

Strategies for Success with GP (Oxygen Permeable) Multifocals

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Introduction

Providing clear, comfortable, binocular vision has always been a central tenet of ophthalmic practice and surely we should not abandon this goal when managing our presbyopic GP (oxygen permeable contact) lens wearers. Yet GP multifocal and bifocal designs remain the most underutilized types of contact lenses. Let's overcome our inhibitions and adopt an easily executed strategy to incorporate this most important modality into our everyday practices.

With almost 100 million people in the United States reaching presbyopic age, there exists an enormous, largely untapped, pool of new and existing contact lens wearers whose visual needs may best be served utilizing multifocal contact lens designs. ⁽¹⁾ Yet many of us often opt for what is perceived as an easier solution, fitting these patients with monovision, single vision contact lenses in combination with reading glasses, or spectacles only. Our apprehension may be rooted in several common misperceptions. These include fear of failing to achieve fitting success due to design complexity, increased chair time, and assumptions that patients will reject this modality due to the increased cost.

It is currently estimated that of contact lens wearers with presbyopia, 70% wear a monovision correction. ⁽²⁾ The relatively high success rate of 80% has been reported with this approach. ⁽³⁾ The benefits of monovision include the fact that only one lens needs to be changed for current wearers, no increased skill or knowledge is required on the part of the fitter, it is less expensive and less chair time is necessary. However the limitations of monovision, which may include reduced stereopsis, reduced contrast sensitivity, asthenopia, and increased disability glare, surely must outweigh the benefits. ⁽⁴⁾ With today's improved GP multifocal designs and sophisticated manufacturing capabilities, we have the ability to offer our patients the enhanced visual functioning that can only lead to even greater patient satisfaction and higher success rates.

Course Objectives

The goal of this article is to familiarize you with the

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features and benefits of GP permeable multifocal lens design, provide a clinical guide for patient evaluation and selection, and review strategies for troubleshooting some of the more common fitting problems. We will also discuss how to best incorporate this most rewarding of "specialty" modalities into everyday practice, thereby maximizing your potential to achieve success for both you and your patients.

Case History and Clinical Examination

The patient examination format and clinical assessment for the potential oxygen permeable multifocal wearer follows much the same protocol as for our other contact lens wearers. Place special emphasis, however, on fully understanding the patients' visual needs and sensitivities as well as counseling the patient on realistic and appropriate expectations (to be discussed later.) First time GP lens wearers will obviously require a longer period of physical as well as visual adaptation and more intensive follow-up.

Your case history should uncover any ocular or systemic medical contraindications to contact lens wear. You should inquire about medications that could potentially limit wearing time due to reduced tear production (e.g. antihistamines, hormone replacement therapy), history and reasons for previous failure with lens wear, occupational and avocational visual requirements. Specifically, ask: "What distances are most important?"

Your clinical examination should include careful manifest refraction. As a general rule, emmetropia or low ametropia (1.0D or less of myopia or hyperopia) is a relative contraindication to multifocal lens wear. ⁽⁵⁾ You may, however, consider a "modified" multifocal approach (multifocal in the non-dominant eye) for the highly motivated individual. Other important measurements include testing for eye dominance,

keratometry, pupil size (mesopic and scotopic), palpebral aperture, and horizontal corneal diameter.

A careful slit lamp examination will enable you to detect lid margin and ocular surface abnormalities that might complicate lens wear, inadequate tear meniscus or tear break up time, corneal scarring or neovascularization, and size and location of tarsal plate papillary hypertrophy. Assessment of lid tonicity and recording upper and lower lid position is of significant importance in lens design selection and determination of overall lens diameter. ⁽⁶⁾

LENS DESIGNS

Having a basic understanding of GP lens design is an important first step in acquiring the skills to incorporate the fitting of these lenses into your everyday practice. Keep in mind that all designs are available in the same variety of materials of gas permeable lenses with which we fit our monofocal lens patients. These materials offer superior wetting capabilities and a range of oxygen transmissibility (Dk). General fitting principles suggest that higher Dk materials (such as Boston XO, Paragon HDS or Fluoroperm 92) would be the materials of choice for higher degrees of ametropia as well as for prism ballasted designs, due to the increased lens thickness. For patients with higher degrees of corneal toricity we might choose lenses that “flex” less such as Boston ES or Fluoroperm 30.

GP multifocals may be broadly divided into two types: simultaneous vision and alternating vision. Within each of these categories there are several variations.

