness. The second-generation Duette multifocal lenses (SynergEyes) are currently the only hybrid lens with a silicone hydrogel skirt (Dk=84).

CORNEAL IRREGULARITIES

There are a number of scleral lens designs available for corneal irregularities like keratoconus, post-trauma and post-surgery, including corneal-scleral, semi-scleral, mini-scleral and conventional scleral fits. These rigid lenses are becoming increasingly popular due to their ability to mask irregularities while being better tolerated than traditional corneal GPs. As scleral lenses are fit to vault the cornea, much of the lens rests on the sclera, as opposed to the cornea. Typically, their diameter is greater than 10mm; fitting sets are a must for this technology.

Additional, there are a few soft designs for the irregular cornea. These lenses typically use thicker center optic zones to mask irregularities. Some limits exist with these designs, but they may be a good option for mild to moderately distorted corneas.

CASE IN POINT

A new 44-year-old male patient presented with complaints of decreased vision with his glasses at distance and near. He reported his vision was worse in his right eye and that he had been told at his previous eye exam that he may have keratoconus; however, he had never been fit with contact lenses. His BCVA was 20/30 OD with an Rx of +2.50-4.00x049 and 20/20 OS with an Rx of +0.75-2.00x132. He was trial fit into the NovaKone (Alden) soft keratoconic contact lens, and later fit with the NovaKone Toric for his right eye and the NovaKone Sphere for his left eye (Figure 1). His vision with contact lenses was equal to his best corrected spectacle prescription, and he expressed satisfaction with his vision and comfort.

DEVELOPING YOUR MARKET

Though you have an existing patient base to draw from, it is important to develop marketing tactics to expand this group. Some possibilities include talking to other doctors in the area—including ophthalmologists, primary care practitioners and even school nurses—to spread the word of your ability to fit custom lenses. These professionals would welcome the opportunity to help their patients and would have no problem admitting their shortcomings in this particular area of care; knowing a specialist to refer their patients to gives them the ability to help without the obligation of developing the expertise in-house.

In addition, consider external and internal advertising efforts such as newsletters, emails, websites and social media outlets. Don’t forget to capture the reaction of your patients as they experience a successful fit and use it to promote your practice. For instance, a happy patient who’s just been fit with a custom lens might want to post a selfie right from your exam chair, providing everyone in their social network with an endorsement for your practice. Boom—instant, real-time marketing. And it’s free.

The above options offer a unique platform and design, which allows the contact lens practitioner to provide unique products to your patients. Some patients will be intolerant of any lens design, but in those instances where a patient would benefit from the optics that a GP delivers, but cannot wear the lenses because of discomfort issues, consider a soft or hybrid lens.
Although contact lenses are classified as medical devices and subject to the same stringent FDA approval process as cardiac stents, orthopedic implants and any other manufactured health aid, they are increasingly seen by many as a commodity. Before the era of mass production, conventional contact lenses were lathe-cut and made to order, with varying diameters and base curves. Then, in the late 1980s, the first disposable soft contact lenses were produced using a cast-mold production process, forever changing the industry. Since then, stock lens offerings have increased exponentially. Patients enter a competitive consumer environment upon leaving the exam room, one that is complicated by a range of discount vision plans and online retailers who emphasize cost savings and little else.

In light of this downgrade of contact lenses in the public sphere—from medical device to commodity product—it is easy to see why many patients lose sight of the value of our expertise in choosing an appropriate lens. This trend is especially concerning for patients with higher demands on their vision who have struggled to find an appropriate stock lens. Educating patients regarding your ability to personalize their fit with custom-designed lenses can help you better meet their needs and stand apart from competition.

**POTENTIAL CANDIDATES**

By definition, a custom contact lens is any soft, gas permeable (GP) or hybrid lens design that is made to order, with multiple design parameters that can be manipulated. Although irregular cornea applications may come to mind first as the best use of custom lenses, they can address many patients’ refractive needs that are not being met with standard “off-the-rack” disposable contact lenses.

- **Astigmatic Patients.** How often do patients mention they have been told they cannot wear contact lenses because of their astigmatism? An estimated 90% of astigmatic patients can be fit in the parameters available with stock soft toric lenses, which typically includes a range of +6.00D to -9.00D in spherical power and up to -2.25D cylinder power.\(^1\)

For patients outside of this range, custom soft toric lenses are an option. Depending on the laboratory, from 8.00D up to 12.00D of astigmatism can be incorporated with one-degree axis steps. With larger amounts of astigmatism, cylindrical axis refinement is critical. Custom lenses can be lathe-cut to nearly any base curve, diameter and prism to improve rotational stability.

When patients express a desire for better vision, consider discussing GP lenses, as they offer a...
superior quality of vision compared with soft toric lenses. As a general rule of thumb, spherical GPs can be used when refractive astigmatism equals corneal astigmatism of less than 2.5D. If there is any residual astigmatism, it can be applied to the front surface. However, in cases of higher corneal astigmatism, back-surface or bitoric GPs are typically used.

If initial comfort with corneal GP lenses is a concern, consider prescribing hybrid or scleral lenses instead. Many GP laboratories are now marketing smaller diameter scleral lenses to fit the “normal” cornea. These specialty lenses provide stable, higher quality vision with comfort rivaling soft toric lenses.

**Presbyopes.** The strain placed on near vision in our technology-driven world, coupled with the influx of presbyopic patients, has put multifocal lenses more in demand than ever. The ability to change multiple design parameters once again increases the odds for success. Knowing the patient’s desired working distance can help in the decision-making process. If higher add powers are required, many GP multifocals have adds greater than 3.0D. Certain custom laboratories such as SpecialEyes can manufacture lenses with an add power up to 4.0D at 0.10D increments.

Most gas permeable and custom soft multifocals rely on aspheric, simultaneous vision designs. Depending on the specific design of the lens, adjusting zone sizes in relation to pupil size can improve the optics. For example, if a center-distance, aspheric GP multifocal has a standard distance zone of 3.95mm, patients with a smaller pupil diameter may have difficulty achieving great near vision, while those with larger pupil diameters

### Case #1: The Presbyope with Large HVID

A 44-year-old pilot presented complaining of decreased near vision with his habitual progressive spectacles. He was interested in trying contact lenses for the first time. Given his occupation, there is a high demand on his vision at various working distances. Spectacle Rx was 0.00 0.75x090 OD and 0.00 0.50x095 OS, with an add of +1.50. Keratometry readings were 42.25/42.75 at 180 OU. A pair of standard center-near monthly replacement multifocals was placed on his eyes, but were decentering superiorly with excessive movement.

A pair of custom center-near aspheric soft multifocals was ordered using spherical equivalent power for the distance correction. The base curve and diameter was adjusted to 8.4mm and 15.2mm OU to improve the fitting relationship. Given a pupil diameter of 4.0mm in ambient light, the center-near zone was set at 2.0mm extending to a 3.5mm intermediate zone. With these lenses, he was able to comfortably achieve 20/20 distance vision in each eye and read his phone and an iPad that he uses in the cockpit.
MAKING THE CASE FOR CUSTOM LENSES

Case #2: The High Astigmat
A 24-year-old graduate student presented wearing soft toric lenses, but only part-time because he reported that vision is better in spectacles. In addition to better clarity when using spectacles, he reported fluctuating vision when blinking in his contact lenses.

