

# 10 years' experience of comparing presbyopia-correcting IOLs

Dr de Lange describes his experience with presbyopia-correcting IOLs

**By Lisa Stewart;**

*Reviewed by Dr Johan de Lange*

**D**r Johan de Lange of Ocumed, Vanderbijlpark, South Africa, has more than 30 years of experience with presbyopia-correcting IOLs. The first multifocal IOL (MIOL) he encountered was the 3M MIOL, in the late 1980s, but the technology was in its infancy then and the side effects significant, so the experiment was short-lived. His interest continued over the years as new MIOLs became available and, since 2008, Dr Johan has himself implanted 478 lenses of 10 different types, carefully monitoring and comparing the outcomes with different products.

Dr de Lange explained, "I have always been an early adopter whenever possible. I did the first implantable contact lens surgery in South Africa and also brought the first femtosecond laser into South Africa, in 2007. I am always on the lookout for products and opportunities to improve as an ophthalmologist. Sometimes I am fortunate enough

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— Dr de Lange

to be the first in my country to use new products. If companies ask me to try a new product I am always keen to do so."

## Multifocal IOLs

After hearing the same story from each and every MIOL rep—"this MIOL has new technology and will outperform its predecessors"—Dr de Lange decided to test the different MIOLs himself. He says that, of course, everybody wants to have the vision of a 20 year old, so he endeavours to provide spectacle independence for his patients.

"This journey to provide spectacle

independence has taught me many things about MIOLs, patients, the ophthalmic trade and human behaviour in general", he said. "Patient selection is the name of the game. Women are better candidates than men: in our series of 478 MIOLs we had to remove 5% of male MIOLs and only 1% of female MIOLs. Certain personality types, such as perfectionists, and activity patterns, such as night driving, are not compatible with the side effects of MIOLs."

**Although the optics of all the different MIOLs available are not identical, they have a number of characteristics in common:**

1. Light is redistributed to facilitate vision at different distances. That means the light is divided, which causes side effects
2. The optical nature of the designs means that all images created by MIOLs are permanently available. Some images are in focus and some out of focus. The out-of-focus images cause the side effects
3. All MIOLs cause reduction of vision in poor [mesopic, scotopic] light
4. All MIOLs cause reduction in contrast.

Dr de Lange says: "The bottom line is that you must make the patient's vision significantly better than before. That is why hyperopes are the best candidates, because preoperatively they were totally dependent on spectacles. MIOLs make their uncorrected visual acuity (UCVA) better in all departments and over all distances." Referring to eyes only, it is well accepted that myopes between -1.00 and -3.00 are the worst

## IN SHORT

► Results with the new RayOne trifocal IOL are similar to those obtained in 10 years of experience with other presbyopia-correcting multifocal IOLs.

candidates because they are used to crisp near vision without correction. MIOLs cannot provide near visual acuity of equal quality.

Dr de Lange's policy is to implant MIOLs bilaterally: unilateral implantation is not promoted or advised. It is his opinion that neural adaptation occurs quicker and better after the second eye has been implanted with a MIOL.

He aims to implant 50 eyes with each type of MIOL in order to compare the different lenses in a statistically meaningful way.

### The RayOne trifocal IOL

The most recent addition to his arsenal is the RayOne trifocal, which he was the first ophthalmologist in South Africa to use, in March 2017. Dr Johan's practice has implanted 16 RayOne trifocal lenses in 8 patients (6 women, 2 men; mean age 63 years) since performing the first operation in February 2018.

He describes the results achieved as very good, although the series is not complete and nor is follow-up: time since the implant currently ranges between a few days and 9 months. So far, however, the lens appears to compare favourably with the best among the 10 other MIOLs used in his practice during the past 10 years.

