

# Astigmatism treatment uses refractive, topographic data

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Reviewed by Noel Alpíns, MD

**Boston**—For patients whose refractive and topographic measurements don't match, optimal treatment combining both values may provide better refractive surgery outcome, according to findings by Noel Alpíns, MD.

In his study, astigmatic eyes that were optimally treated using both refractive astigmatism parameters and topographic values were found to have better visual acuity outcomes and greater reductions in corneal astigmatism after a 12-month follow-up period than if refractive astigmatism values alone were used for treatment planning.

## Methodology

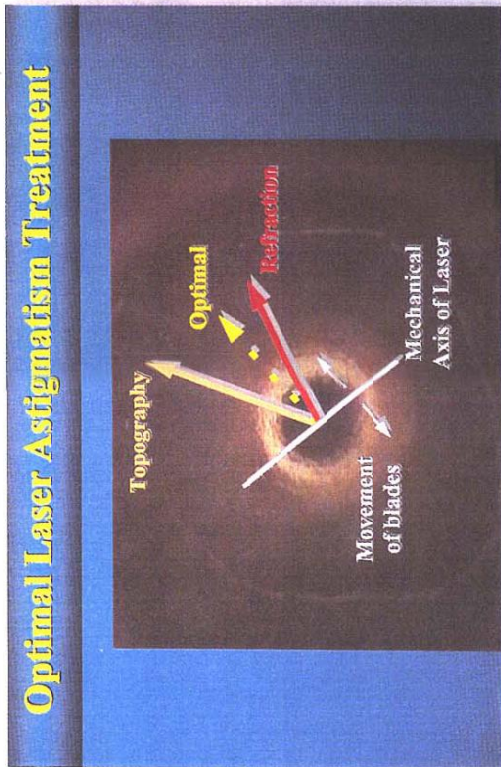
Dr. Alpíns explained the methodology of the study at the 24th annual meeting of the American Society of Cataract and Refractive Surgery here.

"When we treat by refraction values, the positive cylinder steepest axis is in the direction of the movement of the blades of the laser. The topographic axis, which often varies, will be different, and the optimal axis lies between the two.

"When we treat by topography, the topographic axis will be in line with the blade's movement, perpendicular to the mechanical axis of the laser.

"However, because we are treating optimally, the refraction astigmatism axis is directed to one side and the topography axis is to the other side of the treatment axis. Treating between the two on the optimal axis reduces the refraction and the topography maximally," he explained. Dr. Alpíns is Medical Director, NewVision Clinics, Melbourne, Australia.

The 12-month study included 97 eyes (mean patient age, 41 years) that were randomly assigned to receive either refractive astigmatic treatment or optimization in association with their spherical myopia. Treatment was performed



The refraction astigmatism axis is on one side of the treatment axis, and the topography axis is on the other side. (Photo courtesy of Noel Alpíns, MD)

using the VISX 20/20B laser (Santa Clara, CA). Calculations for surgical planning and outcomes analysis were performed using the ASSORT software.

## Eligibility

To be eligible for inclusion in the study, the patients had between  $-1.00$  and  $-10.00$  D of myopia, a refractive astigmatism value of  $-1.00$  D or more, and the expected difference in result between the alternative treatments calculated optimally versus refractively was  $0.25$  D or greater on the cornea, according to Dr. Alpíns.

"With approximately two-thirds of the patients having follow-up of 12 months or more, 50% of patients treated optimally have a visual acuity level of 20/25 or better versus 47% of patients treated refractively; 76% of those treated optimally and 63% of those treated refractively have a visual acuity level of 20/40 or better," Dr. Alpíns said.

"The change in best-corrected visual acuity shows a fairly equivalent loss between the two groups, with two eyes

have been expected when treating optimally, but in fact this was not the case. The refractive astigmatism values also decreased more when treating optimally. Effectively, here, we were getting 'something for nothing'—less corneal astigmatism without an increase in refractive astigmatism. Even better, we had less refractive astigmatism remaining in the groups treated optimally (0.59 D) compared with the refractive group," he said, commenting on the results of the study.

"When the spherical equivalence values in the refractive group were compared with those of the optimally treated group, a difference between the groups was found. The values in the optimally treated group were a little closer to zero.

"Looking at the changes in corneal astigmatism measured by topography, we found a greater decrease in the topographic astigmatism over the 12-month study period when treating optimally," he continued. "This paralleled changes in the patients' keratometric values. The absence of any adverse effect on refractive astigmatism changes in the study group was very pleasing.

"When comparing astigmatism treatment aligned with the optimal axis or the refractive axis, the optimally treated eyes had better uncorrected visual acuity levels, less remaining corneal astigmatism measured by both keratometry and topography, and a greater reduction in corneal astigmatism. All the values showed a similar against-the-rule trend," Dr. Alpíns concluded.

## Commentary

In a discussion period following the presentation, Julian Stevens, MD, of Moorfields Eye Hospital, London, said that Dr. Alpíns' study has been long awaited.

"This is a very important subject when we are faced with patients who have discordant refractive and topographic data," he said. ♦

in both treatment groups losing two or more lines of acuity as a result of haze," he explained. The grades of haze were very similar in the two groups.

When the authors examined the refractive results from the two groups, they found that 53% of patients in the refractive astigmatism group were within  $\pm 1$  D of the intended target and 80% were within  $\pm 2$  D, and in the optimally treated group, 69% were within  $\pm 1$  D and 87% were within  $\pm 2$  D.

"When looking at the results with astigmatism, one would expect that when treating closer to the topographic axis, less corneal astigmatism would result. We found this to be true, but without all results yet available, the results had not reached significance at this stage.

"The astigmatism results measured by keratometry were  $+1.10$  D treated refractively versus  $+1.01$  D treated optimally; measured by topography, we found  $+1.43$  D refractively versus  $+1.25$  D optimally.

"Interestingly, a lesser decrease in the refractive astigmatism value could