His Rx was -10.50 3.00x005 OD and -11.50 2.00x160 OS with keratometry readings of 43.25/45.25 at 089 OD and 43.50/44.75 at 074 OS. Because of the potential for residual astigmatism in a GP lens, a custom soft toric lens was initially chosen.

Custom soft toric lenses were empirically ordered using the Definitive (efrolicon A, Contamac) material. Given his significant level of myopia and thicker lens periphery, a silicone hydrogel material was preferable. After vertexing, the following lenses were ordered: -9.25 2.75x005 with an 8.2 base curve and 14.8 diameter OD and -10.25 1.75x160 with an 8.3mm base curve and 14.8mm diameter. He was able to achieve stable, 20/20 vision in each eye and was thrilled with his vision. He is now wearing his contact lenses daily.

PERSONALIZED FITTING
Identifying candidates for custom contact lenses begins with taking a case history. Many non-contact lens wearers believe their prescriptions exclude them from contact lens wear. Similarly, for both current and former contact lens patients, inquiring about their wearing experiences can help you better tailor a custom lens option for them. Once the need for a custom lens is established, patients can be fit diagnostically or empirically.

Diagnostic fitting evaluates the lens-to-cornea fitting relationship of various lenses; however, this approach may increase chair time during the initial evaluation. Certain lenses, including translating GPs and scleral lenses, are better fit diagnostically.
Because most practices do not carry a large GP inventory or multiple diagnostic sets, empirically ordering GP lenses is often the preferred approach for many practitioners. In addition to potentially reducing chair time, empirically designed GPs have been proven to reduce patient chair time and provide parameters. For presbyopic patients being fit with either GP or custom soft multifocals, measuring pupil size in both photopic and scotopic conditions can help determine initial zone sizes. Keep in mind that add power may vary depending on the patient’s most desired working distance.

Corneal topography is a great tool to use when fitting custom lenses. Multiple measurements such as keratometric readings, HVID, pupil size and corneal eccentricity can be obtained in a matter of minutes. Additionally, many topography software programs can simulate sodium fluorescein patterns of a calculated contact lens. Custom lenses also differ in care requirements compared to “off-the-rack” lenses. Replacement schedules vary depending on the type of lens and the prescription of the prescribing doctor, but typically range from quarterly to annually. Proper care and disinfection is essential to maintaining the life of each lens. In addition to standard disinfection systems, additional solvent cleaners or enzymatic cleaners can be used periodically.

Custom contact lenses can be a tough sell to patients used to the simplicity of online ordering and instant gratification. But just as a tailored suit looks and feels better than a department store’s in-stock options, lenses created expressly for each individual’s visual needs and ocular anatomy will perform better. With a little extra attention during the fit and careful patient education, you can create a truly individualized approach that gives patients superior outcomes and reinforces your expertise. The result? Happier, more loyal patients and a healthier bottom line.

**Case #3: The Astigmatic Athlete**

A 23-year-old professional baseball player presented to the office for contact lens evaluation. He was wearing standard soft toric lenses, but complained of fluctuating vision. As a competitive athlete, it was critical that his vision be as crisp and stable as possible. His Rx was +1.00 1.75x097 OD +1.25 2.00x071 OS, with keratometry readings of 41.75/43.00 at 003 OD and 41.75/43.50 at 167 OS.

We selected hybrid lenses to provide GP optics without the concern for lens rotation or dislodgement. The lenses provided 20/15 vision in each eye. The patient reported they were both comfortable.

---

As permeable (GP) lenses tend to be our “go-to” option for specialty contact lens fits. However, while their use is intuitive for cases of keratoconus and other irregular astigmatic corneas, many other patients would benefit from the crisp vision GP lenses provide or the additional health benefits associated with their use. The wide availability of soft lens modalities and parameters, coupled with the added time and complexity of fitting GP lenses rather than soft lenses, means that GPs comprise less than 10% of total fits today.

In reality, GP lens fitting is straightforward, especially when you have the appropriate tools of the trade—diagnostic GP fitting sets—at your fingertips. Forgoing fitting the lens empirically and observing it yourself on the eye will allow you to make a more informed decision on what parameters will work best for your patient. Let’s look at both empirical and diagnostic fitting methods.

**EMPIRICAL FITTING**

This approach involves fitting a GP lens based on manufacturer guidelines, K readings and refractive measurements. As the simplest method, it saves chair time. Recent manufacturing improvements such as the advent of aspheric lathes and more consistent edge profile designs and minimal center thicknesses have further increased its success rate.

The downside of empirical fitting is that success with the first lens fitted is only about 40% when employing K readings and refractive measurements. Use of topographic software as well as incorporation of the Sim K information and the patient’s corneal e-values or asphericity can help make the lens design more accurate, however. Many corneal topographers are capable of generating a pseudo-fluorescein pattern based on the lens design (i.e., spherical, aspheric and even toric) desired, allowing practitioners to order lenses without the initial placement of a lens on the patient’s eye.

Empirical lens fitting can also be done using online resources (such as those found at GPLI.org) or smartphone apps like EyeDock (www.eyedock.com). However, empirical lens fitting without the advantages of topography and computer-assessed pseudo-fluorescein patterns is likely to result in more lens orders and exchanges until the patient is appropriately fit. This ultimately results in more office time and possibly less patient confidence in the practitioner than would have occurred had the fitting been done with the benefit of a diagnostic GP lens evaluation.

**DIAGNOSTIC GP LENS FITTING**

This technique provides the advantage of observing one or more test lenses, which are similar to the empirical lens values described above, on the patient’s eyes prior to ordering. In this case, the lenses that provide the best lens-to-cornea relationship, as well as good centration and movement, are the ones that should be chosen. Diagnostic lens fitting provides important information as to what visual acuity can be achieved. Residual

---

**ABOUT THE AUTHOR**

Dr. Silbert is a professor of optometric medicine at Pennsylvania College of Optometry, Salus University. He is also the director of cornea and specialty contact lens services at the Eye Institute of Salus University. He has no financial interests in any of the lens materials or designs discussed in this article, nor any financial interests in any of the companies’ products mentioned herein.
astigmatism, if significant, is often observed along with reduced acuity; this improves once additional astigmatic correction is provided via over-refraction. Its presence may indicate that the lens is too thin, and flexing on the eye. Conversely, in some cases residual astigmatism may be higher with more rigid (thicker) lenses; thus, thinner lenses would in fact be more beneficial.3

Patients who undergo diagnostic lens fitting should be forewarned of the differences between GPs and soft contact lenses. Many GP lens patients experience excessive lacrimation and foreign body sensation as a result of initial lens placement, so use proparacaine during initial diagnostic lens fitting to numb the eye. Additionally, while the initial test lens applied to the patient's eyes may not enable them to see clearly immediately, performing an over-refraction can assure them that vision will be correctable to excellent levels similar to what they may enjoy with their glasses.

Diagnostic lens fitting is highly likely to result in fewer lens changes or reorders, as the fitting gives the practitioner a great deal of information, increasing confidence in the lens fitting process. Patient satisfaction is also quite high, despite the added time commitment diagnostic fitting may entail compared with soft lens fittings.

