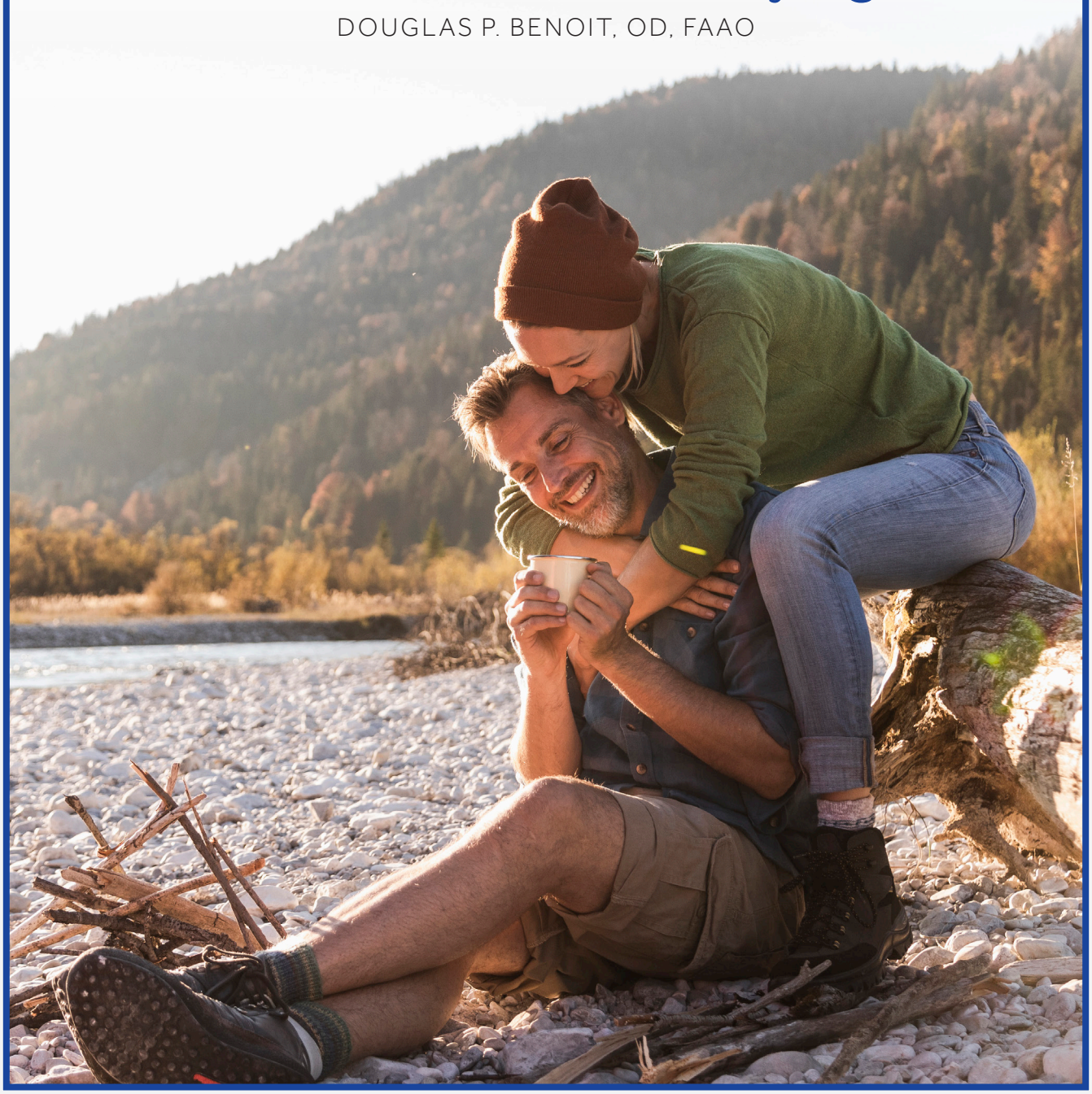
Shared Vision

A collaborative resource for eye care education

THE PRESBYOPIA PLAYBOOK

Achieving success with patients who want to stay in contact lenses as they age.

