

ESCRS highlights

Topography-based PRK in keratoconus

Using vector planning to create surface ablation treatment parameters produced predictable outcomes in patients with mild keratoconus undergoing refractive surgery, according to **Noel A. Alpins, MD**.

Vector planning uses corneal topography measurements, not wavefront measurements, to calculate ablation parameters. The axes of corneal astigmatism and refractive astigmatism are plotted on a double-angle vector diagram, and the vectorial difference between the refractive and corneal astigmatism is calculated, he explained.

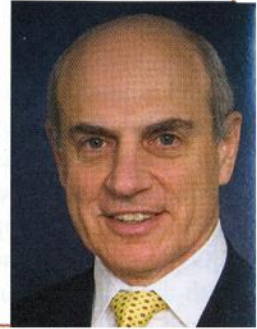
"The magnitudes are the same, but the angles are doubled. So when you are drawing these two together, you have a progeny called the ocular residual astigmatism, or ORA," he said. This is also known as lenticular astigmatism or noncorneal astigmatism, he said.

The applied treatment is intended to reduce both corneal astigmatism and refractive astigmatism by about 50%, rather than eliminating the corneal astigmatism altogether, Dr. Alpins said.

"It is a dioptric value," he noted, "and in this group it was about 50% higher than usual due to the great irregularity in shape of the keratoconic corneas."

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— **Noel A. Alpins, MD**



The study included 44 eyes with a minimum BCVA of 20/40. All eyes had stable keratoconus with corneal steepening of about 1.5 D.

Eleven eyes were excluded from the study because they received spherical correction only, Dr. Alpins said. Thirty-three eyes underwent astigmatic treatments using PRK for an average of 1.92 D of corneal astigmatism and -1.65 D of refractive astigmatism. Mean ORA was 1.22 D, ranging from about 0.19 D to about 3.55 D, Dr. Alpins said.

Treatments were targeted to correct about 40% of the corneal astigmatism, based on corneal topography, and 60% of the refractive astigmatism. At 3 months follow-up, mean corneal astigmatism was reduced to 1.11 D, and mean refractive astigmatism was reduced to 0.51 D, Dr. Alpins said.

"But if we had treated 100%, we in fact would have expected 1.85 D of corneal astigmatism, which is effectively 40% extra, over and above the 1.11 D. We essentially saved this patient from 0.75 D of astigmatism," Dr. Alpins said. He noted that there was no progression of keratoconus following treatment.

"Using vector planning will result in less corneal astigmatism than treatment

by refractive values alone. And refractive astigmatism values are not compromised," he said. "Vector planning really has potential to reduce aberrations and improve spectacle corrected visual acuity. At the end of the day, the patient has less corneal astigmatism, which at the end of the day is also going to reduce any aberrations of the second order (spherical and cylinder) and third order (trefoil and coma)."