Empirical lens design is not advised in cases where specialized lenses are needed, such as with keratoconus or post-keratoplasty patients, and with ortho-keratology fittings. In these cases, specialized diagnostic fitting sets are required to properly assess lens performance, vision and proper lens-to-cornea fitting relationships. This is especially true for patients with keratoconus due to the different cone shapes and locations; patients with pellucid marginal degeneration who require much larger GP lenses to assist in lens centration; and patients who wear bifocal lenses due to variations in pupil size and GP lens designs (i.e., center distance, center near, concentric, spherical and aspheric.)

One exception is the ReClaim HD lens (Blanchard), a multifocal GP lens designed to be fit empirically.

Table 1. Fixed Diameter GP Spherical Diagnostic Fitting Set

<table>
<thead>
<tr>
<th>BCR</th>
<th>SCR/W</th>
<th>ICR/W</th>
<th>PCR/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.38</td>
<td>8.2/0.3</td>
<td>9.2/0.2</td>
<td>10.4/0.2</td>
</tr>
<tr>
<td>7.42</td>
<td>8.2/0.3</td>
<td>9.2/0.2</td>
<td>10.4/0.2</td>
</tr>
<tr>
<td>7.46</td>
<td>8.3/0.3</td>
<td>9.3/0.2</td>
<td>10.5/0.2</td>
</tr>
<tr>
<td>7.50</td>
<td>8.3/0.3</td>
<td>9.3/0.2</td>
<td>10.5/0.2</td>
</tr>
<tr>
<td>7.54</td>
<td>8.3/0.3</td>
<td>9.3/0.2</td>
<td>10.6/0.2</td>
</tr>
<tr>
<td>7.58</td>
<td>8.4/0.3</td>
<td>9.4/0.2</td>
<td>10.6/0.2</td>
</tr>
<tr>
<td>7.63</td>
<td>8.4/0.3</td>
<td>9.4/0.2</td>
<td>10.6/0.2</td>
</tr>
<tr>
<td>7.67</td>
<td>8.5/0.3</td>
<td>9.5/0.2</td>
<td>10.7/0.2</td>
</tr>
<tr>
<td>7.71</td>
<td>8.5/0.3</td>
<td>9.5/0.2</td>
<td>10.7/0.2</td>
</tr>
<tr>
<td>7.75</td>
<td>8.6/0.3</td>
<td>9.6/0.2</td>
<td>10.8/0.2</td>
</tr>
<tr>
<td>7.80</td>
<td>8.6/0.3</td>
<td>9.6/0.2</td>
<td>10.8/0.2</td>
</tr>
<tr>
<td>7.85</td>
<td>8.7/0.3</td>
<td>9.7/0.2</td>
<td>10.9/0.2</td>
</tr>
<tr>
<td>7.89</td>
<td>8.7/0.3</td>
<td>9.7/0.2</td>
<td>10.9/0.2</td>
</tr>
<tr>
<td>7.94</td>
<td>8.8/0.3</td>
<td>9.8/0.2</td>
<td>11.0/0.2</td>
</tr>
<tr>
<td>7.99</td>
<td>8.8/0.3</td>
<td>9.8/0.2</td>
<td>11.0/0.2</td>
</tr>
<tr>
<td>8.04</td>
<td>8.8/0.3</td>
<td>9.8/0.2</td>
<td>11.0/0.2</td>
</tr>
<tr>
<td>8.08</td>
<td>8.9/0.3</td>
<td>9.9/0.2</td>
<td>11.1/0.2</td>
</tr>
<tr>
<td>8.13</td>
<td>8.9/0.3</td>
<td>9.9/0.2</td>
<td>11.1/0.2</td>
</tr>
<tr>
<td>8.18</td>
<td>9.0/0.3</td>
<td>10.0/0.2</td>
<td>11.2/0.2</td>
</tr>
<tr>
<td>8.23</td>
<td>9.0/0.3</td>
<td>10.0/0.2</td>
<td>11.2/0.2</td>
</tr>
</tbody>
</table>
Blanchard does not make diagnostic fitting sets available; instead, an online calculator employing K readings (or Sim Ks) and refractive data will inform the practitioner about the lens parameters that will be provided, and give him/her the ability to adjust add power and other parameters if desired. Note, if residual astigmatism is calculated to be excessive or if inadequate levels of plus reading power would be produced by the lens rear surface aspheric geometry, other options need to be explored through consultation.

Toric GP lenses are often calculated empirically, and frequently with the assistance of the Mandell-Moore Bitoric Fitting Guide (available at www.gpli.info/mandell-moore). This step-by-step empirical method does all the calculations necessary to produce a first bitoric lens for the moderate to highly astigmatic contact lens patient. It provides a good starting point, and in many cases works well in designing a lens that does not need a lot of additional parameter manipulation. Use of diagnostic spherical power effect (SPE) fitting sets, in which each lens in the set is pre-designed with spherical lens optics, makes diagnostic lens fitting extremely easy; the fluorescein analysis that an SPE bitoric fitting set provides enables the practitioner to rapidly select the right amount of rear surface toricity, and then determine the correct power rapidly through over-refraction.

### Diagnostic Fitting of Conventional GP Lenses

When fitting conventional corneas (i.e., to correct astigmatism, provide sharper visual acuity or slow pediatric myopic refractive error), it is recommended to have more than one diagnostic GP lens set—for example, an average diameter GP fitting set and a larger diameter set for “under-the-lid” fitting, which is typically more comfortable and more easily centered. Conventional GP fitting sets on average measure 9.2 to 9.4mm in size, with an optic zone diameter 1.4mm smaller than the total diameter. Powers for these lenses are typically made in -3.00D, as this is close enough for most patients’ refractive errors to be within a range such that over-refractions do not need to be adjusted further.

While there can be variations with high or low Dk GP lens materials, diagnostic sets are best manufactured in a mid-range Dk material with a low wetting angle to ease tear spreading on the lens surface. While many practitioners may have fitting sets in both low Dk and high Dk materials, a Dk of somewhere between 30 and 60 is recommended. As there are many peripheral curve formulas available, it is best to standardize these in the set’s diagnostic lenses using a formula that ensures the secondary curve (SCR), intermediate curve (ICR or TCR) and peripheral curve (PCR) have the same flattening relationship predicated on the selected base curve.