DOUGLAS P. BENOIT, OD, FAAO



The Presbyopia Playbook:

Exploring our options to treat presbyopia—a fact of life for everyone.

Presbyopia is a fact of life. When we get to our late 30s/early 40s, we begin to lose the ability to focus comfortably at near. Eventually, the intermediate vision is also involved. Fortunately, glasses and/or contact lenses can help to give us better vision at multiple distances, like we had before we became presbyopic. We still require periodic evaluation of our visual needs and changes to whatever lenses we are using, until we reach the point where our corrective lenses are doing all the near work. Then things level off and the changes are rarer.

Contact lenses to address presbyopia (true bifocals) have been in existence since the late 1940s. Interestingly, bifocal (and now multifocal) designs are not used that much in presbyopic patients. Of the 160 million presbyopes in the United States[1], only about 8% are fitted with a bifocal or multifocal contact lens design[2]. For contact lens wearers that need help at near, the options used more often include monovision contact lenses, reading glasses over the distance contact lenses, or a change to full-time spectacle wear.

Many patients who wear distance contact lenses in their earlier years do not want to rely on reading glasses as they age.

It is a nuisance to carry readers, and for many the mental picture of their grandmother with readers perched on her nose is just too much. Reverting to wearing glasses full-time is not something most contact lens wearers want to do either. Spectacles can get in the way of an active lifestyle, and again, they can connote aging.

Monovision has been used for decades. The concept is built on using the dominant eye to view distance, while the non-dominant eye views near objects. In early presbyopes, with a low ADD requirement, this can be relatively successful. As the patient progresses and their ADD power increases, there is a decrease in depth perception[3,4]. This can lead to issues in everyday life such as trouble parallel parking, going up or down stairs, or playing catch with a grandchild. Couple these problems with the lower subjective vision ratings for monovision[3,5], and you can understand the frustration that many of these patients experience. When "testing" was done in the conventional, objective manner, (in the exam room, Snellen chart, lights down, etc.), monovision was found to be the best performer. However, when subjects evaluated their lenses in the "real world", subjectively they overwhelmingly preferred the multifocal lenses. Thus, it is extremely critical how

we demonstrate the performance of soft multifocals to our patients! It also suggests that some of our "clinically based" bias towards monovision may be unfounded. There are even medicolegal issues to consider[4], particularly as related to driving. When fitting a patient in monovision it is prudent to have them understand the limitations of that type of correction, then read and sign an informed consent that spells it out.

So why are practitioners reluctant to discuss, let alone fit, **bifocal and multifocal contact lenses?** Some of the hesitation may be because of bad prior experience with such designs. Part of it may be the perception that they are time consuming to fit[6], while another component is a low level of knowledge and experience with modern multifocal designs.

Patients often are not completely happy with their vision when wearing multifocal contact lenses[6], and a significant part of that relates to dissatisfaction with near vision[6]. The design of the contact lens being worn may be a factor, as it may not be the best option for that patient. It is also likely that the patient has expectations that are not realistic.

