Correcting Presbyopia With Soft Contact Lenses

Dr. Pravin Tellakula MS

Why fit presbyopic patients with contact lenses?

The answer is that they want contact lenses. Those who have enjoyed single-vision contact lens correction for years appreciate the multitude of benefits and don’t want to give them up just because they’ve become presbyopic. Many of those who aren’t contact lens wearers have a strong interest in contact lens correction and many of them can be successful with them.

In India, the greatest untapped source of future growth in the contact lens field is the fitting of the presbyopic patient. As demographics continue to shift over the next decade, more patients will be in the over-40 group widening the market. Satisfying this population of patients who make health care decisions for themselves, their children and their elderly parents as well, secures ones position as the eye care provider for the entire family.

The evolution of materials and lens designs have provided a powerful array of contact lenses for presbyopes, who need to wear their lenses full-time, part-time or just for social occasions. The challenge is to identify the viable candidates and match them with the most appropriate corrective option.

Understanding the Aging Eye

Certain special physiologic changes that take place in the aging eye that make fitting contact lenses in a presbyope challenging should be noted.

- There is a reduced elasticity in the lids,
- aging of the meibomian glands,
- the marginal tear meniscus is inadequate,
- lacrimal glands become less productive and there is
- reduction in acuity and contrast sensitivity.
- pupils are smaller and sluggish,
- crystalline lens loses transparency and also
- synchisis of vitreous is present.

The Psyche of the Presbyope

For many people, presbyopia is one of the first indications that they are not going to escape the ravages of aging. Their search for the fountain of youth often leads them to beauticians, personal trainers and cosmetic surgeons. So as these patients hit presbyopia, there are psychological as well as physiological changes that affect their personalities. The presbyope wants to avoid the stigma attached to bifocals and how they relate to a person’s age. Many patients want to see and feel as they did when they were in the twenties.

Compromises present in various systems used to correct Presbyopia

- Spectacles: difficulty is experienced while walking or using stairways, fogging occurs and even slips off during vigorous activity.
- **Translating Bifocals** - near vision is gaze dependent; there can be an image jump at the segment.

- **Simultaneous Bifocals** - degraded retinal image, haloes at nights, reduced contrast sensitivity, ghost images has been reported.

- **Monovision** - reduced central visual acuity in one eye, reduced binocular comfort, reduced visual quality at night has been noted.

- **Refractive surgery** - has also not addressed this issue efficiently.

**Every presbyopic correction be it eyeglasses, monovision or bifocal contact lenses is a compromise.** Vision will never be as natural or as efficient as it was in the twenties. Usually, unwillingness to compromise is a contraindication to the fitting of contact lens for presbyopia.

The goal of presbyopic contact lens fitting is to provide reasonably good vision for most of the activities most of the time. If patient and practitioner both accept this, they are more likely to reach success. Patients and practitioners should understand at the outset that fitting for presbyopia is not instant, automatic or particularly predictable. Successful modern presbyopic fitting is a process that results from an understanding of the lens designs and their appropriate application as well as adjustments and compromises that allow a balance to be achieved.

Presbyopes can be broadly divided into two groups, the emerging presbyopes (in the age group of 35 – 49) referred to as “Gen-X” and the mature presbyopes (in the age group 49-60) referred to as baby-boomers. For the next generation of new and emerging presbyopes Technology is a key component. This generation is highly motivated to preserve both vision function and youthful appearance. Not surprisingly the mindset, visual requirements and life style demands of early presbyopic Gen-Xers are different as indicated in the table below. Likewise the method of correction of presbyopia and lens types will vary between the two groups.

**Soft Lens Options available to manage Presbyopia.**

1. **Reading Glasses**— Patients who have adapted to single-vision contact lenses may prefer reading glasses over their contact lenses, especially if they're early presbyopes, where assistance with near tasks is required only occasionally.