### Table 2. Variable Diameter GP Diagnostic Fitting Set

<table>
<thead>
<tr>
<th>BCR (mm)</th>
<th>Back Vertex Power</th>
<th>Diameters/ODZ</th>
<th>SCR/W</th>
<th>ICR/W</th>
<th>PCR/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.40 (40.25)</td>
<td>-2.000</td>
<td>9.6 / 8.2</td>
<td>9.2 / 3</td>
<td>10.2 / 0.2</td>
<td>11.6 / 0.2</td>
</tr>
<tr>
<td>8.30 (40.62)</td>
<td>-2.000</td>
<td>9.6 / 8.2</td>
<td>9.1 / 3</td>
<td>10.1 / 0.2</td>
<td>11.5 / 0.2</td>
</tr>
<tr>
<td>8.20 (41.12)</td>
<td>-2.000</td>
<td>9.6 / 8.2</td>
<td>9.0 / 3</td>
<td>10.0 / 0.2</td>
<td>11.4 / 0.2</td>
</tr>
<tr>
<td>8.10 (41.67)</td>
<td>-2.000</td>
<td>9.4 / 8.0</td>
<td>8.9 / 3</td>
<td>9.9 / 0.2</td>
<td>11.3 / 0.2</td>
</tr>
<tr>
<td>8.00 (42.25)</td>
<td>-2.000</td>
<td>9.4 / 8.0</td>
<td>8.8 / 3</td>
<td>9.8 / 0.2</td>
<td>11.2 / 0.2</td>
</tr>
<tr>
<td>7.90 (42.25)</td>
<td>-3.000</td>
<td>9.4 / 8.0</td>
<td>8.7 / 3</td>
<td>9.7 / 0.2</td>
<td>11.1 / 0.2</td>
</tr>
<tr>
<td>7.80 (43.25)</td>
<td>-3.000</td>
<td>9.4 / 8.0</td>
<td>8.6 / 3</td>
<td>9.6 / 0.2</td>
<td>11.0 / 0.2</td>
</tr>
<tr>
<td>7.70 (43.75)</td>
<td>-3.000</td>
<td>9.4 / 8.0</td>
<td>8.5 / 3</td>
<td>9.5 / 0.2</td>
<td>10.9 / 0.2</td>
</tr>
<tr>
<td>7.60 (44.37)</td>
<td>-3.000</td>
<td>9.4 / 8.0</td>
<td>8.4 / 3</td>
<td>9.4 / 0.2</td>
<td>10.8 / 0.2</td>
</tr>
<tr>
<td>7.50 (45.00)</td>
<td>-3.000</td>
<td>9.4 / 8.0</td>
<td>8.3 / 3</td>
<td>9.3 / 0.2</td>
<td>10.7 / 0.2</td>
</tr>
<tr>
<td>7.40 (45.62)</td>
<td>-4.000</td>
<td>9.2 / 7.8</td>
<td>8.2 / 3</td>
<td>9.2 / 0.2</td>
<td>10.6 / 0.2</td>
</tr>
<tr>
<td>7.30 (46.25)</td>
<td>-4.000</td>
<td>9.2 / 7.8</td>
<td>8.1 / 3</td>
<td>9.1 / 0.2</td>
<td>10.5 / 0.2</td>
</tr>
<tr>
<td>7.20 (46.87)</td>
<td>-4.000</td>
<td>9.2 / 7.8</td>
<td>8.0 / 3</td>
<td>9.0 / 0.2</td>
<td>10.4 / 0.2</td>
</tr>
<tr>
<td>7.10 (47.50)</td>
<td>-4.000</td>
<td>9.2 / 7.8</td>
<td>7.9 / 3</td>
<td>8.9 / 0.2</td>
<td>10.3 / 0.2</td>
</tr>
</tbody>
</table>
Introducing the Next Generation...

Atlantis™ Scleral PRO SERIES

Atlantis™ Scleral with its 1 • 2 • 3 FIT STRATEGY has evolved. The Atlantis PRO Series includes all of the great benefits of the original Atlantis lens and features larger diameter options along with two toric enhancements.

<table>
<thead>
<tr>
<th>Toric Periphery</th>
<th>Large Diameter</th>
<th>Front Toric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toric PC to aid in 3 &amp; 9 compression or impingement, helping patients with 6 &amp; 12 edge lift or stand-off, and for patients in a front toric that need alignment help.</td>
<td>Two larger diameters in 17.0 &amp; 17.5 creates more sagittal depth for the highly irregular corneas.</td>
<td>Front Toric available for patients with residual astigmatism of 1.00 diopter or more.</td>
</tr>
</tbody>
</table>

Contact X-Cel Specialty Contacts to learn more.
800.241.9312 | xcelinfo@xcelspecialtycontacts.com

© 2015 X-Cel Specialty Contacts
average thickness of the lenses in these various powers would differ and thus affect lens positioning. In cases where this is not economically feasible, a standard set of -3.00D power will usually suffice, as it reflects the most typical patient refractive powers seen in practice.

Another option for a practitioner-designed supplementary diagnostic fitting set is one with a variable diameter (i.e., larger lenses for flatter corneas and smaller lenses for steeper corneas). This set could also have variable lens powers, with lower powers for flatter lenses and higher powers for steeper base curves. Table 2 represents a 20-lens diagnostic set designed by the author and manufactured by Valley Contax for use in an optometric training program.

When cost is not a factor, such as in an institutional practice or large group practice, having a large inventory of GP lenses made in a variety of base curves for the most commonly prescribed myopic powers (i.e., from -1.25D through -5.00D in 0.25D steps). For example, having a 200-lens inventory set would make it easy to dispense lenses directly out of inventory even on the first visit, as typically is done with hydrogel replacement lenses. This would help reduce dispensing delay and make parameter changes easy, as well as enable instant lens replacement for patients who lose or damage their lenses. Maintaining the inventory is critical to this method’s success; while initially expensive, it does provide good economy of time and in patient satisfaction.9

While there is a place for empirical fitting of GP lenses, practitioners should remember the use of diagnostic lens fitting sets, whether for conventional lens design, or for more complex lenses, can only lead to more accurate and satisfying use of these wonderful devices. 

Educational materials at your fingertips

The Boston website offers a variety of educational materials and videos for the specialty lens fitting practice. Bookmark fit-boston.com and make it your “go to” resource for specialty GP lens information.

- “Correction of Keratoconus with GP Lenses”
- A Guide to Scleral Lens Fitting
- Scleral Lens Fitting Videos
- Scleral Lens Fitting Scales

Experience the website now! Scan this QR code on your device and watch a video on what fit-boston.com has to offer.
Visual freedom, better quality of life and—in many cases—improved quality of vision are just some of the benefits many wearers gain from contact lenses as compared to spectacles. With the ongoing refinement of contact lens designs, practitioners now have more options than ever to fit even the most astigmatic presbyope or severe case of dry eye. Technology has evolved in tandem with the lenses themselves, offering more advanced lens design and fabrication methods. This article addresses how today there truly is a lens for every patient.

SOFT LENSES
Lathe-cutting of custom soft toric and soft toric multifocal lenses was first introduced with the approval by the Food and Drug Administration of the Definitive 74 silicone hydrogel lens material from Contamac. This process results in highly oxygen permeable lenses in practically any lens parameter. One relatively new example of this design is the Intelliwave multifocal (Art Optical), a center-near simultaneous vision soft lens with a multi-aspheric front surface for the correction of vision at all distances. This lens is an aberration-control design that can be fit empirically.

The C-Vue Advanced HydraVue toric multifocal (Unilens) is another example. Replaced monthly, it can be made in virtually any lens parameter. Eye care practitioners can also specify the base curve radius, overall diameter, sphere power, cylinder power and axis, add power and zone size.

New innovations in custom soft lens designs are not limited to the astigmatic presbyopic patient. Recently introduced custom soft keratoconic designs such as the KeraSoft IC (Bausch + Lomb) and NovaKone (Alden Optical) offer a made-to-order lens option available in almost every conceivable power and cylinder axis. KeraSoft is available in the Definitive silicone hydrogel material (Art Optical) with aberration control optics, while NovaKone uses a 54% hydrogel material. A quarterly replacement schedule is recommended for both lenses.

SCLERAL LENSES
Scleral lens use has continued to increase in recent years as a result of the high quality vision, lens stability and comfort they provide for patients with irregular corneas and dry eye. Although the original design has been available for decades, new trends include the development of varying diameters, materials and back surface geometries.