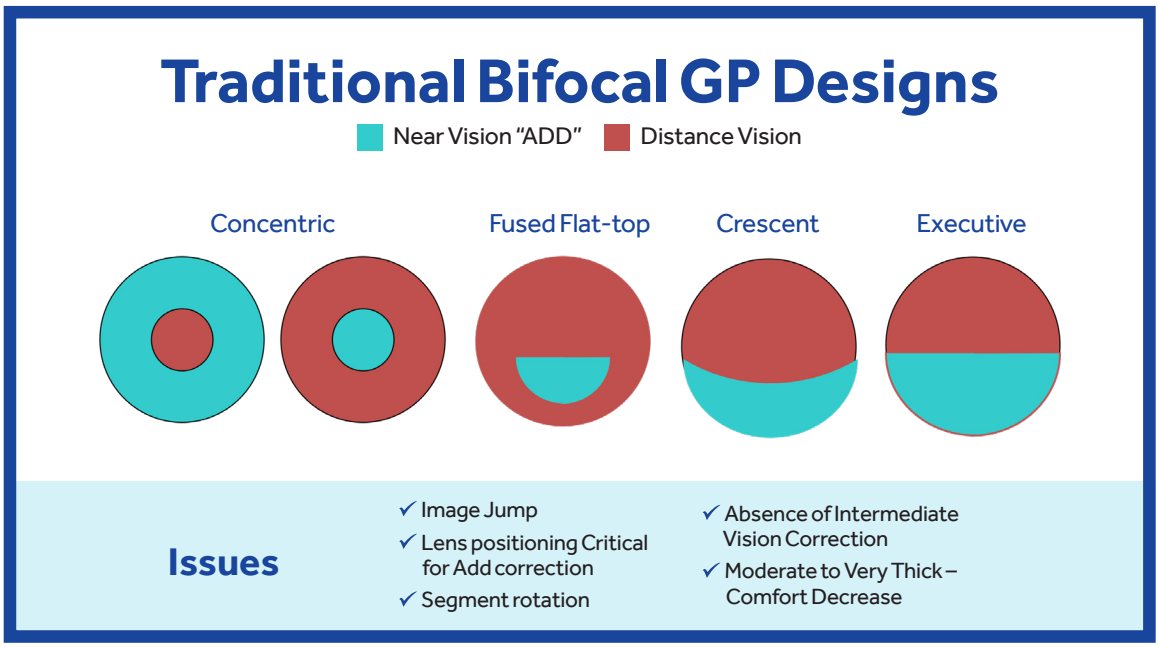
Patient education is a big factor in achieving success. Patients need to know all of their options and deserve a discussion of the pros and cons of each.

If patients know what to expect with a particular design or modality, they will be more willing to put up with the little nuisances associated with adaptation to their new contact lenses. Explain what will happen, why it occurs, and what changes will be possible as they become more accustomed to the lens. Give them a timeline for the process but overestimate how long it may take. Then, when adaptation happens faster than they expect, you are the hero.

First, we must consider the patient. Is their ocular health (and general health) conducive to contact lens wear? Is there an issue of dryness, with or without contact lens wear? Address any eye lid, meibomian gland, and/or tear film problems before fitting the patient. Do a fresh refraction to assess quality of vision and determine an accurate starting point for the contact lens prescription. Make sure that their binocular status and internal health are normal as well. Investigate the patient's vocation and avocational activities. Lastly, what is the patient's motivation to wear contact lenses? Do they want the vision they had at 25 or do they just want freedom from glasses in their daily activities? Proper motivation can be a big factor in the success of multifocal contact lenses and if the patient has realistic expectations it is much easier.

Next the practitioner should evaluate the available choices for bifocal and multifocal contact lenses. Bifocal and multifocal contact lenses fall into two categories, alternating image (translating) and simultaneous image (aspheric and concentric) designs.

Alternating image designs are currently only available as corneal GPs. There were soft translating multifocal lenses in the past, but they are not currently available. That may be changing soon as a new start-up is in the development stages of such a lens, so stay tuned. With all translating lenses, there is a distinct distance zone and near zone, and there are some that have an intermediate zone as well. With the translating designs, in primary gaze the pupil is positioned in the distance zone. When the eye rotates down as the patient attempts to read, the lens moves up and the near portion of the lens is positioned before the pupil. This process is accomplished by superior lid attachment, truncating the lens bottom, or a combination of the two. The segment portion of the lens can take various forms. It may be a straight-top design, like we see in bifocal glasses, or it could have a curve or crescent design. When an intermediate zone is added in a trifocal design, the positioning of the lens becomes a bit more difficult, but the results can be amazing once the fit is optimised.