2. Alternatively, regular soft contact lenses can be prescribed using the **Monovision** principle in which one eye is corrected for distance and the other eye for near.

3. Special Bifocal contact lenses with **translating designs** (segmented), which provide distance and near vision by alternating the gaze between the segments of the lens is another form of correction.

**TABLE 1**

<table>
<thead>
<tr>
<th>GENERAL PRESCRIBING FACTOR</th>
<th>EARLY/EMERGING PRESBYOPES (AGE 35-49)</th>
<th>MATURE PRESBYOPES (AGE 50-64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiology / ocular health</td>
<td>Relatively fewer challenges / healthy ocular surfaces</td>
<td>Chronic ocular disease conditions (especially dryness) may hinder successful contact lens wear.</td>
</tr>
<tr>
<td>Vision tasks / demands</td>
<td>Greater use of mobile technology, more demanding visual-motor tasks (greater use of texting/personal computing). Greater task variability.</td>
<td>Less use of mobile technologies. Comparatively less demanding, stationary near vision tasks (reading). Relatively less vision task diversity.</td>
</tr>
<tr>
<td>Refractive error</td>
<td>Strong motive to preserve both vision function and youthful appearance</td>
<td>Generally greater functional orientation</td>
</tr>
</tbody>
</table>

Strong motive to preserve both vision function and youthful appearance
4. In **Simultaneous Vision** lens designs the distance and near vision is perceived simultaneously and the brain selects the image of interest. They come in different types, concentric ring or bull’s eye design (annular), aspheric design, multi-zone or diffractive design.

5. **Modified monovision** is a method where single vision lens is used in one eye and a bifocal in the other.

6. Other **Combinations** like different designs of multi/bifocal lenses in each eye are reserved for mature presbyopes and those having higher demands in vision.

A good **patient evaluation** is required, prior to selecting a method of correction, noting the amount of refractive error and visual sensitivity, occupation, visual needs, personality, previous contact lens experience, motivation and expectations. Ocular examination would include the routine for any contact lens fitting with special attention to the pupil size and dynamics, tear function, lid position and lid tonicity. Low error and high adds may be problematic, as may high sensitivity to small lens changes during refractive testing and acuity not correctable to 20/20 in each eye.

**Selecting the method of correction** will depend on the ocular health and needs of the patients. The visual demands vary widely and could be any of the following:

- Good distance vision
- Reasonable distance and near vision
- Good distance and near vision
- Occasional good vision without specs
- Cosmetic value

In general, in patients where assistance with near tasks is required only occasionally (e.g., reading medicine bottles or threading a needle) spectacles over their contact lenses is preferred. As presbyopia progresses and near tasks become more and more challenging, this form of correction becomes unacceptable and inconvenient.

For an emerging presbyope over-plussing the non-dominant eye will work well. While early presbyopes are well served this way it can be tried in all presbyopes.

**Simultaneous / Aspheric lenses are good for good intermediate vision** e.g. Computer professionals and in occupations like accountant, mechanic, plumber, electrician requiring “arm’s length” vision range. It is also the recommended lens type for the emerging presbyopes.

**Translating designs** are best suited for patients with “near to far” demands, like teachers and truck drivers. It is also the recommended lens type for the advanced presbyopes.

When the pupil size is more than 4.5 mm in mesopic conditions do not attempt bifocal contact lenses.

**Monovision**

Monovision provides the simplest method of correcting both distance and near vision with contact lenses. A distance contact lens is fitted to one eye and a near contact lens is fitted to the other. The Dominant eye is corrected for distance and the other for near. This concept of over-plussing the non-dominant eye was first proposed by Westsmith 3 more than 30 years ago. The induced imbalance is minimal and often well tolerated. While this method of correction works well with emerging presbyopes, it can be used for all presbyopes with any lens material and any replacement schedule. It can also be used with toric lenses in patients with astigmatism by exercising caution.