There are several new designs of note on the market. The Zenlens (Alden Optical) is available in both prolate and oblate designs with either a 16mm or 17mm diameter. With this lens, practitioners are able to modify a single parameter (i.e., base curve, limbal clearance curve or peripheral curves) at a time. Toric peripheral curves can be ordered, as well as a front surface toric correction if needed.

The Europa Scleral (Visionary Optics) is a second-generation Jupiter scleral lens design with a large optical zone, mid-peripheral reverse curve and an enhanced haptic profile for a better lens-to-sclera fitting relationship. It is indicated both for irregular cornea correction and for patients with ocular surface disease.

Tru-Form Optics has the DigiForm 15mm scleral lens which is available in five primary designs for patients with either keratoconic, LASIK, RK, post-corneal graft or healthy corneas, as well as toric and quadrant-specific versions. The DigiForm 18mm diameter version incorporates laser markings on the front surface corresponding to the fitting zone of the back surface.

ABOUT THE AUTHOR
Dr. Bennett is a professor of optometry and assistant dean of student services and alumni relations at the University of Missouri-St. Louis College of Optometry. He is also the executive director of the GP Lens Institute.
Keep abreast of new developments in lenses and related technology that can strengthen your practice.

By Edward S. Bennett, OD

Peripheral toricity is also an important and increasingly popular feature of the newer scleral lens designs. The Custom Stable Elite lens (Valley Contax) is one such design.

Of course, scleral contact lenses are not just for compromised eyes; an increasing number have been introduced for astigmatic and presbyopic patients as well. These include the Onefit P+A lens for astigmatic patients and Reclain HD aspheric front surface multifocal for presbyopes, both from Blanchard Contact Lens. The Elara Scleral (Visionary Optics) is another example of a scleral lens with a prolate design that has clinical applications for both healthy eyes and dry eye patients.

**Gas Permeable Multifocal Lenses**

The introduction of front surface aspheric multifocal or aspheric-concentric combination designs, capable of providing high add powers, has made GP multifocals the “go-to” lenses for presbyopes interested in clearer vision. The MPower lens (Art Optical), a simultaneous vision multifocal design, uses anterior surface eccentricity control to provide an extreme power change generated within the lens’ central 5mm of the lens.

New progressive segmented, translating GP multifocal designs have also been introduced as well that allow not only uninterrupted vision at distance and near but also correction at all distances. The SpectraVue by Tangent Streak (Firestone Optics) multifocal lens has the distance correction in the upper section of the lens that combines with a crescent-shaped middle segment to provide a progressive intermediate power change, similar to a spectacle progressive addition lens but without a limiting channel.

Several other relatively new GP multifocal lens designs provide the presbyope with vision correction at all distances. These lenses complement other multifocal and translating designs introduced in recent years, including the TriVA design from ABB Optical and the Expert Progressive lens (Essilor, Art Optical), both of which can be ordered empirically based on refractive and anatomical information.

**Hybrid Lenses**

Hybrid contact lens designs also continue to improve. Problems with first and second generation designs include limited oxygen transmission, tearing of the junction between the center GP and soft skirt and a tight fitting relationship; more recent designs have since addressed these issues.

One example, the UltraHealth design (SynergEyes), uses a reverse geometry vault system to accommodate a range of prolate and oblate corneas. In this lens,
the oxygen-permeable central GP section is joined to the peripheral silicone hydrogel skirt with a covalent bond to minimize tearing. A second lens from the same company, the UltraHealth FC, is designed specifically for oblate corneas, including post-refractive surgery patients and patients with pellucid marginal degeneration. SynergEyes is continuing to work on solving the third issue.

CUSTOM TINTED LENSES
While tinted lenses are often considered cosmetic in nature, patients with traumatic eye injuries or congenital iris anomalies can also benefit from these custom designs. One company, Orion Vision, specializes in custom tinting of existing contact lenses supplied by ABB Optical and Alden Optical.

MYOPIA PROGRESSION
While off-label, interest has risen in the use of corneal reshaping contact lenses to slow myopia progression. Several studies on young progressive myopes wearing orthokeratology lenses overnight indicated axial length growth was significantly slowed in comparison to those who wore contact lenses and spectacles. Other research evaluating peripheral plus power soft lens designs found regular wear resulted in an average of 50% less myopia progression and a 58% reduction in axial length progression, compared with non-peripheral plus power soft lens wearers. Peripheral plus bifocal designs have also demonstrated an effect on myopia, albeit less significant and with some vision compromise.

LENS DESIGN SOFTWARE
In addition to the lenses themselves, new software programs are helping eye care practitioners achieve more successful fits. Recently available in the US, EyeSpace imports data from the corneal topographer and uses this information to design a rigid lens. It has notable applications in designing specialty lenses. (Figure 1). “I have been using EyeSpace for a variety of corneal reshaping patients,” says Michael Lipson, OD. “It has worked well to attain centration in some difficult cases. Using it to design corneal reshaping lenses adds a high degree of precision and control to the effect and predictability to the process.”

The use of three-dimensional mapping to help fit scleral lenses is also gaining popularity, says Greg DeNaeyer, OD. “Corneo-scleral topography and 3D mapping will significantly advance scleral lens fitting. Rather than relying on guesstimates from diagnostic lenses, corneo-scleral topography and scleral lens fitting software will allow practitioners to virtually fit scleral lenses that are customized for each particular eye.”

The sMap3D corneo-scleral topography system (Precision Ocular Metrology) is one such example that uses a structured light approach to obtain micro precision measurements of the cornea and sclera.
Developed by Christine Sindt, OD, and manufactured by AVT, EyePrintPro is another 3D mapping technology that creates a prosthetic optical shell unique to the shape of the patient’s eye (Figures 2a and 2b). “The EyePrintPro has given me the opportunity to fit extremely difficult patients with success,” says Stephanie Woo, OD. “The 3D scanner used to create the lens enables the practitioner to achieve a near-perfect tear layer between the cornea and the EyePrint, which results in a precise fit and great vision. You can also customize the EyePrint to incorporate decentered optics or prism within the lens, which gives the patient a truly unique and custom visual device.”

NO LIMITS
The introduction of innovative new designs, supported by highly advanced software and manufacturing technology, has resulted in exciting new materials and designs in practically any lens parameters for almost any patient who is interested in contact lenses. This does not mean that further research is not warranted; rather, this is simply the next step, and we look forward to see what next year will bring.

The author wishes to acknowledge the following: Peg Achenbach, OD (SynergEyes), Josh Adams (Valley Contax), Greg DeNaeyer, OD, Richard Dorer (Blanchard Contact Lens), Cassandra Gordon (Visionary Optics), Mike Johnson (Art Optical), Kelly McKnight (Unilens), Daren Nygren (Custom Craft Lens Service), Keith Parker (AVT), John Patterson (Orion Vision), David Rusch (Firestone Optics/Diversified Ophthalmics), Ann Shackelford (ABB Optical), Bill Shelly (Alden Optical), Jan Soochak (Tru-Form Optics), and Stephanie Woo, OD.

Scleral lenses have always been a mainstay of a specialty contact lens practice, offering patients with irregular corneas and severe ocular surface disease alike the chance to benefit from lens wear. But the category has been enjoying a renaissance in recent years, as the evolution of scleral lens designs has given us more fitting options—namely, standard and reverse geometry designs, toric curves in the landing and transition zones, and toric and multifocal optics—that in turn allow us to offer these lenses beyond the core group of traditional scleral patients.