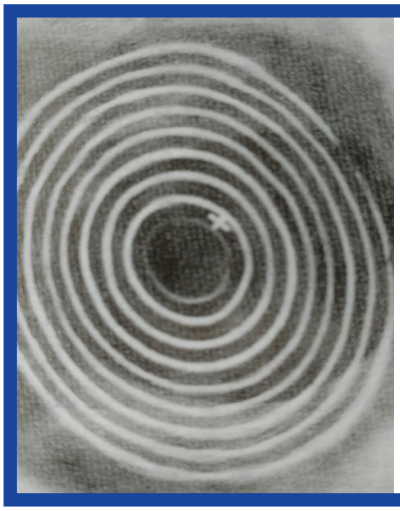


Translating design contact lens can provide very sharp vision at both distance and near, which is excellent for patients with high visual needs, such as engineers. These lenses can be made in just about any distance power, and any ADD power. The remaining parameters are also customisable. While translating lenses can be relatively thick compared to a spherical corneal lens, materials with high oxygen permeability can reduce corneal health concerns.

Examples of GP translating designs include the Tangent Streak (Contact Lens Centre Australia [CLCA]) which is a straight-top executive style bifocal, the Linear Plus

Translating Bifocal (Gelflex/ACL [G/ACL]), and the Menifocal Z (Menicon) which is a center-distance concentric design. There are a great number of other laboratories making such designs in gas permeable materials.

The simultaneous image designs are available in GP (corneal and scleral) and soft materials, as well as hybrids, and all can be either center-near or center-distance configurations. For the corneal GP lenses, there are aspheric (front or back surface), as well as bi-aspheric and concentric designs. Representative examples of the GP lenses are: the SA Multifocal (Capricornia) which is a front surface aspheric, and the Essential GP (CLCA), which is a back surface aspheric with a low eccentricity value.

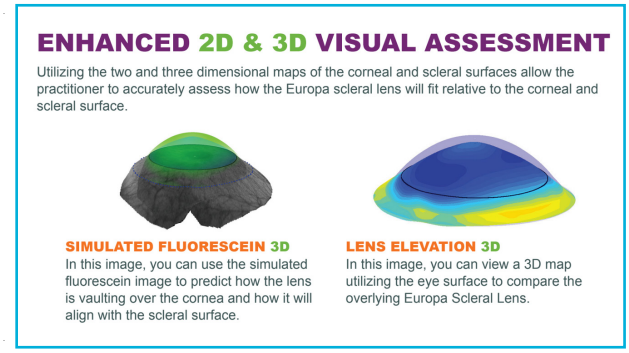


A front aspheric design has the ADD power on the front surface and a spherical back surface.

In theory this preserves corneal integrity while providing good near vision. The back aspheric variety generates the ADD power on the back surface, whereas the front surface is spherical. Depending on the eccentricity of the back surface, there could be changes to the corneal curvature from lens wear. Some early back surface aspheric GP lenses were fit 5-7 diopters steeper than flat K and caused issues with corneal steepening and/or warping.

Newer aspheric GPs avoid this potential complication due to their much lower eccentricity. The bi-aspheric designs have the best of both worlds. They utilise a low e-value back surface to minimise corneal issues related to fit, while still providing some ADD power, and they incorporate an ADD on the front surface as well.

Scleral GP lenses have enjoyed a resurgence in the past decade or so. Initially reserved for diseased corneas, they are now being used as another option for healthy corneas that have larger amounts of astigmatism or corneal irregularities. Scleral lenses are also available in bifocal configurations, they tend to be concentric designs and can have various zone sizes. They may be center-distance or center-near, and since scleral lenses don't more very much on the eye, using a distance center on the dominant eye and a near center on the non-dominant eye can be beneficial. The ultimate scleral lens is made by CLCA, using the sMap3D system).