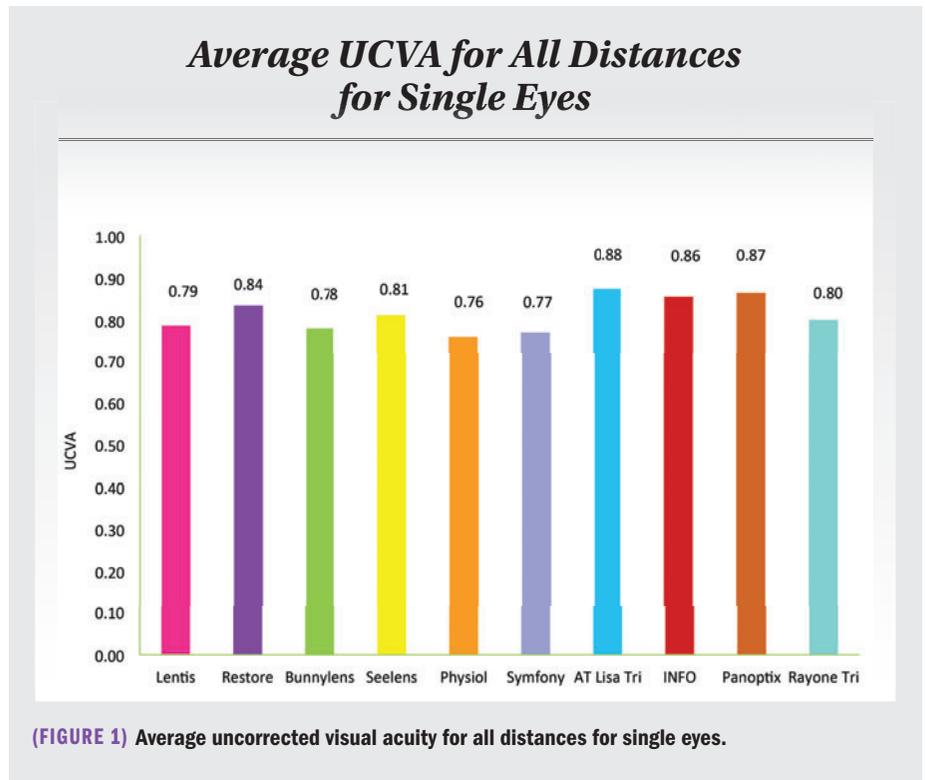
It is important to note that all eyes that have received the RayOne trifocal IOL lens had cataracts preoperatively. All eyes were tested comprehensively to exclude other pathology.

Thus, postoperative UCVA in all eyes was expected to be 6/6 [Decimal 1.0] for all distances: any UCVA of less than 1.0 was regarded as less than perfect. Of course, perfection is not always achieved, for many reasons including imperfect biometry, imperfect surgery, astigmatism post-op, a not-totally-clear posterior capsule, cystoid macular oedema or any other unexpected complications.

### Results

The mean uncorrected distance visual acuity (UDVA) of single eyes was 1.02 after 1 month, improving

The mean UCVA of individual eyes is always a little worse than the mean UCVA with both eyes (OU). In other words, OU vision incorporates



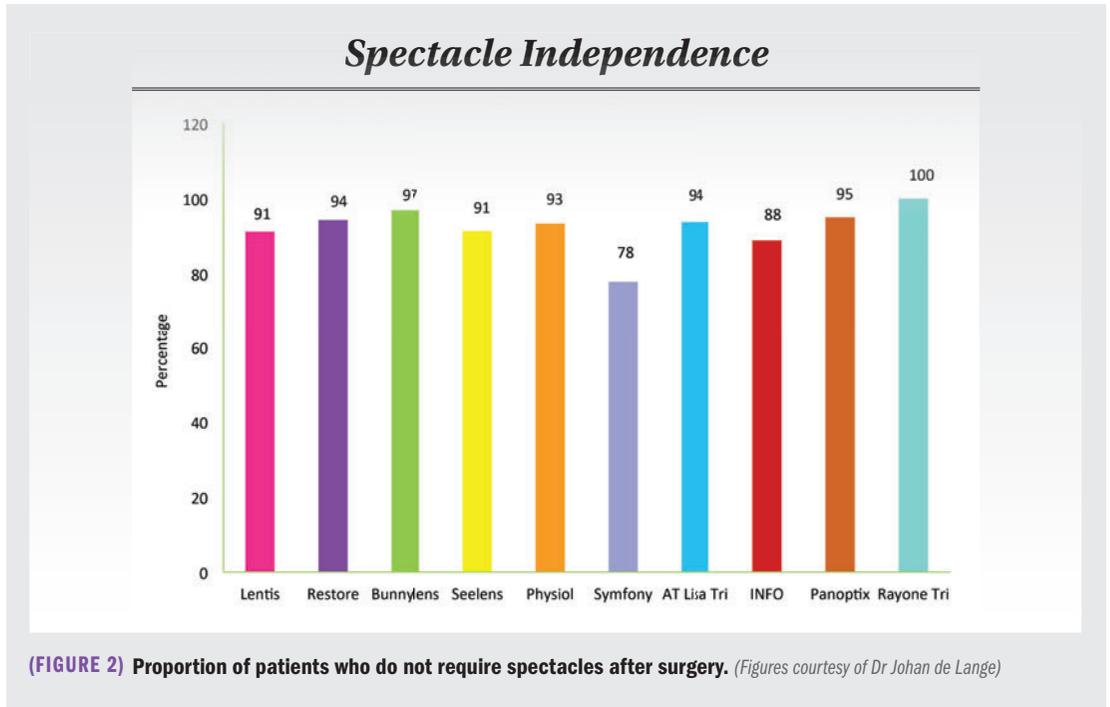
(FIGURE 1) Average uncorrected visual acuity for all distances for single eyes.