While this increase in scleral lens parameter options gives practitioners the ability to fit a wider range of eyes, it may make perfecting the fit itself more challenging. Technology, on the other hand, is providing information that can help us fit these lenses quicker and more accurately.

This article reviews some of the newer approaches to the evaluation and fit.

THE LIMITS OF DIAGNOSTIC SETS
Traditionally, scleral lenses are fit using one or several diagnostic sets. Practitioners use accompanying fitting guides based on keratometry readings, ocular surface health and patient history to select an initial diagnostic lens; alternatively, they can simply choose a lens from the middle of the set to start with and adjust their selection accordingly based on the amount of lens depth needed. Some scleral lens fitters may opt to look at the profile of the eye they’re fitting and use their experience to tell them which lens is most appropriate.

These techniques, however, while sometimes accurate, are difficult to teach and unreliable overall. Keratometric readings provide little information about the ocular surface, even when combined with ocular history such as a diagnosis of keratoconus or surgical procedures. If blind-selecting a lens, practitioners face the issue of identifying the necessary depth adjustments—assuming the fitting set is appropriate for the eye shape to begin with.

Thus, a more appropriate measurement system is needed.

SELECTING A LENS
While scleral lenses, unlike corneal lenses, vault the cornea to rest on the sclera, it is still vital for the practitioner to understand the contours of the patient’s cornea to ensure adequate but not excessive vault, which, after allowing for lens settling, should be approximately 150µm to 250µm centrally and then taper back to eventually land on the sclera just past the limbus. Inadequate vault can result in cornea/lens touch and associated problems, as well as difficulty with lens removal due to capillary attraction; excessive vault can inhibit oxygen flow, patient comfort and ease of application. Aligning a scleral lens properly also lessens
the need for high prescriptions that may reduce visual acuity, which can occur especially when fitting steep corneal lenses in keratoconus, for example. Corneal topography can be used to ascertain corneal diameter or horizontal visible iris diameter (HVID), corneal apex location and the sagittal height of the cornea at a 10mm chord.

Anterior segment depth measurements obtained using optical coherence tomography (OCT) or Scheimpflug imaging is another way to improve the fit of a scleral lens. The initial fitting process can be streamlined by use of OCT or Scheimpflug imaging, as these instruments obtain objective measurements of the depth of the cornea and sclera out to nearly 15mm, thereby providing a known starting point for diagnostic fitting. In addition, these images allow the fitter to see the contour of the cornea and sclera, to help determine if a particular fitting set may be more ideal than others. OCT can also be used to evaluate the success of a fit at follow up by providing precise measurements of the tear reservoir and edge contour to the sclera after a period of wear, without having to remove or manipulate the lens on eye.

Other scleral imaging instruments provide information regarding scleral shape and toricity to determine whether a lens should be ordered with toricity in the landing zone. Below are some methods for obtaining these measurements.

- **HVID.** Because the scleral lens needs to vault the entire cornea and limbus, it must be large enough in diameter to land outside the corneal-limbal zone. Corneal diameter measurements can be obtained using a corneal topographer—simply capture the topographical map and use the corneal diameter measure on the display (Figure 1). Some topographers may also offer the ability to measure HVID with a point and click line display. A handheld ruler (Figure 2), slit lamp reticule or slit lamp camera with measuring capabilities, as well as anterior segment OCT, can also be used to measure HVID.

- **Corneal Shape.** Evaluating corneal shape is a good next step in the scleral lens fitting process. Knowing where the corneal apex is will allow you to choose a lens with the most appropriate shape to match the cornea. If the corneal apex is within the central 4mm of the cornea, a standard geometry lens should work well; if the apex of the cornea is located outside the central 4mm, however, or if there are significant elevations (e.g., Salzmann’s nodular degeneration) near the peripheral cornea, a reverse geometry lens design may be more successful (Figure 3).

- **Sagittal Height.** Another useful measurement to aid in the scleral lens fitting process is corneal sagittal height. Found on many corneal topographers, it is the measurement between the geometric center of the cornea and the intersection of a specified chord length—in this case, 10mm (Figure 4). Average sagittal height from 10mm to...
15mm for all eye types is approximately 2,000µm. Thus, by using the 10mm chord depth and adding 2,000µm for the sag of the 10mm to 15mm chord plus the desired vault, you can come very close to the proper sag of the lens needed.

Take the following example: a 10mm chord demonstrates a sagittal height of 1,906µm. Based on a desired initial vault of 350µm centrally, a diagnostic lens in a 15mm diameter should be 4,256µm (i.e., 1906µm + 2,000µm + 350µm for vault = 4,256µm starting point for a 15mm lens). If the lens to be fit is larger than 15mm, the sagittal height will need to be increased incrementally, as the larger area of eye surface to be covered will mean greater overall depth. In my experience, having reviewed several scleral fits in retrospect, I find that an adjustment of approximately 300µm per millimeter of lens diameter is fairly accurate (i.e., 4,256µm + 600µm, for a 2mm diameter increase = 4,856µm sagittal height for a 17mm diameter lens).

Obtaining a cross-sectional image of the anterior segment using diagnostic imaging technology is another useful way to obtain a starting point for an initial diagnostic lens. The software included in these instruments can provide measurements for a variety of possible heights and widths (Figures 5 & 6), simplifying the initial lens selection process.

• Scleral Contour Measurements. Some instruments are capable of evaluating the shape of the sclera, which may help practitioners achieve a proper lens fit. Figure 7 shows an image of a highly toric sclera obtained from the Eye Surface Profile (Eaglet Eye), one of two such instruments (the other being the sMap3D by Precision Ocular Metrology; see “Virtually Fitting Custom Scleral Lenses,” p. 29). However, while these instruments provide more information about the ocular surface than corneal topography, at this time they are so new that the data they provide cannot yet be applied universally to all scleral lenses with simple formulas or rules.

ASSESSING LENS FIT

Once the scleral lens is on the eye, OCT can be used to assess lens fit by providing information on central vault, limbal clearance and landing zone in relation to the sclera. The amount of desired

Fig. 3. Corneal topography demonstrating the apex of the cornea located approximately 4.5mm inferior to the corneal center. This shape may be better fit with a scleral lens with a reverse geometry design.

Fig. 4. Three-dimensional display of corneal topography shows corneal sagittal height measurement at 10.0mm of 1,906 microns.

Fig. 5. OCT image demonstrating a sagittal height of 3,760 microns at a 15mm chord.

Fig. 6. Pentacam image demonstrating a sagittal height of 4,230 microns at a chord of 14.64mm.
Virtually Fitting Custom Scleral Lenses
By Gregory W. DeNaeyer, OD

The sMap3D topographer (Precision Ocular Metrology) uses a structured light approach for three-dimensional mapping to obtain measurements of the cornea and sclera with a 22mm maximum field of view. The sMap3D takes multiple triangulated measurements using a single DLP projector and two cameras positioned laterally on each side. Fluorescein is added to the patient’s eye, which is necessary for imaging the corneal and bulbar conjunctival surface. The patient is then instructed to gaze at a fixated light straight ahead while the eyelids are opened as widely as possible with assistance from the practitioner or a staff member. The practitioner focuses the eye and captures the image. Two additional measurements with the patient fixating up and down are taken in succession.

