

Promising Outcomes with a New Strategy for Extended Depth of Focus Monovision



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Recent advances in intraocular lenses (IOLs) that expand monovision options are now available. While some patients may still prefer a diffractive multifocal lens, these new monovision IOLs may provide a high level of surgeon comfort and patient satisfaction that is not always possible with premium diffractive multifocal IOLs. For instance, a period of neuroadaptation is often needed with diffractive multifocal lenses, resulting in a period of up to six months before individuals realise the full visual outcomes potential with these IOLs.^{1,2} This process is driven by higher-level brain function that is independent of optical factors,³ making proper patient selection and counselling critical with these IOLs.⁴

New Extended Depth of Focus (EDOF) IOL Options

Interest in monovision has increased as premium multifocal options continue to pose challenges in terms of higher price and the lack of immediate improvements in visual outcomes. Moreover, my personal enthusiasm for monovision has been supported in recent years with the introduction of multiple enhanced monofocal IOL options that exhibit extended depth of focus (EDOF). These products may offer advantages over standard monofocal IOLs, especially as they expand intermediate vision outcomes.⁵ I have been implanting Rayner's RayOne EMV enhanced monofocal IOL for about a year now and have seen unique properties that have the potential to result in consistently good outcomes for many of my patients at a more affordable price than many premium multifocal IOLs. The IOL comes preloaded inside a proprietary injector⁶ that ensures greater surgeon comfort, even for new refractive surgeons without substantial previous experience with this product. In addition, the IOL has an overall 12.5 mm diameter with closed loop haptics. This allows stable, predictable centration in the capsular bag and I have found that it behaves in the eye just like any other monofocal lens. As a result, even on the first postoperative day, most patients have uncorrected distance visual acuity of 20/20 and no symptoms of positive dysphotopsia.

Monovision Strategies to Enhance Range of Focus

A mini-monovision strategy to extend a patient's range of focus is still a popular technique, even today. With this technique, the range of focus can be extended by approximately 2.25 diopters (D), meaning that most patients will be able to perform daily tasks at an intermediate vision range, such as browsing a magazine or reading a computer screen, without the need for spectacle correction. In my experience, Jaeger 4 to Jaeger 3 print reading ability is achieved without spectacles, which represents another reason for high patient satisfaction.

When targeting emmetropia, RayOne EMV provides an average of 1.25 D of extended range of vision that is achieved by a unique central zone in the lens optic that induces controlled positive spherical aberration,⁶ resulting in a smoother transition between intermediate and distance vision. This result is achieved without resorting to diffractive or distinct zonal refractive elements in the IOL, which can result in dysphotopsia.⁷ I have not attempted going beyond -0.75 D of myopic target in the non-dominant eye and been able to consistently achieve a comfortable Jaeger 3 print reading capacity in my patients.

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The Importance of Proper Patient Selection

When considering modest monovision strategies with EDOF IOLs, patient selection and adequate counseling to assess and manage patient expectations is very important. With any monofocal IOL, the postoperative near vision achieved in patients with a moderate or high degree of myopia may not match the

KEY TAKEAWAYS

- 1 RayOne EMV ensures greater surgeon comfort, even for new refractive surgeons without previous experience with the lens.
- 2 RayOne EMV allows stable, predictable centration in the capsular bag.
- 3 On the first postoperative day, most patients have uncorrected distance visual acuity of 20/20.

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preoperative uncorrected near vision, and this tradeoff between distance and near vision should be explained when the patient is presented with IOL options. Modest monovision goals with EDOF lenses are promising in patients who for a variety of reasons are not good candidates for diffractive trifocal IOLs. This is especially true for those who require quality distance vision due to their profession, such as professional drivers. Those who have hobbies or professions in the arts and other fields such as gardening may also prefer this option, as might anyone whose work or leisure activities require the visual perception of crisp colour. These patients would not be satisfied with a trifocal lens due to the loss of contrast and the potential for dysphotopsias. Also, neuroadaptation to trifocal optics takes longer in elderly patients, possibly due to the underlying neurologic functions that need to be recruited during this process.³ Patients with conditions such as dry eye, corneal scarring, or cognitive deficits are also not good candidates for diffractive trifocal IOLs. Meanwhile, non-diffractive EDOF IOLs with a strategy to target mini or modest monovision are good additions to our portfolio and should be considered in patients who value sharp contrast and colour vision, those who do not have prolonged reading habits, and elderly patients with significant cataracts.

In summary, my experience suggests that there are three main patient populations who are likely to benefit from new non-diffractive EDOF IOLs, especially RayOne EMV. These include farsighted individuals experiencing age-related presbyopia, patients of advanced age with advanced cataracts, and patients for whom diffractive multifocal IOLs are not appropriate due to the need for excellent far vision outcomes. These individuals are likely to be very happy with the resulting outcomes and spectacle independence in the range of 1.5-2.0 D, which is adequate for most daily activities.

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