# **Case Report: Reasons Why I Chose to Have PRESBYOND** Laser Blended Vision

DAN Z. REINSTEIN, MD MA (CANTAB) FRCSC DABO FRCOPHTH FEBO

Presbyopia correction has been one of my main areas of interest, but it has become increasingly relevant to me, as presbyopia has finally taken hold at age 53. Having always had perfect 20/10 vision, I was lucky that I slowly became myopic through my 40s, to about -1.00 D. This meant that I was only wearing glasses for driving at night.

A Kenyan safari holiday led me to decide that I wanted my distance vision corrected, as I ended up wearing my myopic spectacles underneath my sunglasses the whole trip. After performing more than 25,000 procedures on others, I realized the time had come to "drink my own Kool-Aid" and have surgery. But out of all of the treatment options available for presbyopia, what would I choose for myself?

Considering this decision as a prospective patient, I set some boundaries. I wanted a procedure that could achieve good binocular vision at far, intermediate, and near and also maintain optical quality, contrast sensitivity, night vision, and stereoacuity. The procedure should be adjustable and repairable if complications were to arise postoperatively. But as a 53-year-old with excellent ocular health and (hopefully) a long life ahead of me, my first priority was safety both currently and in the long-term.

#### **Trends in multifocal approaches**

Over the last 15 years as each iteration has been commercially released, there has been a clear progression in reducing the amount of aberrations in multifocal IOLs as well as reducing aberrations in corneal multifocal treatments. This has been done each time in an effort to reduce the incidence of poor patient satisfaction in those who are unable to achieve neuraladaptation or neural-resignation, reduce side effects, reduce the decrease in quality of vision, and, particularly for corneal multifocality, to increase the level of safety. Some newer

releases of multifocal diffractive IOL and corneal modalities have had their multifocality compressed near the primary focal plane and have been rebranded as extended depth-of-field treatments. However, reducing multifocality to a level where safety becomes reasonable has meant that the multifocality then provides insufficient near vision. Therefore, these reduced multifocality modes are combined with a small degree of monovision in order to provide adequate near vision.

Trifocal lenses have also improved the landscape of multifocal IOLs, with some ingenious designs decreasing the light transmission loss to the same level as a bifocal diffractive IOL and providing an additional focal point for intermediate distances.

In summary, current multifocal technologies aim to reduce multifocality to a level more akin to extended depth-of-field and combine this with micro-monovision to achieve the full range of vision. If this all sounds familiar, that is because it is. This is exactly the same endpoint that we are observing from monovision advocates.

### **Trends in Monovision**

Many patients, including myself, cannot tolerate the anisometropia required of standard monovision. The trend in monovision has been to reduce the anisometropia in an attempt to improve tolerance and resolve well known issues such as stereo-acuity loss; however, this comes at the expense of some near vision loss. The solution that is implemented both in corneal laser and IOL monovision is to increase near vision by controlled induction of spherical aberration to extend depth of field. This method takes advantage of the natural ability for our brains to filter spherical aberration and render a retinal image degraded by the spherical aberration into a sharp, unaberrated image in our minds.

This was the approach that I took when developing PRESBYOND. It is based on my early wavefront-guided therapeutic treatments for highly aberrated post-LASIK eyes that provided evidence for a "tolerable" level of spherical aberration below which quality of vision is unaffected. This approach has

also been employed in new IOL designs by Graham Barrett and by Calhoun Vision, maker of the Light Adjustable Lens.

Therefore, it seems to me that both monovision and multifocal approaches are converging on the same solution of extended depth-of-field combined with micro-monovision.

## My Choice

In my mind, the benefits in terms of range of vision were similar between modern trifocal IOLs and extended depth-of-field micro-monovision with IOLs and with LASIK. Therefore, at 53 years old, with a clear and health lens, my decision came down to the comparison of risks.

The commonly stated risk that cataract surgery can result in serious or permanent visual loss in approximately 1 in 1,000 patients does not stand up to the risk of corneal laser refractive surgery, where 1 in 1,000 patients will lose 2 lines CDVA. I also considered the long-term risk of having an artificial lens inside my eyes for as long as another 40 to 50 years; for example, there are increasing concerns about late IOL dislocation due to the highly active lives that young presbyopes lead compared to the classical cataract population. The potential for an IOL exchange due to intolerance of a multifocal IOL was a serious consideration as well, especially as multifocals have a higher rate of posterior capsular opacification requiring YAG capsulotomy. In comparison, long-term concerns of LASIK for the correction of low myopia are refractive stability and development of visually significant cataract. Refractive shifts have no safety implications and can be easily adjusted with a low risk corneal retreatment. Cataract development simply means undergoing cataract surgery, but I would prefer to take the 70% chance of not needing it rather than opting for clear lens exchange. If a

cataract was to develop, the existing depth of field can be combined with a high-quality monofocal IOL and micro-monovision to retain the full range of vision. For these reasons, I chose to undergo PRESBYOND.

#### **My Outcome**

Choosing a surgeon was easy: I not only trained Glenn Carp, I have had the honor of working alongside him for 10 years. Together, we have published our comparative outcomes demonstrating absolute equality. Also, it was his turn to return the favor, as he had trusted me with his eyes 8 years ago.

After surgery, I have excellent binocular 20/10 vision at distance, J3 intermediate, and J1 at near. I have 40 seconds of near uncorrected stereo vision, which reverses to full binocularity and 20 seconds of stereoacuity in the slit-lamp and operating room microscope. As a result, my effectiveness as a corneal refractive surgeon has not been compromised in any way, and my ability on the tennis court remains... what it was! Personally, I do not understand why anybody in their 50s would choose to have their natural high-transmission and still accommodating lens replaced given that it is possible to achieve an outcome like mine by corneal surgery alone.

Dr. Reinstein practices at the London Vision Clinic, London, and is affiliated with the Department of Ophthalmology, Columbia University Medical College, New York, and the Centre Hospitalier National d'Ophtalmologie, Paris, and the Biomedical Sciences Research Institute, Ulster University, UK. Dr. Reinstein is a consultant to Carl Zeiss Meditec and has financial interest in ArcScan Inc. He can be contacted at dzr@londonvisionclinic.com.