The sMapPro software is able to stitch together the images taken in straight, up, and down positions to produce a three-dimensional model of the patient’s eye (Figure 1). Stitching is a necessary step to obtain maximum area of the sclera that is occluded by the lids despite the eyelids being held open. A stitched model is required for measurement of the vertical meridians to determine accurate toricity measurements and over all sagittal depth value, which are used for custom fitting.

The sMapPro software gives sagittal depth data at any specified chord. Corneo-scleral topography and elevation maps can be evaluated. Scleral toricity can also be calculated from any specified radius from center (Figure 2). The virtual fit screen allows the practitioner to send the data directly to Visionary Optics for analysis and design of a custom Europa Scleral lens. A diagnostic lens does need to be applied for over-refraction to determine final lens power.

Alternatively, the practitioner can custom fit the lens using the software’s virtual fitting plots. sMapPro software allows for complete specification of any lens parameter to virtually adjust for corneal and limbal clearance, as well as custom back surface toricity. The sMapPro recommends a starting base curve based upon any desired initial amount of central corneal clearance. Peripheral curve toricity is calculated based upon the patient’s maximum scleral toricity. The fitting software adjusts peripheral curve widths to ensure limbal clearance. Figure 3 shows a virtual fit of a Europa scleral lens for a patient with keratoconus.

Dr. DeNaeyer is clinical director of Arena Eye Surgeons in Columbus, Ohio, and a consultant to Alcon, Visionary Optics, Bausch + Lomb and Acient. He is also the designer of the Europa scleral lens (Visionary Optics) and a shareholder for Precision Ocular Metrology (sMap3D).

Fig. 1. Data from three eye positions is stitched together to form a 3D model.

Fig. 2. Scleral elevation map and toricity.

Fig. 3. Virtual fit scleral lens on a keratoconus patient.
central vault and limbal clearance varies somewhat from one lens design to another, as well as from one fitter to the next. Generally speaking, a settled scleral lens should have between 150µm and 250µm of central vault, which tapers down to a fraction of that (20µm to 40µm) over the limbus to eventually land on the sclera. A scleral lens with excessive or inadequate vault, or one that lands on or inside the limbus, needs to be reordered with the appropriate adjustments made to fix these deficiencies. Keep in mind these parameters may change somewhat from initial application to a time several hours later as the scleral lens settles into the tissue.

With respect to limbal clearance, there is no “magic number”; rather, as long as some amount of clearance exists, the limbus should be able to tolerate the lens. Note, however, excessive limbal clearance may allow for conjunctival prolapse and possibly sectoral hypoxia due to a thick tear reservoir. Figure 9 demonstrates several OCT images of scleral lenses with varying degrees of clearance over the limbal area.

OCT imaging can also be used to evaluate edge profiles. This is helpful in ensuring that the landing zone of the lens is acceptable in all quadrants. A scleral lens that is too flat will demonstrate edge lift on OCT. This flat edge will encourage debris to accumulate under the lens and fogging of the vision over the course of the day. A scleral lens that is too tight will demonstrate an appearance of lens “digging in” to the conjunctival-scleral complex. This tightness will create discomfort and redness over time, and may have more significant long-term effects on the ocular surface. OCT can be particularly helpful in comparing edge fit along different meridians in helping to determine if toric landing curves might be helpful to improve a scleral lens fit. Figure 10 shows several edge profiles.

Fitting scleral lenses in the past has been more of an art than a science in many respects. The future of scleral lens fitting figures to be more scientific, driven by precise ocular surface measurements and software that can customize a lens to the individual eye. In the immediate term, using the technology that is available will streamline the fitting process while we wait for a technological revolution in scleral lens fitting to occur.


Fig. 7. Corneal and scleral topography obtained with an eye surface profiler indicate a highly toric scleral contour.

Fig. 8. OCT images of an adequately vaulted scleral lens (top) and inadequately vaulted scleral lens (bottom).

Fig. 9. OCT images of scleral lenses over the limbus, demonstrating ideal, inadequate and possible excessive clearance.

Fig. 10. OCT images of scleral edge profiles. The top image appears to have a proper alignment to the sclera, the middle image is loose and the bottom image is tight.
Critical Measurements to Improve Scleral Lens Fitting

Valid for credit through September 1, 2018

Online: This exam can also be taken online at www.reviewofcontactlenses.com. Upon passing the exam, you can view your results immediately. You can also view your test history at any time from the website.

Directions: Select one answer for each question in the exam and completely darken the appropriate circle. A minimum score of 70% is required to earn credit.

Mail to: Jobson Optometric CE, Canal Street Station, PO Box 488 New York, NY 10013

Payment: Remit $20 with this exam. Make check payable to Jobson Medical Information LLC.

Credit: COPE approval for 1 hour of CE credit is pending for this course.

Sponsorship: Joint-sponsored by the Pennsylvania College of Optometry

Processing: There is an eight-to-10 week processing time for this exam.

Answers to CE exam:

1. [ ] [ ] [ ] [ ] [ ]
2. [ ] [ ] [ ] [ ] [ ]
3. [ ] [ ] [ ] [ ] [ ]
4. [ ] [ ] [ ] [ ] [ ]
5. [ ] [ ] [ ] [ ] [ ]

Evaluation questions (1 = Excellent, 2 = Very Good, 3 = Good, 4 = Fair, 5 = Poor)
Rate the effectiveness of how well the activity:
11. Met the goal statement: [ ] [ ] [ ] [ ]
12. Related to your practice needs: [ ] [ ] [ ] [ ]
13. Will help improve patient care: [ ] [ ] [ ] [ ]
14. Avoided commercial bias/influence: [ ] [ ] [ ] [ ]
15. How do you rate the overall quality of the material? [ ] [ ] [ ] [ ]
16. Your knowledge of the subject increased: [ ] [ ] [ ] [ ]
17. The difficulty of the course was: [ ] [ ] [ ] [ ]
18. How long did it take to complete this course? ____________________________
19. Comments on this course: __________________________________________

20. Suggested topics for future CE articles: ______________________________
_________________________________________________________________
_________________________________________________________________

Identifying information (please print clearly):
First Name ____________________________ Last Name ____________________________
Email ______________________________
The following is your: [ ] Home Address [ ] Business Address
Business Name ____________________________
Address ______________________________
City ____________________________ State ____________________________
ZIP ______________________________
Telephone # ____________________________ Fax # ____________________________

By submitting this answer sheet, I certify that I have read the lesson in its entirety and completed the self-assessment exam personally based on the material presented. I have not obtained the answers to this exam by fraudulent or improper means.

Signature: ____________________________ Date: ____________________________

Please retain a copy for your records.

Jobson Optometric CE, Canal Street Station, PO Box 488 New York, NY 10013

www.reviewofcontactlenses.com

This exam can also be taken online at www.reviewofcontactlenses.com.
Custom contact lens design is a constantly evolving field, from the advent of GP lenses in 1978 to more recent developments in ortho-keratology. Soft lenses in particular now feature expanded diameters, curvatures, thicknesses and sphere and cylinder powers, giving practitioners more options than ever to manage complicated prescriptions in a highly precise way. Expanded diameters enable practitioners to fit both small and large corneas of patients who would otherwise drop out of contact lens wear due to comfort or fit issues; base curve customization can also help with achieving great fit. Powers for these lenses range from +/-50D, giving even the most nearsighted patients the ability to see. With contact lenses this versatile, we can expand the amount of patients that we can help to wear contacts.