to 1.15 after 6 months. Mean uncorrected intermediate visual acuity for single eyes was 1.05 at 3 months, which is excellent, and 0.9 at 6 months. These figures are very good, comparing well with other MIOLs (Figure 1), but full statistical analyses have not yet been performed because of the small number of cases.

Mean monocular uncorrected near visual acuity, however, has never improved beyond 0.73; at 6 months it is 0.55. This is acceptable but not the best in the series of 10 different MIOLs. "Although patients were extremely happy," Dr de Lange explained, "it was obvious that the near visual acuity was not perfect. It was comparable with that achieved with other MIOLs but not better."

the advantage of one better eye compensating for the other, worse eye. Of course, patients function with both eyes open, so this is a more accurate measure of visual acuity, and UCVA measured OU may include mini-monovision, which is very often a great advantage to the patient.

"There have been absolutely no complications regarding efficacy, safety and predictability," Dr de Lange says. "The RayOne centres beautifully and UCVA's measured for all distances are excellent." The frequencies of annoying side effects, such as starburst, glare, haloes, reduced contrast sensitivity and reduced visual acuity in mesopic and scotopic light, were similar to or better than those seen with other



trifocal IOLs. However, the RayOne MIOL has two unique qualities: one is positive, a very short adaptation period – anecdotally, taking less than

**‘There have been absolutely no complications regarding efficacy, safety and predictability.’ – Dr de Lange**

a week – and the other is neutral: the post-operative auto-refractor values coincide with the near-refraction of the eyes. In practical terms this means that an eye with a 6/6 [1.0] UDVA gave a –2.25 D auto-refraction reading. In order to determine the true distance refraction, a subjective refraction had to be performed.

This has no clinical significance for the patient, because UCVA was extremely good at intermediate and far, and adequate at near. Patients were generally very satisfied with the lens. At follow up, from 1 month post-op, 100% of patients agreed that if they had known before surgery what they know now, they would have the operation again. Asked to

score their satisfaction with the lens out of 10, the average value was 8.89.

### Conclusion

In conclusion, Dr de Lange says, “As with most other MIOLs, we are impressed with the visual outcomes of the RayOne Trifocal IOL. The aim is to implant 50 RayOne Trifocals before moving on to the next lens. The RayOne trifocal delivers similar results to other MIOLs, with few side effects and high patient satisfaction.”

He meets his stated aim of spectacle independence in most cases (Figure 2).

### Regarding his studies comparing MIOLs:

1. The best near UCVA was attained with the Restor with a +4 reading add [discontinued product]
2. The AMO Symphony gave excellent intermediate UCVA but not good near UCVA
3. Glistening was seen in 4% of Lentis Mplus MIOLs
4. 13/14 explanted MIOLs were actually bifocal MIOLs

### 5. Poor patient selection was responsible for explantation of 5/14 MIOLs (three patients).

“In my view,” he concludes, “MIOLs are only a transition from monofocal IOLs to the next level of presbyopia-correcting IOLs. MIOLs are optically very sophisticated and advanced, but the side effects coupled with the cost prevent ophthalmologists from using them routinely, particularly in less-affluent countries.”

“What will the next level be? Perhaps a foldable small-incision accommodative IOL? Or a chemical means of preventing cataracts, such as eyedrops or vitamins? Who knows?”

#### DR JOHAN DE LANGE

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Dr de Lange is in private ophthalmological practice in Ocumed, Vanderbijlpark, South Africa and is the CEO and Director of Ocumed Eye & Laser Institute in Vanderbijlpark. He has received consultant fees from Surgical & Ophthalmic Supplies (Pty) Ltd in South Africa as well as from these other MIOL distributors in South Africa: Provision (Lentis IOL), Epic Vision (Hanita IOL), Swiss Advanced Vision (Info IOL), Eye Pharma (Physiol Fine Vision), SOS (Rayner Trifocal).