The advantage with monovision correction is that it provides consistent near and distance vision independent of gaze position. It does not cause aberrations or distortion of the peripheral visual field. Patients with an add of less than +2.00 Dioptres theoretically attain well focused image for any intermediate viewing distance. It is easy to fit comparatively, it is less time-consuming and less expensive for both patients and practitioners than bifocals and has shown a high success rates with patients.

A more complex monovision approach uses a bifocal lens in one eye and a single vision contact lens in the other, i.e. so-called modified monovision. Usually, the single vision lens is used to correct the patient’s vision for their most critical viewing distance, i.e. distance or near, and then base the multifocal lens for the other range.

The alternative is to use bifocals in both eyes.
Monovision Fitting
A fundamental dictum to successful monovision prescribing is to demonstrate benefits of monovision before describing how it works. Some patients may not be comfortable with the idea of monovision. A few key tests can help identify a patient who can successfully adapt.

Patient Selection - The key tests
1. While the patient is wearing his distance correction, determine his dominant eye (The dominant eye can be determined by methods such as the simple “hole in the hand” test or fogging techniques where plus power over-correction is added to each eye in turn, and the eye that accepts the most plus is considered the non-dominant one.)
2. Next, evaluate his near acuity by holding the appropriate power spectacle trial lens over the non-dominant eye. Unacceptable near vision is usually indicative of a poor monovision candidate.
3. If the response is positive, ask him to shift his gaze to a detailed distant object and evaluate the distance acuity. Most patients accept some compromise of distance vision if near is acceptable.
4. Dispense a trial lens for patient to test monovision in everyday situations, if the response is positive.
5. When distance or near vision is unacceptable, explore bifocal options.

Adaptation
Abrupt onset of anisometropia presents a significant challenge to presbyopic visual system. Hazy vision and occasional loss of balancing can be experienced during this time. Some patients possess strong blur suppression skills and can adapt very easily. No clinical tests available to confirm the time taken for monovision adaptation (usually 2-3 weeks)

How does Monovision work?

Cortical processing of Monovision Images
Several cortical processes like Suppression, Adaptation and Binocular Unmasking are involved while generating monovision images.

Suppression- Visual system preferentially processes output from dominant eye even so it has been shown that the output from the suppressed eye still contributes to binocular summation. The suppression of blur in monovision is different from that in retinal rivalry. Thus under normal monovision viewing conditions, the blurred eye makes substantial contribution to binocularly perceived image and should be capable of sustaining useful levels of binocular function in most patients. However, under certain conditions inter-ocular suppression is not constant. This momentary loss can increase the risk of loss of confidence or of efficient judgment. 20 % of monovision patients are unable to achieve second degree fusion.

Adaptation- is another cortical process present in varying degrees in patients. Some patients inherently possess strong blur suppression skills that may be absent in unsuccessful monovision patients.

Binocular Unmasking- The ability to assess the organization of visual space is impaired when information to one eye is reduced. Also there is evidence that indicates the ability to detect visual signals in the presence of noise (blur secondary images) is significantly enhanced under binocular conditions. These findings suggest that cortical processing of complex images generated by presbyopic contact lenses involves higher order functions and requires further study.

Controversies of Monovision
Both monovision and bifocal contact lens modalities have been criticized for the visual quality they provide compared to spectacle bifocal lenses.

Anisometropia- Some clinicians find the intentional anisometropia created by Monovision to be unacceptable ethically. In reality if one observes the aniseikonia with monovision contact lens is typically insignificant compared to that of spectacle correction. E.g. for a difference of +2.75D between the two eyes, aniseikonia is 6% for spectacles compared to 0.5 % in the case of contact lens.
Other binocular performance concerns with monovision include its possible effects on stereopsis, fusion and complex spatial-locomotor tasks (especially driving).

**Effects on Static Functions**

Various Static functions like stereopsis, contrast sensitivity and peripheral vision have been assessed.