LOYALTY PROGRAM
With any contact lenses—standard, toric or even multifocal—the key to a successful fit is achieving the best vision, comfort and ocular health response possible for the patient. Doing so effectively builds patient loyalty, especially when developing a contact lens specialty practice. Candidates for custom soft lenses include those who are experiencing refraction, rotation or fit issues in their current lenses due to corneal irregularity, particularly high astigmatism, and GP lens candidates who are concerned about experiencing discomfort in hard lenses. Astigmatic presbyopes are also well suited to wear custom soft lenses.

If the patient expresses dissatisfaction with the vision or comfort provided by their current lenses, try explaining that a customized lens may be more comfortable and provide better vision. When a patient sees you for their comprehensive eye exam, and you have performed a careful refraction along with keratometry readings, this could lead you to recommending custom lenses.

Take this scenario, for example: “Jane, I see why your vision is not as sharp with your current contacts. The lenses you are wearing now are a ‘one-size-fits all,’” meaning that the shape of the lens only comes in one curve. Thus, you may need another shape to fit your eye properly. Also, your current lenses only correct most of your prescription, not all of it. A more custom lens may fit your eye better and give you better vision.” Adjusting the prescription and selecting a custom lens better suited to the patient’s unique corneal shape are two simple ways to earn patient loyalty.

Even if they have not previously worn contacts, most patients with high astigmatism are aware their prescription is high—in fact, they may have already been told they are not candidates for contact lens wear. So, present the possibility of wearing custom lenses instead: “I think you are a great candidate for contact lenses; however, you have a significant amount of astigmatism. It is more than most standard contact lenses have available. So, I would recommend a custom lens that corrects your entire prescription and fits your eye properly.” Once patients understand why they can’t wear standard contact lenses, yet they are very motivated to wear them, they have no problem trying a more custom design.

SUPPLY AND DEMAND
Many contact lens manufacturers use some sort of fitting nomogram to design a lens. Typically, the patient’s keratometry values, refraction and horizontal visible iris diameter (HVID) are used to create a lens; however, if the HVID is not available, most laboratories can still create the lens.

HVID has become somewhat of a hot topic within the contact lens community, as about 26% of patients fall out of the average iris diameter range. Appropriate lens diameter is important for lens stabilization and centration; thus, an
inappropriate lens diameter can lead to excessive lens movement and discomfort, and subsequent patient dropout. This is due to the pressure of the lid-lens interaction, which causes the lens to move and rotate on the eye; increasing the diameter of the lens decreases the lid-lens interaction. Most custom lenses can be ordered through the manufacturer’s website, or by supplying the laboratory with the patient’s refraction and keratometry values directly.

**Clinical Pearls**
- Custom soft lenses provide excellent vision and fit.
- Ordering custom soft lenses is simple—many manufacturers only require refraction and keratometry values.
- The cost is often comparable to or even less than the patient’s current lenses.
- Most patients cannot be fit anywhere but in your office, ensuring patient loyalty.

**CUSTOM GP LENSES**
Soft lenses are not the only lenses that are improving; huge strides are being made in the GP lens industry as well. One such example is the QuadraKone (TruForm Optics), which features different quadrants that can be manipulated to be steeper or flatter, depending on the patient’s needs. Keratoconic lenses sometimes have a bit too much edge lift, which can cause the lens to decenter and dislodge from the eye. Steepening one of the quadrants can help tuck the edge in for a more precise fit (Figure 1).

Scleral lenses have also improved significantly in a relatively small amount of time. Most manufacturers have a multifocal scleral design available for the presbyopic population. Some sclerals are also available in a front surface toric version, allowing residual astigmatism to be easily added into the prescription (Figure 2). Practitioners can also rely on notching, a popular method of maneuvering around conjunctival obstacles such as pingueculas and blebs, and corneal topographic mapping, to fit sclerals more efficiently.

**Fig. 2. Scleral lens with front toric markings and notch near pinguecula.**

---


---

Expand your clinical skills and catch up on your CE requirements, all from the comfort of your own home.

Review offers nearly 100 hours of COPE-approved continuing education — right now! It’s just a click away. Our extensive library of exams runs the gamut from keratoconus to fundus autofluorescence, and everything in between.

www.revoptom.com/continuing_education
Many of us have read or heard practice management advice that goes something like this: “If you want your patients to do X, tell them Y.” For example, “If you want to have more patients purchase annual supplies of contact lenses, tell them the price is less per box if they buy eight boxes than if they buy only one.”

Sounds reasonable, doesn’t it? So, after hearing this suggestion, you return to your practice and mention it to your next patient. And either it works or it doesn’t. In either case—success or failure—the question becomes, what do you do next? Does this one result give you enough information from which to craft a new strategy? How much can you extrapolate from a single data point? Not much. No scientist would attempt to draw conclusions from a study with a sample size of n=1. But in business matters, we have a harder time seeing the shortcomings of such an approach.

If the patient responded the way you had hoped and agreed to the bulk purchase, a few factors will help you determine if this approach is worth continuing or not. First, will your patient have a better or worse clinical outcome with a year’s supply of lenses on hand? Studies suggest that it will generally be more favorable because patient compliance is typically higher when they have more lenses at the ready. However, is that going to be the case for this particular patient, or will they be one of those outliers who hoard their lenses? Since this remains a possibility, if you choose to use this strategy your definition of “success” should include a system of checks and balances so that when lens hoarders return, you don’t make the same mistake.

Next—and in my view most importantly—make sure that viewing this as a successful strategy and thus worthy of routine use, doesn’t close the door to other strategies that may be even better. For example, what would happen if you presented the lenses to the patient and said, “When you buy a year’s supply of lenses, you will never run out,” but you never mentioned the discount? Do you think as many patients would take you up on your offer? Even if only 10% fewer did, what would the effect be on the increased revenue you’d generate by not offering a discount? Alternatively, don’t assume that the lack of a volume discount will lead to fewer sales. It can (and often does) lead to more, depending on how you present the situation.

Regardless of your plan of action, however, be wary of using industry benchmarks as your goals. This will help you avoid any potential issues with using varying definitions. Continuing with the same example, one doctor might report that 10% of their patients purchase annual supplies, while a second doctor reports 90% of their patients do so. What is not recorded, however, is the fact that the first doctor has a large base of specialty scleral patients and the second has a significant population of millennials who buy their lenses directly from the practice’s website. Additionally, keep in mind that benchmarking typically demonstrates averages and reports of “what is,” not what could be—as such, they can be limiting.
Simply smarter chemistry:

Introducing MyDay® daily disposable featuring Smart Silicone™

Now joining the world’s most complete portfolio of silicone hydrogel lenses

Visit coopervision.com/mydaypreview for a special preview
Hello Miru.
Bye, bye blister pack.

Introducing Miru 1day, the world’s thinnest package for daily disposable contact lenses.

Miru’s ultra lightweight 1mm thin package is about 1/8th the thickness of a traditional blister pack and was specifically developed to reduce the risk of microbial contamination. When opened, the lens is presented on a special disk, oriented correctly for proper insertion.

To learn more and request trials, please visit: miru.meniconamerica.com

©2014 Menicon America, Inc. Miru is a registered trademark of Menicon Company Ltd.