Aspheric Multifocals (Simultaneous Vision)

Aspheric multifocals are progressive design lenses that focus both distant and near objects on the retina simultaneously. The patient, therefore, relies on a “cortical selection” process (in the brain) to help filter out images which are not being attended to. Traditionally, these designs incorporated high eccentricity posterior aspheric surfaces with spherical anterior surfaces (e.g. VFL3, Conforma, Norfolk, VA). These lenses were fit approximately 3D steeper than K. Lower eccentricity designs such as Essentials (Blanchard, Manchester, NH) are typically fit between 0.75D and 1.50D steeper than K. These lens designs typically provide add powers up to approximately +1.75D. As the add power increases away from the optic center, patients with larger pupils obtain a greater add effect.

Several of the more recently introduced lens designs have enhanced the effective add powers by reducing the effective distance optical zone and/or by modifying the front lens surface. For example Essentials Xtra is available in three effective add powers and additional add of up to +1.25D may be placed on the anterior surface (CSA enhancement).

Alternative designs include spherical back surface with an aspheric front surface (e.g. C-Vue Multifocal, Unilens). The advantage of this design platform is the easier conversion of fit from the patients’ current spherical lens parameters as well as the reduced corneal molding which often occurs secondary to progressive rigid lens wear. A relatively new entry into this category is the Renovation Multifocal (Art Optical Inc.) The Renovation Multifocal features an eccentric front surface, which controls for spherical aberration throughout the distance and intermediate transition zones. It also offers three distance/intermediate zone diameters to accommodate for smaller or larger than average pupils. Add power may be specified up to +3.50D in .25D steps.

Patient Selection

Progressive aspheric lenses are an excellent option for all current GP lens wearers as well as new wearers with appropriate levels of motivation and high visual sensitivity. In particular, consider this design for early presbyopes without a highly critical distance demand, patients who spend much of their time at a computer and for athletes - as aspherics tend to move less with the blink.

⁽⁷⁾ Anatomical considerations should include the following: pupil size 5mm or less in normal room illumination, patients with a well-centered corneal apex, patients with steeper than average corneas and patients with low or flaccid lower lids (as these patients are not good candidates for a translating design.)

Fitting Characteristics and Diagnostic Evaluation

By and large, you should follow CLMA-member laboratories’ fitting guidelines for your initial lens selection. While this author prefers diagnostic fitting, many practitioners find they do equally well fitting empirically by providing the laboratory with all necessary information. This is certainly an excellent way to begin the process of trying different designs on your first few fits in order to arrive at your “designs of choice”. After your first three or four fits with a

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given design, you will have successfully negotiated the “learning curve” and may want to obtain diagnostic kits. A minimum of two types of aspheric designs will generally cover most needs. Keep in mind that no matter which fitting approach you choose, diagnostic or empirical, your CLMA laboratory consultants are your most valuable partners in the process.

In general, all aspherics should exhibit good centration with little lens movement with the blink. Front surface aspherics will fit similarly to back surface aspheric designs; however, there will typically be an alignment fluorescein pattern and slight superior decentration. In either case, slight translation should occur on downgaze for the add to be accessed when the patient reads.

Problem-solving

The most commonly encountered problems with aspheric lens design include decentration, insufficient add power and glare.

Decentration, especially when accompanied by excessive lens movement, may cause reduced or variable vision at all distances as well as physical lens awareness. If the lens is riding inferiorly with excessive movement steepen the base curve radius by 0.50 D. If the inferior decentration occurs with little or no movement, flatten the base curve radius to promote lift by the upper lid. To remedy lateral decentration, steepen the base curve and/or increase the overall diameter. By addressing issues of decentration, most problems of glare will be eliminated. Additionally, choosing a different design that permits control of distance optical zone size may be necessary.

For problems of insufficient add power, choose a design which offers higher add increments. If binocularly increasing the add reduces the distance vision, a higher add may be applied to the non-dominant eye only. Alternatively, try over-plussing the distance power on the non-dominant eye by 0.50D. This often works well for patients primarily requiring sustained intermediate vision as with computer tasks.

Translating (Alternating) Multifocals

Most commonly, translating designs are segmented, similar to traditional spectacle bifocals. In straight-ahead gazes the distance portion of the lens positions in front of the pupil. When the patient lowers her eyes to read, the lens shifts upward or “translates” such that the lower near section is positioned in front of the pupil. All translating designs are prism-

ballasted typically incorporating anywhere from 1.5 to 3.0 prism diopters. Some of these designs are also truncated to enable the lower lid to more effectively assist the lens in translation and provide added stability. Examples of segmented translating designs include the Tangent Streak Bifocal (Fused Contacts of Missouri) and the Metro Seg Crescent (Metro Optics). There are some translating designs that also incorporate an intermediate correction such as the Presbylite II (Lens Dynamics). This non-truncated lens with 1.5 prism diopters of ballasting features a spherical distance zone, spherical near zone and a triangle-shaped intermediate zone.