**Stereopsis** - 94% exhibit stereopsis within norms with an average stereoacuity of 58 seconds as information from suppressed eye continues to be processed. Under dynamic conditions, such as driving the contribution of stereopsis is minimal beyond 20 ft, instead other clues such as perception, speed of motion, overlapping contours & dynamically changing disparities tend to indirectly enhance the perception.

**Contrast Sensitivity** - As add increases binocular contrast sensitivity approaches that of monocular contrast sensitivity. Binocular summation not seen for adds greater than +2.00 D as reported by electrophysiological data. For low contrast targets, monovision provided better visual acuity than simultaneous vision bifocal lenses. For adds greater than +2.0 D it reduces the ability to make background figure judgements and affects posture and movement.

**Peripheral Vision** - Monovision does not reduce the size of the binocular field or peripheral visual acuity. Detection acuity is better than resolution acuity in the peripheral retina.

**Effects on Dynamic Functions**

**Motion perception and Spatial Localization** - Of all the visual functions performed by the peripheral retina, motion perception is least affected by blur. Peripheral blur essentially has no effect on spatial localization and perceived egocentric movement. Thus, monovision should have no significant impact on these vital peripheral functions.

**Dynamic Activities** - No difference in reaction time is seen in various lens types, however, in near point occupational tasks, resolution tasks suffered most with monovision as it was for certain eye hand co-ordination procedures at close range. Ghosting and momentary diplopia have been reported. The secondary images cause distraction and have been reported to contribute to nearly 33% of pilot errors in accidents and hence may not be a choice for patients requiring very high visual demands.

**Night Driving** - Monocular blur of bright objects, during night driving, such as headlights against a dark background is extremely difficult to suppress and the patient should be cautioned regarding the risk. It is also to be noted that night-driving conditions appear to present significant problems for most presbyopic contact lens treatment modalities.

**Monovision - Conclusion**

Currently available information indicates that monovision is an effective and reasonable prescription for correcting presbyopia. Patients should be fully informed of all correction alternatives, visual limitations and precautions and an informed consent should be obtained. Properly selected patients can obtain good vision for most viewing distances under most circumstances.

**Soft Bifocal / Multifocal Contact Lenses**

Soft bifocal contact lenses can be considered for previous soft lens patients who are already accustomed to the handling and care of these lenses. It is also ideal for those who consider comfort or lens stability a priority, such as sportspersons. It is also an excellent option for occasional wearers as immediate comfort is achieved. It works best in patients who have no more than 0.75D of spectacle astigmatism and on low to moderate (+0.75D to +1.50D) presbyopes. One can achieve higher add effects with a modified monovision approach, adding more plus to the bifocal lens on the non-dominant eye.

When approaching a presbyopic patient for bifocal contact lenses it is important to know their needs and expectations. The patients should be aware that contact lenses also have limitations and the goal for fitting would be to meet most of their visual needs most of the time. The presbyope must accept certain visual compromises which will vary depending on the individual patient and the type of contact lens correction he wears.

The best candidates for fitting bifocal contact lens would be those with low visual demands, low visual sensitivity,
adapted contact lens wearers and those with realistic expectations and good ocular health. Fitting patients with high visual demands at more than one distance, high visual sensitivity, patients who have never worn contact lens before, flaccid lids, dry eye and unrealistic expectations would be more challenging.

The ideal candidate for a beginner in fitting bifocal contact lens would be a patient who is symptomatic during near tasks and requires distance correction of at least −0.50D of myopia or +0.75D of hyperopia and an add of at least +0.75D.

The Multifocal Milieu

No other aspect of contact lens practice offers the variety that is available with multifocals.

Soft bifocal lenses mostly are simultaneous vision designs, which present distance and near optical portions within the pupil at the same time. Some aspheric and multi-zone designs also provide optics for intermediate distances. Alternating (translating) soft lens designs, available in fewer numbers, have mostly been unsuccessful because translation is usually insufficient to displace one optical portion of the lens for another. However this design has performed well in RGP's (Fig 1).