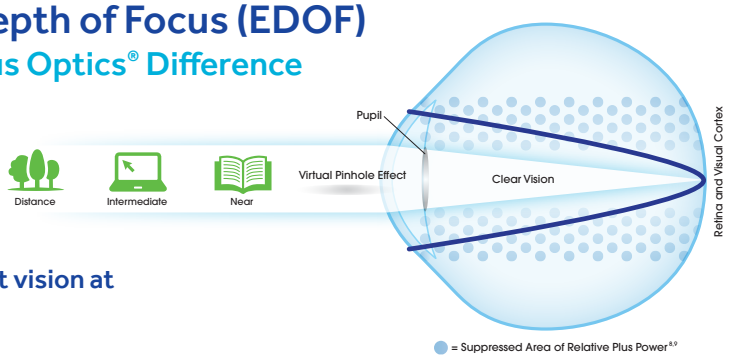
This unique system maps the corneal surface by imaging the fluorescein stained tearfilm in 3 positions of gaze. Over 1,000,000 data points are captured and combined by the sMapPro software to create a fully customisable lens without the inconvenience of having to take an impression of the ocular surface.

This lens has the advantage of being able to be fit around glaucoma shunt tubes, filtering blebs, and other anomalies of the surface that can complicate contact lens fitting. And it is available in a bifocal!

Within the soft lens group there are further divisions based on discard frequency, going from annual discard all the way down to daily disposables. Many soft multifocal contact lenses come in fixed parameters but there are custom designs, including toric multifocals, available. With all simultaneous image designs, there are multiple images presented to the retina at the same time. The designs of soft, simultaneous image multifocal contact lenses show great variety. Some are aspheric, with a relatively smooth transition from one power area to the next, while the concentric designs tend to have a more abrupt transition between power areas. Changes in pupil size and/or different power zone sizes are responsible for creating the visual result. Some use actual differences in the size and/or power of the zones for the ADD, with a smaller ADD intrusion on the dominant eye and a larger one on the non-dominant eye. Others use a central distance power zone for the dominant eye, and a central near power zone for the non-dominant eye. Still other manufacturers use the same zone size/type for each eye and advise "pushing plus" on the non-dominant eye to enhance the patients' vision. More recent versions of simultaneous image designs rely on creating an extended depth of focus (EDOF) to provide good vision at all distances. One EDOF design, the NaturalVue Multifocal 1 Day contact lens, creates a virtual or optical/pinhole aperture that generates the extended depth of focus.

NaturalVue Design Induced Aperture[7,8] = Extended Depth of Focus (EDOF)

The Neurofocus Optics® Difference

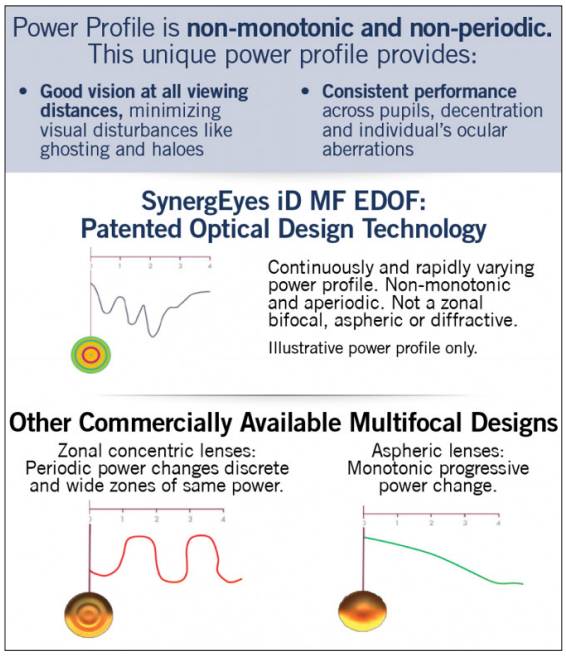


Results in excellent vision at every distance.[9]