Annular, concentric translating designs are prism ballasted. They utilize a superiorly decentered central distance zone surrounded by a near concentric periphery. An example is the Mandell Seamless Bifocal (Con-Cise) with an average 3.4mm central distance zone.

Patient Selection

Due to the thicker profiles of these lens designs, well-adapted GP lens wearers are the best candidates. For the most part, you will choose this route for patients who have critical vision tasks for distance, near or both. Also consider them for moderate to advanced presbyopes who may not achieve satisfaction with higher add aspheric designs and/or patients with larger than average pupils. You should select patients with good lower lid tonicity where the lower lid positions within one millimeter of the lower limbus. Patients with flatter than average corneas that may not be suitable for aspherics as well as moderate to high hyperopes on whom lenses tend to decenter inferiorly, are also good candidates. This is the design of choice for patients requiring a front toric design for residual astigmatism or a toric design for high corneal astigmatism.

Fitting Characteristics and Diagnostic Evaluation

Due to the greater complexity of fitting these designs and the number of fitting variables, it is best to use diagnostic lenses of standard parameters provided by the manufacturers.

These designs are typically fit slightly flatter than K to allow for rapid descent of the lens to the lower lid. The seg line or crescent should be positioned at or within 1mm below the lower pupil margin. The lens should move up slightly with the blink, but the seg line should not move more than one millimeter into the pupil in straight-ahead gaze. Be sure to evaluate the seg position in normal illumination. A Burton

lamp allows for an excellent real life view, with the patient's head in a natural position. Confirm appropriate translation by having the patient assume a natural head position while reading in the exam room and lifting the lids to observe the seg position. It is helpful to check acuities at both distance and near, monocularly as well as binocularly. For rotating truncated lenses due to an upswept lower lid, you can compensate by using the RALS acronym and specify the prism placement to the lab by adding or subtracting from the 90-degree position.

Problem-solving

Potential problems with translating designs include excessive rotation with the blink, superiorly positioned lens, poor lens translation, and poor distance, intermediate or near vision.

For excessive lens rotation on a with-the-rule cornea, flatten the base curve. Conversely, for an against-the-rule cornea steepen the base curve. If the lens rides too high with the blink such that the segment interferes with distance vision try increasing the prism ballast by .5 prism diopters and or flattening the base curve in 0.50D increments. To promote translation in a lens translating poorly or only intermittently, try increasing the edge clearance by flattening the peripheral curve radius or try increasing the amount of truncation.

For poor distance vision due to superiorly riding or excessively moving lenses increase the prism ballast. For otherwise well-fitting lenses, manage inadequate distance vision or poor night vision by increasing the overall diameter by .4mm and/or reducing the seg height.

For well fitted, well translating lenses not providing adequate near vision, raise the seg height and reeducate the patient on proper eye movement instead of head movement.

To provide intermediate correction, utilize a design incorporating an intermediate segment or overplus the distance portion of the non-dominant eye (remembering to reduce the add to compensate). Alternatively, the use of auxiliary spectacles for the appropriate working distance may be prescribed.

Summary and Clinical Pearls

Fitting multifocal GP lenses is professionally rewarding, allowing you to engage and enhance your rigid lens fitting skills while providing a valuable service to your patients and your practice setting. The most

important keys to success are having a positive, optimistic, but realistic approach and taking care to set appropriate expectations. Advise patients that multifocal contact lenses will adequately address 75% to 85% of their visual requirements and that auxiliary spectacles may be necessary for tasks such as night driving or reading very small print such as in telephone books or on medicine bottles. Remember to remind patients that excellent lighting is necessary for maximum visual comfort. Point out that the fact that there are small compromises is no different from what they experience with their spectacles, just that these compromises may be of a different nature. Remember to emphasize the positives such as the fact that contact lenses offer a more natural way of seeing with greater peripheral awareness and less distortion. Help our GP presbyopic lens wearers to remember why they chose GP contact lenses in the first place!

Resources

Valuable resources for the beginning to advanced lens fitter include the laboratory consultant, professional journals such as *Contact Lens Spectrum* and *Review of Cornea and Contact Lenses* (supplement to *Review of Optometry*), as well as the Gas Permeable Lens Institute. The GP Lens Institute website (<http://www.gpli.info/>) provides a comprehensive lens and laboratory database, fitting guides, practice management resources as well as on-line CLMA-sponsored symposia. You will find most helpful the CLMA produced CD "Rx for Success" which details the key components of incorporating GP Bifocals and Multifocals into your practice.

