

# Blended vision with LASIK shows promise for presbyopic correction in hyperopic astigmatism

**Dermot McGrath  
in Rome**

USING LASIK to induce a small degree of monovision and helpful negative spherical aberration is a safe and effective means of providing simultaneous distance and near vision for patients with hyperopic astigmatism, according to Dan Z Reinstein MD FRCS, St Thomas' Hospital, London, UK.

"We found that the concept of 'blended vision' proposed by CK users, also applies to LASIK. By inducing about  $-1.25$  D of monovision in the non-dominant eye, we obtained very impressive binocular distance and near outcomes with very high rates of patient satisfaction," said Dr Reinstein.

Explaining the concept of 'blended vision', Dr Reinstein said he employed the term deliberately because, in his view, the process is not the same as classic monovision.

"The acceptance of classical contact lens monovision is 60% at best, while LASIK blended vision appears to be accepted by over 95% of patients we test preoperatively," he said.

"When a patient tells me that they have failed to adapt to monovision with their contact lenses, I explain to them that the effect of correcting their hyperopia with LASIK is easier to adapt to and that the result is in fact better than the effect of correcting presbyopia with monovision contact lenses. This is because of the increased depth of field induced by the hyperopic laser treatment as a function of the increased negative spherical aberration (OSA nomenclature).

"With hyperopic LASIK inducing  $-1.25$  D of myopia in the non-

dominant eye, we observe patients seeing better at distance than we would expect from a nascent  $-1.25$  D refraction and better at near than we would expect from a  $+1.25$  add alone. Likewise the dominant eye corrected to plano by hyperopic ablation has far better near vision than a plano eye would yield in a presbyopic patient. This is not monovision or two distinct focal planes for each eye – this is two eyes, each with increased depth of focus that are blending."

## Prospective study

Dr Reinstein presented data from a prospective study of 40 consecutive hyperopic patients with a mean age of 55 years (range 40 to 69 years), who were treated for a mean spherical equivalent of  $+2.68$  ( $\pm 1.23$  D). The dominant eye was targeted at plano for distance while the non-dominant eye was targeted at  $-1.25$  D.

All treatments were carried out using the Carl Zeiss Meditec MEL 80 laser system incorporating the CRS-Master for ablation profile design (Carl Zeiss Meditec AG, Jena, Germany). After an average follow-up of four months, distance visual acuity was 20/25 or better in 100% and 20/20 or better in 85%. With binocular testing distance vision was 20/25 or better in 100% and 20/20 or better in 93%.

Near binocular uncorrected vision was 75%, 85%, 95% 98% respectively reading N5, N6, N8 and N10. In terms of safety, no eyes lost two or more lines, 8% lost one and 28% gained one line of best spectacle corrected visual acuity.

"Of the eyes that lost one line, four eyes had started at 20/16 and two eyes unfortunately went to 20/25. But those were actually the high hyperopic eyes (above  $+3.25$ ), so it is perhaps not that surprising,"



**Dan Z Reinstein**

he said. All eyes that lost a line are the reading eye so this does not impact on the distance vision.

## High patient satisfaction

Nevertheless, he reported that 97.5% (39/40) of patients said they were 'very' or 'highly' satisfied with their outcomes after surgery. One patient (1/40 or 2.5%) requested bringing up his near eye to distance vision as he was a high-speed car racing enthusiast and felt this would be safer for judging distances. After enhancement, he was still able to see N10, thanks to the increased negative spherical aberration afforded by the hyperopic ablation.

Dr. Reinstein also said that one of the more gratifying aspects of the treatment had been the fact that patients noted a qualitative as well as quantitative improvement in their vision.

"One of the things that I have been rather surprised about in performing hyperopic corrections up to  $+6.0$  D with the MEL 80 laser is that despite the high corrections and the relatively large pupil sizes in some of these patients, we are not getting the subjective complaints of

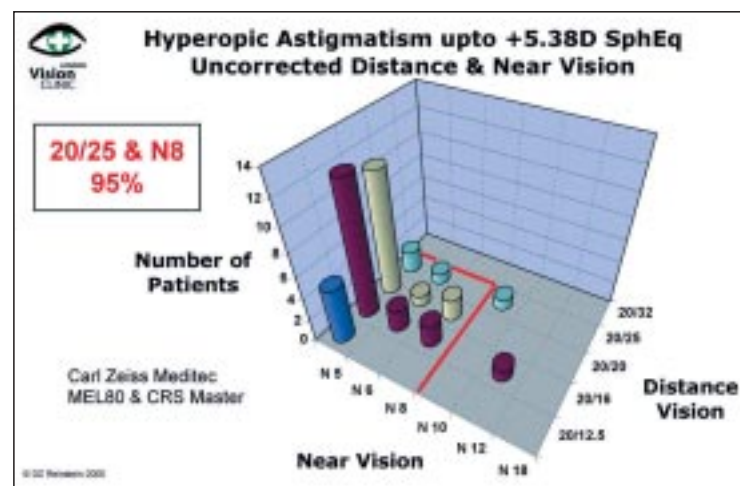
night vision disturbances that might have been expected. However, we do need more data and a reliable means of objectively measuring postoperative quality of vision to fully evaluate this," he said.

Referring to the predictability of the treatment, Dr Reinstein said that the nomogram had been deliberately set for a slight under-correction,

"In my opinion, this is actually a good thing, because no eyes ended up corrected over  $-0.5$  D. This is important for patient satisfaction because leaving people  $-1.0$  D for three to six months after refractive

"The enhancement rate is about 23% which was what we expected for these relatively high hyperopic treatments. At our clinic we tell our patients that there is a one-in-five chance that we will need to make a further adjustment, which they accept willingly in exchange for not having to wear distance glasses for several months after the procedure," he said.

"This induction of negative spherical aberration in hyperopic LASIK provides an excellent alternative to multifocal IOLs and other intraocular procedures. It provides very good function, and



Courtesy of Dan Z Reinstein MD

surgery is frustrating for them even if they do finally end up on plano," he said.

## Enhancements often necessary

Dr Reinstein said that a high enhancement rate was part-and-parcel of this particular procedure and by giving clear explanation to patients in advance, posed no particular problems for the majority of patients.

does not involve the risks of bilateral intraocular surgery. In my opinion it serves as the safest alternative for helping hyperopic astigmatic presbyopic patients achieve maximum independence from glasses," he added.

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