Simultaneous designs are classified as

- center near,
- center distance
- full aperture designs

The above designs use one of the following optics

- aspheric,
- concentric,
- combinations of aspheric and concentric diffractive optics.

Fig. 1. Translating (segmented) RGP contact lens (source IACLE)

Fig. 2. (Left) Translating Design with near power at the bottom (Midele) concentric design with near prescription in the middle and for correction at the periphery (Right) Aspheric design.

Fig. 2. Left: In this example of a translating design the near power is on the bottom. The bottom edge is flattened to keep the lens from rotating on your eye when you blink. Middle: In this concentric design the near prescription is in the middle and far is on the outside, but they can be reversed. Right: In this aspheric design the near and distance prescriptions are both near the pupil.

With a concentric design, a central zone of distance or near power focus is surrounded by one or more rings that contain the opposite power (Figure 2, 3). Some even alternate distance and near in a repeating pattern which helps to improve pupil coverage and visual input with variations of illumination and pupil size.

Aspheric designs use an aspheric front or back surface to create the multifocal effect (Figure 2). Most often, front surface aspheric designs are center-near and back surface aspherics are center-distance. Each type has its own merits, as center-near designs tend to favor near and intermediate vision, while center-distance lenses usually give better distance focus. Which one to choose depends on the patient's individual needs and ocular characteristics.
Multi-zone lenses usually have distance correction in the center and also provide optics for intermediate distances and could even be a combination of aspheric and concentric zones.

With diffractive design (Figure 5), light entering the eye is diffracted to produce the images the retina receives. The diffractive design has a distance center and a series of diffractive phase-plates that surround it. As the add power increases, the number of phase-plates increases, and they get closer together.

**Design of the various categories**, clinical application, their advantages and disadvantages are discussed below. Few of the locally available lenses have been described in more detail.

**Aspheric Center Near Designs**— Aspheric center near designs have maximum plus power centrally. The graduated front surface curve change, results in a progressive increase in minus or decrease in plus toward the periphery.

Clinically, the anterior aspheric multifocals not only create a progressive power effect, but they may also reduce optical aberrations and increase depth of focus\(^1\). They should be fitted as flat as possible without compromising comfort or lens centration.

Even with good centration, many aspheric center near designs require more plus or less minus than expected in the non-dominant eye of more mature presbyopes in order to achieve adequate near vision. If this provides unacceptable distance acuity, a concentric design on the non-dominant eye and an aspheric design on the dominant eye may better balance distance and near vision.

The locally available **Bausch & Lomb Soflens Multi-Focal** lenses fall in this category of front aspheric center-near design. These lenses come in two base curves, 8.5 and 8.8 mm, and in two profiles, low add and high add. It is a cast moulded lens made from low water content non-ionic material Polymacon.

By and large the low add profile is used for spectacle adds of +1.50D or less and the high add profile for spectacle adds of +2.50D or more. For the intermediate range between +1.50 and +2.50D low add on dominant eye and high add on non-dominant eye is used. In case of unacceptable vision trouble shooting should be done as per the manufacturer’s fitting recommendations initially.

Natra-Sight Optics incorporated in this Soflens multifocal provides a broad near to distance power transition to provide crisp, clear and natural vision. Equalised mass distribution facilitates lens centration essential for effective functioning of the aspheric optics. Comfort blend geometry reduces the back surface mass, creating a consistent peripheral zone and enhancing comfort. Round edge profile provides smooth movement over conjunctival tissue for excellent comfort.