One benefit of this design, in addition to delivering visual acuity and stereopsis comparable to spectacle vision, is the design is independent of pupil size, provided the patients pupil is larger than 2.5mm. Some manufacturers manipulate

positive spherical aberration to achieve that goal. An example here is the SEED lens. Simultaneous image designs work well for patients who need good vision at multiple distances throughout their day, such as office workers who are on computers and at a desk during the workday. Other examples of soft aspheric designs include the Air Optix Multifocal, Dailies Aquacomfort Plus Multifocal, and Dailies Total 1 Multifocal (all from Alcon Laboratories). 1-Day Acuvue Moist Multifocal (Johnson & Johnson Vision Care) is one design that attempts to compensate for the change in pupil size with both age and refractive error. The Bausch + Lomb family of soft multifocals utilise a lower ADD for the dominant eye and a higher Add for the non-dominant eye to achieve their goal. The Biofinity Multifocal (Coopervision) and Proclear Multifocal (Coopervision) employ a center-distance lens for the dominant eye and a center-near lens for the non-dominant eye strategy, with various ADD powers available for each design.

To this point we have only dealt with soft multifocal contact lens options that have set parameters. There are many independent laboratories that are manufacturing custom soft lenses. They have pretty much any design configuration desired, (concentric or aspheric near zones) and they have a wide range of powers available, for both distance and near ADDs. They can even do toric multifocals. Most of these lenses are either on a monthly or quarterly replacement cycle, but some are semi-annual or annual replacement. Examples of such labs are Capricornia and Gelflex They offer spherical and toric multifocal designs with distance power ranges, cylinder corrections, and ADD powers in just about any parameter you desire.



The last category of multifocal lens to discuss is the hybrid lens. This area is currently served by one company, SynergEyes, who seem to be constantly innovating. The hybrid gets its name from the incorporation of a rigid center and a soft skirt that surrounds it. This allows for the visual benefits of a rigid lens with the comfort of a soft lens. Their offerings include the Duette Multifocal, which uses small and/or large zones for the ADD, the Duette Progressive, which has center-near and center-distance configurations, each with multiple ADD powers, and the SynergEyes iD MF EDOF, which manipulates higher order aberrations to generate its visual result. This last lens is individually designed and is empirically fit.

It is not necessary to have all of these different lenses in the office. However, each practitioner should work with a few of the different designs to become comfortable with how they perform and feel confident with which design to prescribe for which

patient. The key here is to follow the fitting guide for each lens. Manufacturers spend countless hours and dollars developing these instructions. No two lenses are the same, despite what looking at the listings in a parameter chart might show. You cannot fit a translating design corneal GP the same way you fit an aspheric corneal GP lens. Conversely, you cannot fit a center-near soft multifocal the same way you would fit a center-distance soft multifocal. Make life easy and follow the fitting guide. This advice carries over to troubleshooting the lens fit as well. All contact lenses need to center well and move appropriately in order to work well. For instance, corneal alternating image GP multifocals need to have the distance zone accessed in primary gaze and be able to translate into the reading power zone in order to access the ADD. If the lens does not translate properly, you can change the diameter, change the base curve, or even truncate the lens depending on the situation.

After becoming familiar with these lens options, think about using a presbyopic contact lens on all appropriate patients.

When it comes to fitting approaches, there are a number to consider. Ideally it would be best to use a "total bifocal fit" where each eye gets the full correction for distance and near. In theory this arrangement should maintain peak binocularity. It should be noted that many multifocal contact lenses are designed to work via an enhanced, or modified, monovision approach. Here, the dominant eye is biased for distance and the non-dominant eye gets a greater ADD and is set more for near vision. This method also allows for the use of a mixture of bifocal, multifocal, and single vision lenses. In truth, a combination of all these design concepts seems to find its' way into our treatment of these presbyopic patients.