References:

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- (3) Collins M, Bruce A, Thompson B: Adaptation to Monovision, *Int Contact Lens Clin* 21:218-224. 1994.
- (4) Bennett ES, Jurkus JM, Schwartz CA: Bifocal Contact Lens In Bennett ES, Henry VA, editors: *Clinical Management of Contact Lenses*, Philadelphia, 2000, Lipincott Williams and Wilkins pp.437-440.(5-7) Bennett ES, Hom M: *Manual of Gas Permeable Contact Lenses, 2nd edition*, St. Louis, Mo. 2004, Elsevier Science, pp. 324-356.

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1. Historically the traditional approach to managing presbyopia with contact lenses has been
 - a. refit to spectacles only
 - b. prescribe reading glasses for use with distance contact lenses
 - c. prescribe monovision contact lenses
 - d. all of the above
2. Practitioner apprehension about utilizing multifocal lenses may be related to
 - a. increased chair time
 - b. design complexity
 - c. increased practitioner and patient cost
 - d. all of the above
3. Advantages of monovision may include
 - a. normal stereopsis
 - b. improved vision for driving at night
 - c. no need to refit to a different lens design
 - d. all of the above
4. Your case history of a prospective multifocal GP lens wearer will **most likely** exclude a patient who
 - a. was previously intolerant of gas permeable contact lenses
 - b. is interested in and is a good candidate as a first time wearer of aspheric multifocals
 - c. manifests 2.0 D of corneal cylinder
 - d. is a lawyer and reads a lot
5. Your clinical evaluation will **most likely** rule out a prospective GP multifocal wearer who
 - a. Is emmetropic with emerging presbyopia
 - b. Is a moderate myope who was previously corrected for near with slight monovision
 - c. Uses pilocarpine for glaucoma and has a fixed pupil size of 2mm
 - d. A and C
6. You have a patient whose OU refraction is +3.00D/+1.50D ADD. You plan to order aspheric multifocals. Your material preference is:
 - a. Polycon
 - b. Boston ES
 - c. Fluoroperm 30
 - d. Fluoroperm 60
7. You have a patient whose OU refraction is -2.00-2.00 x 180/+1.25D ADD. Keratometry is OU 43.00@180/45.00@90. You plan to order aspheric multifocals. You would most likely choose which of the following materials?
 - a. Paragon HDS
 - b. Boston XO
 - c. PMMA
 - d. Boston ES
8. Aspheric multifocal designs may incorporate which of the following manufacturing techniques?
 - a. back surface eccentricity
 - b. front surface eccentricity
 - c. eccentric back surface plus annular concentric add on the front surface
 - d. all of the above
9. Which of the following anatomical characteristics might rule out a prospective aspheric multifocal wearer?
 - a. lower lid 2 mm below the lower pupillary margin
 - b. central corneal curvature of 40.00D
 - c. scotopic pupil size of 5mm
 - d. central corneal curvature of 45.00D
10. Which of the following fitting characteristics is **not** indicative of a well fitted aspheric multifocal?
 - a. good centration
 - b. 3mm of movement with the blink
 - c. 1mm superior decentration
 - d. slight apical clearance fluorescein pattern
11. To remedy temporal decentration in with an aspheric design you may
 - a. steepen the base curve by .5D
 - b. order a lens with a larger OAD
 - c. A and B
 - d. Flatten the peripheral curve
12. Your well-adapted GP wearer wishes to be refit with translating bifocals. His current spherical Rx is -5.00D/+2.00 ADD. Your **primary** anatomical consideration is
 - a. pupil size
 - b. lower lid position
 - c. upper lid position
 - d. horizontal corneal diameter
13. In a translating bifocal design the seg line should be evaluated first in primary gaze and should be observed to position
 - a. bisecting the pupil
 - b. 2mm below the pupil
 - c. at the lower pupil margin
 - d. at the lower limbus
14. You observe a truncated segmented bifocal on the right eye to rotate excessively to your right (nasally). You specify to the lab that you want the prism to lie at
 - a. 90 degrees
 - b. 105 degrees
 - c. 75 degrees
 - d. 180 degrees
15. Your translating bifocal wearer is not comfortable with his near vision. This may be due to
 - a. seg height too low
 - b. adequate add power
 - c. seg height too high
 - d. adequate translation

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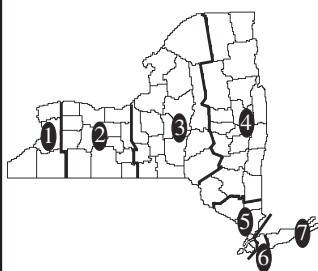
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