The **Air Optix Aqua Multifocal** lens from **Ciba Vision** is another proven aspheric back surface design and will be shortly launched in the Indian market. This lens has shown good centration and excellent fitting characteristics. While there are definitive near, intermediate and distance zones in the lens, the design allows for a smooth transition from each zone.
This unique presbyopic lens system with 3 ADD powers is designed to successfully fit emerging presbyopes and smoothly transition patients through the different stages of presbyopia so they can stay in contact lenses longer. Air Optix Aqua Multifocal has a base curve of 8.6mm and a diameter of 14.2 mm. It will be available in spherical powers of +6.00 to -10.00D in 0.25 steps with LOW, MED and HIGH Adds.

**Concentric Center Near Designs**— Pupil size assessment is critical for success with concentric center near lenses. Small pupils require small add zone diameters to provide adequate distance viewing, while larger pupils require larger add zones on each eye. With any pupil size, it’s often beneficial to use smaller central near zones on the dominant eye to enhance distance viewing and larger central near zones on the non-dominant eye to enhance near viewing. A significant part of fitting these designs is determining the proper add zone size for each eye to optimize visual performance.

Excellent centration is important with any center near contact lens design. Patients who are exposed to a wide variety of light levels and who have extreme variations in pupil size may experience some fluctuation in vision. Most concentric center near designs available internationally offer multiple near zone sizes.

**Aspheric Center Distance Designs**— Aspheric center distance designs have maximum minus or minimum plus power centrally, and the graduated back surface curve change results in a progressive increase in plus or decrease in minus toward the periphery.

Generally, they provide very good distance acuity, and adapted single-vision soft contact lens wearers convert easily to them. Near acuity is often best accepted by the early presbyope. A patient with large pupils may have better near vision with these designs, as increased light rays from the more plus peripheral portion enter the pupil.

Centration is also key to success with back surface aspheric multifocals. A decentered lens places a more plus peripheral portion of the lens along the line-of-sight with distance fixation. This over-plussing requires more minus to compensate, which diminishes the near add effect.

**Concentric Center Distance Design**— Only a few concentric center distance soft lenses are widely available internationally. While this lens generally provides very good near vision, the peripheral near zone may interfere with distance vision, especially in patients with large pupils. This can be particularly problematic with night driving.

**Multi-Zone Designs**— All current multi-zone designs feature distance correction in the center of the lens. The locally available Acuvue Bifocal from Johnson & Johnson, is a multi-zone concentric lens having PUPIL INTELLIGENT DESIGN™ which consists of 5 alternating zones with optimized size and spacing.

Center distance zone: when pupil miosis occurs under extreme bright light conditions, center zone delivers distance correction. Multiple alternating concentric zones: Three middle zones, together with the center zone deliver equal amounts of near and distance vision under intermediate light conditions. Outer distance zone: Provides added distance correction to optimize vision during night driving, and other low light situations. Precision junctions are designed to reduce blurs and haloes in low lighting. The modified Edge design promotes an exceptional comfort.

Acuvue Bifocal has significantly improved my success with presbyopes and soft bifocal lenses. This simultaneous design, two-week replacement lens is approved for daily wear and has ultraviolet filtration and a light blue handling tint. Its unique design features alternating distance and near zones (Fig. 4). Contrary to most simultaneous vision designs, this lens performs quite well, even in the absence of ideal centration, and is relatively independent of pupil size. Although a large range of ametropes can achieve success with the lens, myopes with low to moderate adds are very enthusiastic wearers.

Fitting is very straightforward, but you must follow specific guidelines to achieve optimal success. Initial lens power selection is equal to the vertexed spectacle prescription. Following insertion of the lenses, verify that they are properly orientated by viewing an inversion indicator on the lens. Some patients don’t feel an inverted lens, which makes the inversion indicator even more valuable in assuring proper vision. Finally, allow patients to assess their vision outside of the examining room for 10 to 15 minutes. When they return to the exam room, ask them how their vision is.
Their comments guide you to which, if any, lens power adjustments to make. As with nearly all soft multifocal contact lenses, higher adds in the Acuvue Bifocal tend to degrade distance vision. A lower add lens or possibly a single-vision distance lens on the dominant eye, combined with a higher add lens on the non-dominant eye often provides an acceptable balance of distance and near vision. A good supply of Acuvue Bifocal diagnostic lenses are available, allowing both doctor and patient to efficiently explore the feasibility of this lens with little or no economic risk.

