



PROVIDING FULL RANGE OF VISION WITH A TRIFOCAL IOL

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The digital era has resulted in patients being ever more dependent on their intermediate vision, and cataract patients

implanted with monofocal intraocular lenses (IOLs) frequently rely on glasses after surgery. With increased digital access to medical information, the general population is often well-informed of their health and treatment options before they sit in our exam chair. Our health care system also requires out-of-pocket payment for anything beyond basic care, prompting patients to be more discerning. Therefore, cataract patients have higher expectations and are no longer satisfied with solely good distance vision.

To meet our patients' expectations, we must listen to their needs, and provide resources and education on the available options. It is crucial that patients understand we have the technology and capability to provide them with good vision at multiple working distances, although

no IOLs exist that may give them back their 20-year-old sight.

MANAGING THE EXPECTATION OF SPECTACLE INDEPENDENCE

Increasingly, my patients want complete spectacle independence. In order to fit their lifestyle, they want the entire range of vision from distance to intermediate to near. My patients want dynamic vision with the ability to quickly transition from watching television to looking at their phone/tablets, take a road trip, or hit a few golf balls, without the inconvenience of pausing to put on glasses.

With premium IOLs and advanced clinical treatment, we aim to meet this demand; however, it is not without compromise. Standard cataract surgery with monofocal IOLs (and astigmatism correction as needed) can provide good distance vision to the patient but limited functional near vision. Multifocal IOLs available in the United States today utilize diffractive designs that split light into two focal points to provide good distance and near vision (dependent on add powers).

Existing extended depth of focus (EDOF) lenses also split light into multiple foci, elongating the range of vision from distance to intermediate. Currently, there is no IOL available in the US that provides good vision for the entire range from near to distance and patients must choose between good distance and near vision or good distance and intermediate vision.

We can mix and match multifocal IOLs to somewhat overcome this compromise by using a low-add multifocal IOL or an EDOF lens in the dominant eye and a higher add multifocal IOL in the nondominant eye to achieve "binocular pseudo-trifocality." Chair time is increased preoperatively as we customize the IOL planning for the individual patient and educate them on this approach. Postoperatively, chair time may also increase as we counsel patients and encourage patience through the adjustment period of their new vision.

FULL VISUAL RANGE IN AN IOL?

The ideal scenario is to provide our patients an option for clear functional vision at all distances in both eyes with



minimal or no reliance on spectacles. Various trifocal IOL designs exist that provide full range of vision; however, these are not currently available in the United States. One of the major differences amongst trifocal IOLs is the design of the intermediate focal point. First-generation trifocal IOLs provide an intermediate focal point at 80 cm (31 inches) while the next generation AcrySof IQ PanOptix Trifocal IOL (Alcon) is designed to provide good intermediate vision at 60 cm (24 inches). Most intermediate vision activities are done at a relaxed arm's length, which is about 60 cm for an average height person.¹⁻⁴

The AcrySof IQ PanOptix Trifocal IOL is available in many other countries (CE mark received in 2015) and studies of the trifocal IOL show a continuous range of vision from infinity to near. In a study by Kohnen et al,⁵ the PanOptix IOL consistently provided a visual acuity of 20/20 or better under uncorrected and distance corrected conditions at distance, intermediate (60 cm), and near (Table) with 96% of patients reporting complete spectacle independence.

Defocus curve assessments enable us in a very effective way to assess the visual performance of any IOL that is designed to manage presbyopia. A series of positive and negative powered lenses are placed in front of the patient to simulate

		LogMAR	Snellen
Uncorrected Visual Acuity	At distance	0.00 ± 0.094	20/20
	At intermediate (80 cm or 31 inch)	0.09 ± 0.107	20/25
	At intermediate (60 cm or 24 inch)	0.00 ± 0.111	20/20
	At near (40cm or 16 inch)	0.01 ± 0.087	20/20
Distance Corrected Visual Acuity	At distance	-0.07 ± 0.076	20/16-
	At intermediate (80 cm or 31 inch)	0.10 ± 0.126	20/25
	At intermediate (60 cm or 24 inch)	0.01 ± 0.124	20/20
	At near (40cm or 16 inch)	0.03 ± 0.113	20/20-

different distances. At each simulated distance, the visual acuity of the patient is measured. For example, a -2.50 D lens placed into a trial frame simulates how the patient will see at 40 cm or 15.7 inches. This assessment showed a visual acuity of 20/25 or better from near (40 cm or 16 inches, -2.50 D of defocus) to infinity in patients implanted with a PanOptix trifocal IOL (Figure).⁶

FUTURE OPTIONS FOR PATIENTS

It is an exciting time in refractive cataract care. Lifestyles are evolving, visual demands are changing, and technology is adapting to meet those demands. While we may feel a natural hesitation towards change, leaning into it will bring the greatest rewards. I look forward to the

future and the visual capability I will be able to offer my patients. ■

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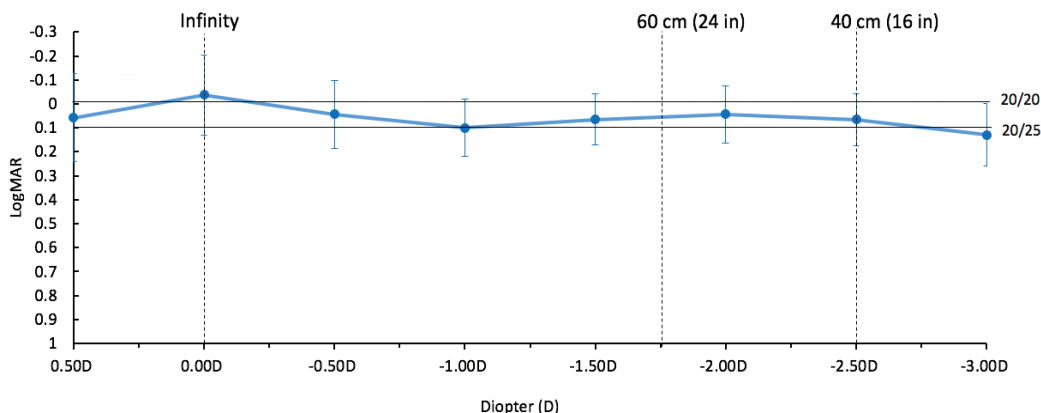


Figure. Binocular distance-corrected defocus curve at the 6-month follow up visit with 134 eyes implanted with a PanOptix IOL.⁶

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