That involves patient education. They need to know that presbyopia is a common issue as we age. There are many ways to handle their vision correction needs. Talk about what the presbyopic contact lens can and cannot do. Will there be times when something other than the contact lenses will be needed? The patient will still need a serviceable pair of spectacles for times when the contact lenses are not being worn. It is a good idea to discuss what the patient should expect in the way of adaptation. Changing to a new multifocal contact lens design, whether from a different multifocal lens or single vision contact lenses, requires a period of adjustment. It is better to overestimate the time needed to adapt, and to give the patient some idea of what the process will entail. Then there is less likelihood of the patient becoming discouraged if their vision isn't perfect at the start. The bottom line is that patients must have realistic expectations to go with their motivation in order to be successful. As we said at the beginning, there is a large population of presbyopes out there. Many of them are probably in your practice already. Most contact lens wearing patients want to continue to wear contact lenses as they age. With new designs, we can help them stay in contact lenses without having to compromise

vision. Happy patients are more loyal to the practitioner and return for scheduled examinations on a regular basis. They also refer family and friends to the doctor who 'made them see again'. Let us all embrace multifocal contact lenses and watch the practice grow.

CASE STUDY 1

GW, a 53-year-old attorney
Triathlete and avid bicyclist

Currently wears SV GP contact lenses and uses reading glasses over (which she does not like)

RX:	OD -3.75-0.50x165	20/20	OD dominant
	OS -4.25-0.50x20	20/20	ADD +1.75 OU, VA 20/20 OU
Ks:	OD 42.00/42.25@90		
	OS 42.37/42.62@85		

Ocular health was normal.

First diagnostic lenses: Menifocal Z, center-distance concentric design, Base curve 8.10mm OU, Lens diameter 9.8mm OU, Distance Power -3.75 OU, ADD +2.00 OU.
VA 20/20- OD, OS, OU at distance although patient noted an "image shadow".
Overrefraction did not show any improvement. Near vision was 20/20 OD, OS, OU.

- Comfort was "great" OU
- Positioned slightly superior, central OU
- Movement good in all positions of gaze
- Fluorescein evaluation showed an alignment pattern centrally, with good peripheral clearance
- At the 1-week progress evaluation the patient noted no difference in VA or comfort.
- Slit lamp Biomicroscopy was also unchanged.
- Ordered new CLs: Menifocal Z, 8.00mm base curve, 9.8mm lens diameter, -4.00D power in distance and +2.00 ADD OU.
- At pick-up visit: VA 20/20+ at distance and near. No shadows noted.
- Position was central, with good movement in all positions of gaze.
- Fluorescein evaluation showed trace apical clearance with good peripheral clearance.
- The patient left very happy and continues to do well.

CASE STUDY 2

AR, a 60-year-old homemaker
Exercise/sports enthusiast

Wore PMMA CLs 30 years ago and is interested in CLs for physical activities, at least part-time

RX: OD -2.25-0.25x45 20/20
OS -2.25-0.50x60 20/20 ADD +2.25 20/20 OU OS dominant

Ks: OD 43.87/44.25@150
OS 43.50/44.12@140

Ocular health normal except for slight end of day dryness OU

Based on the possible part-time nature of the lens wear, the NaturalVue Multifocal 1 Day contact lens was chosen, Base curve 8.3mm, Lens diameter 14.5mm, extended depth of focus optics.

- Initial diagnostic lens powers per the fitting guide and Quickstart calculator: -2.75 OU
- After 10-minute initial adaptation, VA was 20/20+ OD, OS, OU at distance and near.
- Patient released for 1-week trial period with additional lenses
- At the progress evaluation, the patient noted excellent vision at all distances, including at night and stated she was wearing the lenses 10-14 hours most days with no dryness issues.

Douglas P. Benoit
OD, FAAO

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Disclaimer: Dr. Benoit is Executive Director for Professional Services with Visioneering Technologies, Inc.