**Full Aperture Design**—This design uses a diffractive phase plate which extends effectively across the entire pupil. The phase plate is formed by back surface echelettes which split the light to form the near image. The add power of a diffractive lens is determined by the number of diffractive rings. Higher adds have more rings with shorter radii. Optical performance of diffractive lens is less dependent on pupil size. Approximately 20 percent of the light is lost to higher orders of diffraction, so lens performance is often reduced in low light conditions. Good centration is necessary to achieve adequate near acuity. These lenses work best on hyperopes, and pushing plus to create a distance over-refraction of -0.50D usually enhances near vision without compromising distance vision significantly.

Preparing patients for initial awareness of halos at night and a 3-D effect with near printed material helps reassure and ease them through adaptation. The diffractive lens can significantly limit oxygen transmission, particularly in higher powers, so careful slit lamp examination for striae and other signs of hypoxia is indicated.

| **Emmetropia** | Patients who are emmetropic for distance may be dissatisfied with the compromise in distance vision associated with nearly all bifocal contact lens designs. They need to be to be told that a little of their distance vision will be stolen to improve their near vision. If need be they could wear a “driving glass” fully correcting distance vision while wearing the bifocal contact lens. |
| **Myopia** | Most low to moderate myopes can wear either a simultaneous or alternating design, depending on their visual needs and lid position. Alternating designs are the best for high myopes. |
| **Hyperopia** | Although hyperopes can wear either simultaneous or alternating vision bifocal designs, aspheric simultaneous designs are recommended. |
| **Presbyopia** | Add needs are important in choosing correction. Patients with a low add and only transient symptoms during near tasks are best managed with reading spectacles over their distance contact lenses. When they need the spectacles more frequently and the hassle becomes unbearable, bifocal contact lenses can be suggested. For the incipient presbyope who is reluctant to wear any form of spectacle correction aspheric soft bifocals would be a good choice. These lenses generally perform well in correcting low presbyopia (low adds +0.75D to +1.00D) and often require little adaptation. For adds ranging from 1.25D to 1.75D, soft multifocals will work, but the patient may need unequal adds or slight over-plussing of one lens for adequate near correction while maintaining satisfactory distance vision. For add needs 2.00D or greater alternating lens designs can be tried. Soft multifocal lenses may need some degree of monovision for success. |
| **Astigmatism** | Most soft bifocals don’t provide satisfactory vision if the patient has an astigmatic error exceeding 0.75D. When corneal astigmatism is present or if the astigmatism is more than 2.00D alternating designs are preferred. Internal astigmatism should do well with either simultaneous or alternating design. Astigmatism correction with soft contact lenses has improved. Ignoring astigmatism and fitting with equivalent sphere correction often creates too much compromise when attempting multifocal correction. |
Matching Patients with the Right Option

With so many options, even just finding a starting point can be overwhelming. On the other hand, evaluating a presbyopic patient for contact lens correction is similar to evaluating single vision correction; however, accurately correcting each eye becomes more significant.

Factors like Refractive error, amount of Presbyopia and Pupil size would determine the type of lens to be used.

Astigmatic patients who want or need soft lenses should anticipate some compromise in vision. Monovision with toric soft lenses can work, but is more likely to fail. A few soft bifocals are available internationally in toric designs with concentric center near designs and a toric back surface, but fitting them is a lengthy process. Some patients will present with significant astigmatism in only one eye. In such cases, try fitting a single vision toric lens on one eye (usually for distance vision) and a multifocal sphere on the other.

