

# Objective Outcomes with Non-Diffractive Extended Depth of Focus Intraocular Lenses: Initial results of a Personal Case Series



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For many years, in our surgical practice in Nova Gorica, Slovenia, we have been comfortable offering multifocal IOLs to a large number of our patients. Recently, however, we have seen an increase in patients with complaints of loss in visual acuity/quality, which we believe is due to ocular surface disease in combination with diffractive multifocal IOLs. As a result, we have been looking for an alternative to add to our IOL portfolio and started to gain experience with some of the new non-diffractive, extended depth of focus (EDOF) IOLs.

These new IOLs, with the potential use of micro-monovision, are proving to be more forgiving and offer high levels of patient satisfaction. We believe it is also important for this category of IOL to maintain visual acuity when transitioning from photopic to mesopic conditions. In our initial experience, we have found that these non-diffractive EDOF IOLs enable patients to perform daily tasks like reading with a good degree of spectacle independence.

## Comparative Evaluation

To better understand the IOLs in the new non-diffractive EDOF category, we conducted a prospective, comparative evaluation. The goal was to determine which lens objectively provides our patients with the greatest range of focus in both photopic (85 Lux) and mesopic (20 Lux) lighting conditions. To create a baseline for comparison, all patients were distance corrected and their visual acuity was measured in decimal, using ETDRS visual charts.

Our evaluation included four of these new IOLs, along with a standard monofocal as a control lens: RayOne EMV (Rayner Intraocular Lenses Limited, Worthing, UK), the ISOPURE 123 (BVI Medical, Liege, Belgium), TECNIS Eyhance (Johnson & Johnson Vision, Santa Ana, CA) and the LuxSmart (Bausch+Lomb, Bridgewater, NJ) with the TECNIS monofocal IOL (Johnson & Johnson Vision, Santa Ana, CA) as the control IOL.

As expected, average distance corrected visual acuity (DCVA) of 1.0 decimal was achieved by

all the IOLs, the exception being the LuxSmart which achieved an average of 0.8 decimal. RayOne EMV provided patients with the greatest range of focus, as it achieved the highest visual acuity across distance-corrected intermediate visual acuity (DCIVA) and distance-corrected near visual acuity (DCNVA) in both photopic and mesopic conditions (Figure 1.1 and 1.2). The greatest differential among the non-diffractive EDOF IOLs was between RayOne EMV and LuxSmart, with the advantage for RayOne EMV in DCIVA and DCNVA in mesopic conditions being statistically significant ( $p=0.0037$  and  $p=0.0024$  respectively).

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## Cost and Coverage Considerations

The added costs of presbyopia correcting IOLs can pose a hurdle to patients, depending on available health insurance options. The public system in Slovenia does not allow for co-payment towards premium IOLs, only covering standard monofocal procedures. Even if we can demonstrate robust outcomes that reduce costs over time, such as increased spectacle independence, public healthcare systems are still too rigid and do not foresee an opportunity to drive change. Private insurance, therefore, remains necessary for premium IOL options.

## IOL Choice Based on Desired Visual Outcomes

We recommend specific types of IOLs for patients based on their expectations after cataract surgery. For instance, an individual may have a hobby or apply makeup daily that makes seamless near to intermediate vision a desirable goal. On the other hand, individuals with a job or daily activities that require excellent distance vision may prefer a monofocal EDOF IOL. Certain jobs may also be unsuitable for the choice of a diffractive multifocal IOL. In Slovenia, for

## KEY TAKEAWAYS

1 In a comparison of four non-diffractive EDOF IOLs, RayOne EMV provided patients with the greatest range of focus.

2 RayOne EMV achieved the highest visual acuity across DCIVA and DCNVA in both photopic and mesopic conditions.

instance, professional pilots are prohibited from receiving diffractive multifocal IOL implants due to halo and starburst phenomena that are common with these options. Meanwhile, new technology to analyse the cornea allows us to better select patients who are most likely to benefit from a multifocal IOL.

Our results from this evaluation help to confirm the benefits of adding a non-diffractive EDOF IOL to our lens portfolio. We anticipate that

more of our patients will choose non-diffractive EDOF lenses as they provide a good range of functional vision at a more affordable procedure rate, whilst also reducing concerns of dysphotopsia associated with premium IOLs with diffractive optics. Our goal was to determine which non-diffractive EDOF lens objectively provides the greatest range of focus and for this to be added to our lens portfolio. Based on our analysis and encouraging results we will be consistently recommending the RayOne EMV.

Figure 1.1 DCIVA (80cm) in Photopic and Mesopic Conditions

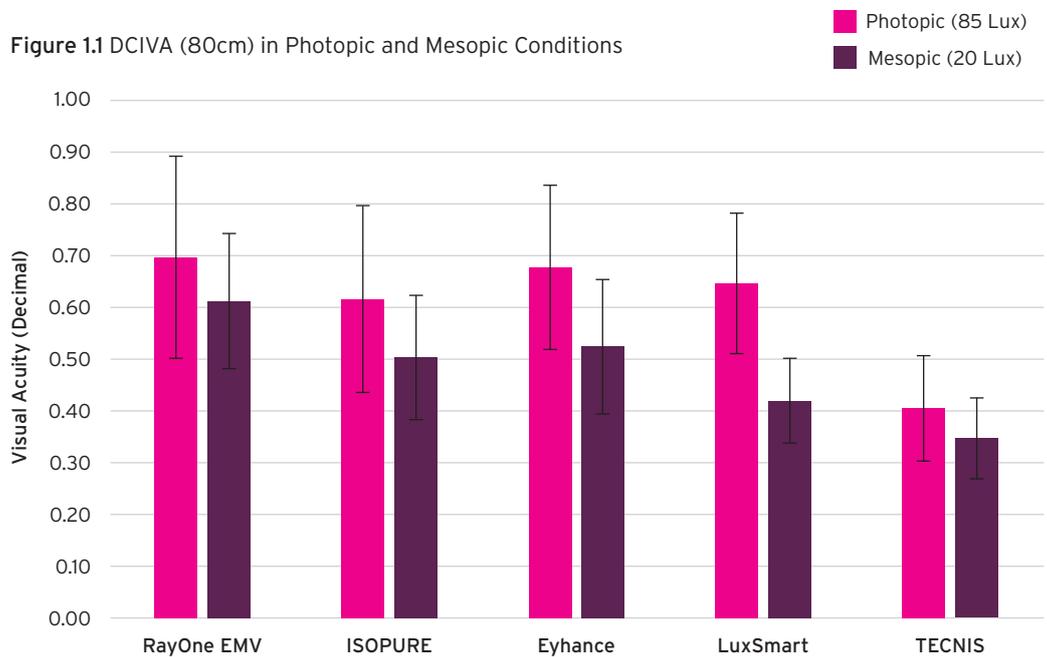


Figure 1.2 DCNVA (40cm) in Photopic & Mesopic Condition

