Multifocal ablation patterns in myopic patients create more prolate corneas and result in satisfied patients

Nadja Geipert in Lisbon

MULTIFOCAL LASIK ablation can produce good distance vision, relative independence from glasses, and improved contrast sensitivity in myopic patients, a small Belgian study finds.

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"I came to these ablation patterns by accidentally overcorrecting myopic patients, retreating the overcorrection and then discovering good distance visual acuity in these patients with astonishing reading abilities," said Jerome Vryghem MD, Brussels, Belgium, who presented his findings at the annual ESCRS meeting in Lisbon.

In a prospective study, Dr Vryghem treated 30 eyes of 15 myopic patients ranging in age from 46 to 57 years. The patients wanted relative independence of reading glasses, could not cope with monovision, and had enough corneal tissue to allow for safe treatment. The average pre-operative spherical equivalent was -3.56 D, ranging from -2.0 to -8.0 D.

Using the WaveLight Allegretto Wave Eye Q-400 excimer laser (WaveLight Laser Technologie AG, Erlangen, Germany), Dr Vryghem overcorrected the shortsightedness by +1.5 D, followed by a subsequent treatment of the overcorrection. Both ablation profiles were centred on the pupil and made with an optical zone of 6.5 mm. The resulting ablation profile is steeper in its periphery and more prolate than the original wavefront-optimised treatment profile, already provided by the WaveLight laser, Dr Vryghem explained.

Good distance vision

Six months after the procedure, 92% of the patients had 20/20 or better vision without glasses and 96% were within 0.5 D of emmetropia. A majority, 69% did not gain or lose any lines of best-corrected visual acuity, 16% gained one or two lines, and 15% lost one line. The average spherical equivalent after surgery was -0.19 D, ranging from -0.75 D to +0.13 D.

When it came to near uncorrected visual acuity measured on the Parinaud scale, seven patients read at the P1 level, one patient read at the P1.4 level, four patients read at the P2 level and three patients read at the P3 level. In addition, the patients showed improvements in contrast sensitivity.

"We did not induce loss in contrast sensitivity in standard or wavefront guided treatment when using the WaveLight laser in the FDA study. Here, in these multifocal patients we even improved contrast sensitivity under photopic and scotopic conditions," reported Dr Vryghem.

Less oblate corneas postoperatively

In comparing the asphericity (Q 20 value, as measured on the WaveLight Topolyzer) of these 'multifocal' corneas with that of a similar group of patients who underwent a monofocal treatment the shift towards oblateness, induced by a myopic laser treatment, is shown to be greatly reduced by the multifocal treatment, especially when the initial short-sightedness was lower than -5.0 dioptres.

When questioned, some 25% of the patients reported having slight problems with halo, glare or night vision. Only one patient complained about the halos and glare. Moreover, 86% of the participants reported that their distance vision was equal or better than with they had with spectacles or contact lenses before surgery.

In addition, 27% of patients reported that their uncorrected near vision after the procedure had improved. However, 60% said their post-op near UCVA was worse than their pre-op BCVA. Two patients used glasses all the time for their near vision, two patients used glasses up to 80% of the time, five patients used glasses half of the time, and the remaining six patients used glasses less than 20% of the time for near vision.

Overall, all patients felt 75% to 100% satisfied with their visual outcomes with an average of 85%, the satisfaction being higher in distance than in near vision.

The super position of two different ablation profiles creates a more prolate cornea with multifocal characteristics that allows for distance and reading vision, according to Dr Vryghem. The results are better in patients with an initial myopia of -5.0 D or lower.

He considers his findings encouraging because this multifocal ablation pattern allows for excellent distance vision, moderate reading abilities and no loss in best-corrected visual acuity compared to monofocal procedures. He added that this procedure is now his preferred treatment option in all myopic and presbyopic patients who are not ready to cope with monovision, as long as their pre-op corneal thickness allows for treatment in safe circumstances.

"In the near future, refinements in the laser software such as the F-CAT will allow for customised determination of the target asphericity, or Q-value, which might lead to better and/or more predictable results," he predicted.

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