The pupil factor. Patients with very small pupils will have difficulty utilizing anything but the central portion of a relatively stationary lens. A lens that centers well over the pupil is advantageous, but may also be limiting. Consider pupil size in determining whether to use a center-near or center-distance design. Patients with exceptionally large pupils are more likely to have night vision problems with multifocal lenses and may be more suited to monovision. Multi-zone lenses are the least pupil dependent. When the pupil size is more than 4.5 mm in mesopic conditions do not attempt bifocal contact lenses.

Pupils are almost always slightly decentered nasally. Most multifocal lens designs are symmetrical, and if they center on the cornea they will not center over the patient's pupil. Observe the red reflex through a retinoscope or direct ophthalmoscope to check for position of the multifocal components relative to the pupil.

General Fitting Guidelines

As stated, good lens centration is critical to success with most soft bifocal contact lenses, especially concentric center near and diffractive designs. Although centration is still desirable, some aspheric designs perform adequately with small decenteration, especially for early presbyopes. The Acuvue bifocal seems to be relatively independent of lens centration. With most simultaneous vision multifocals, minimal movement is desired to provide a stable optical system over the pupil. However, enough lens movement must occur to flush debris from beneath the lens and to prevent limbal binding. As with all soft lenses, it’s necessary to allow the lenses to settle at least 15-20 minutes before assessing visual performance.

With most designs, other than the true alternating bifocals, distance vision and near vision tend to compete such that the better one is, the worse the other becomes. This challenges the fitter to find the balance point appropriate for the patient. Break from the idea that both eyes need full near correction. At least half of the successful soft multifocal fits consist of lenses with unequal adds (the so-called modified bifocal), and in the majority of both rigid and soft lens fits, the degree of add is less than what the spectacle correction called for. Just as with monovision, the less near correction one employs, the less one interferes with the distance vision.

Assessing Vision— The first golden rule is to assess vision binocularly both at far and near, which provides a better and more realistic evaluation than the monocular testing. Monocular acuity assessment does not accurately reflect what patients experience during their habitual binocular state and will often be disappointing. The second golden rule is to measure success as meeting most of the patient's visual needs most of the time. Success is achieved when the patient is able to perform most of his visual tasks comfortably. If the patient is happy, the practitioner should be too. Do not get locked in to the need to achieve 20/20 vision. Many bifocal contact lens wearers are successful with binocular distance acuity 20/25 and binocular near acuity of 20/30.

It should be noted that changes as small as 0.25D in distance lens power can have a profound effect on near vision when working with presbyopic lenses. If near vision is inadequate, add additional plus to the lens on the non-dominant eye or switch designs. In some cases, success can be achieved with a different design on each eye. For example, an aspheric lens on the dominant eye and a concentric center near design on the non-dominant eye may provide the proper balance needed.
to provide adequate vision at distance and at near. Another way to assess near vision is to have the patient move a near target in and out to locate the distance of clearest vision. If this “tromboning” locates a best vision area within the patient’s habitual reading zone, the patient will likely be pleased with his near vision.

**Conclusion**

No given bifocal lens design or brand meets the needs of all presbyopic patients. Emerging presbyopes or those requiring maximum visual performance at distance and at intermediate may do best with aspheric designs. High add patients may do best with over-plussing the distance correction in the non-dominant eye in order to achieve adequate near vision. High add patients with detailed distance demands may do best with a single-vision distance lens on the dominant eye and a bifocal lens on the non-dominant eye. Of course, many patients, particularly those with low or intermediate add strengths, do quite well with straight monovision.

The wealth of options and the development of some of the newer multi-zone multifocals affords the opportunity to provide a higher level of visual correction to presbyopic patients today. The ability to provide clear vision at distance and at near in a more natural binocular state is within the practitioner’s grasp. Nothing about multifocal or bifocal contact lens fitting is difficult as it is really a progression of standard contact lens practice.

**References**

15. IACLE Contact lens teaching Module 8: Unit 8.3