Symmetry in motion: A look at the Alpins' method for treating irregular astigmatism

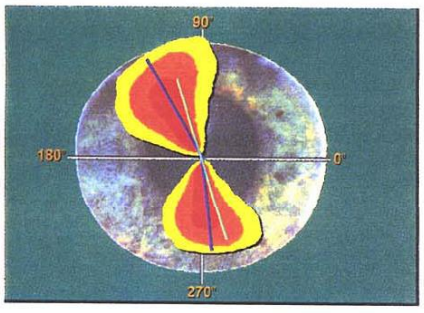
by Maxine Lipner Contributing Editor

From resolving topography against refractive astigmatism to the idea of a clinic, where an uneven cornea could be turned into a smooth, regular one, Dr. Alpins has a unique vision for correcting irregular astigmatism.

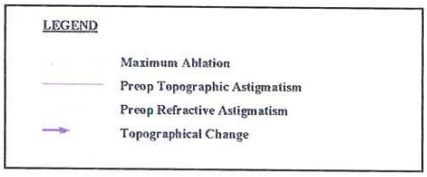
Imagine tackling the difficult problem of irregular astigmatism by applying individualized treatments to the two halves of the cornea. This is just one of several unique concepts that Noel A. Alpins, MD, has derived to deal with the all-too-common difficulty of irregular astigmatism. Among other things, the Alpins' method has also brought to light the ideas of optimizing treatment by resolving topography against refractive astigmatism, of using vector planning for determining the surgical strategy, and of regularizing irregular astigmatism without necessarily changing refraction.

Specifically, irregular corneal astigmatism comes into play when the two steepest meridians on the opposite sides of the cornea have different magnitudes, making them asymmetrical, and/or when the two halves are not correctly aligned, so that they are nonorthogonal. This affects just about all patients, said Alpins, who is in private practice in Melbourne, Australia, and is the medical director of New Vision Clinics. "There's always some difference between the two halves of the cornea ... with some being more disparate than others," he said.

Scott M. MacRae, MD, associate professor of ophthalmology at the Casey Eye Institute, Oregon Health Science University, in Portland, finds many surgeons are stymied by the treatment of astigmatism. "Initially, most American ophthalmologists could only treat patients with spherical treatment — now that we've become more refined at treating astigmatism, we realize this can be more challenging than we thought," he said. "Dr. Alpins and others have really pioneered how to approach patients with astigmatism problems."



Computerized videokeratometry demonstrating differences between topographic and refractive astigmatism.



Until now, the problem of irregular astigmatism has been ignored, with most available lasers limited to treating the eye in a straight-line symmetrical fashion. Alpins likens this to a tractor tilling a straight path across the cornea — if the top of the hill is slightly left or right of the path, it is unequally disturbed, leaving the cornea with uneven patches.

Newer scanning lasers allow the irregularity to be addressed; however, many refractive surgeons have taken the stance of just treating to eliminate spectacles, by essentially carving them onto the cornea. "When you treat by refractive or spectacle values alone, you're really disregarding the corneal shape," Alpins said. He believes that this, as well as the opposite extreme, in which surgeons aim for "tennis ball-like" paracentral sphericity, is a mistake.

The Alpins' Method

"My belief is that you really want to be able to combine the two values of topography and refraction into the surgical plan," Alpins said. To deal with differences between the two, Alpins' "Optimal Treatment" uses his vector-planning approach to determine how much emphasis to place toward correcting topography and how much toward correcting refraction.

This idea of optimizing treatment by sharing the remaining astigmatism between the refraction and the cornea is based on two pivotal concepts — the belief that less astigmatism is better than more astigmatism and the idea that the orientation of some corneal astigmatism is more favorable than others. "When you've worked out the calculation of the two components, the guiding concept is that if the astigmatism falls on the cornea in an unfavorable orientation, then you'd rather have a spherical cornea and you leave that kind of unavoidable astigmatism at the spectacle level," Alpins said. "However, if the astigmatism falls on the cornea in what the surgeon believes to be a favorable orientation, then it's OK to let it land on the cornea and target a spherical refraction." In effect, the surgeon follows a sliding scale based on individual patient parameters and surgical preferences.

In patients randomized into two groups, comparing optimal vs. refractive treatment, Alpins has found that a reduction in corneal astigmatism is achieved without any penalty of increased overall refractive astigmatism.

Correcting astigmatism with ASSORT

Alpins has developed a computer program known as ASSORT (Alpins Statistical System for Ophthalmic Refractive Surgery Techniques), which handles the calculations needed to enable surgeons to more easily use his method.

Alpins has also developed an optional ASSORT Designer Cornea module for the treatment of irregular astigmatism, which allows practitioners to generate discrete laser settings for the cornea's differing hemidivisions. "The software resolves the topography and refraction separately for the two halves of the cornea and, in this way, is able to reduce astigmatism individually for each and does a calculation for the averaged refractive result," Alpins said.

Another unique application involves the concept of reshaping irregular astigmatism, without changing refraction. The idea is to turn a somewhat wrinkly cornea into a smooth, regularized astigmatic one. This may enable patients to see several lines further down the chart with the same spectacles. Alpins believes this could evolve into a huge expansion of the refractive market, with the development of what he terms See Better Clinics, where patients could go to get their eyes functioning at the best optical level without necessarily altering their prescriptions.

For the future, Alpins is looking toward the integration of related computer systems for the treatment of astigmatism. Currently, topography machines, the laser, and vector-planning analysis are all individual units. While laser companies are moving toward combining topography units with their machines, they're still missing an analysis of what will happen as a result of surgery and the specific treatment to create these changes, addressing both topography and refraction, as calculated by the vector planning of the ASSORT program. "Without this, it's a lot like flying a plane without its sophisticated navigation system — the craft could end up way off course," Alpins said.

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