

The Key Corneal Characteristics

Reviewing the corrective options.

BY LEE T. NORDAN, MD



Curvature, clarity, and irregularity—these are the three corneal characteristics that separately or in combination can cause poor visual function. Improper curvature in the presence of a smooth cornea creates a refractive error. An irregular surface, caused

by either a diseased epithelium or an abnormal stroma, precludes good vision, as does significant corneal opacity.

The treatments for curvature, clarity, and irregularity overlap. The most important aspects of corneal surgery, which includes keratorefractive surgery, are determining the cause of a problem and designing the surgery that can restore the cornea as an effective optical component of the eye. For me, the allure of corneal surgery has always been the challenge of diagnosing a corneal problem and electing a course of action that can return effective vision within a relatively short time.

PERSONAL CONCLUSIONS

The correction of refractive error and presbyopia ensures that the importance of keratorefractive surgery will increase within anterior segment surgery. Table 1 provides

“The correction of refractive error and presbyopia ensures that the importance of keratorefractive surgery will increase.”

a practical guide to diagnosing and solving corneal problems. The most interesting aspect of this table, for me, is the varied use of a PRK-type procedure for treating both primary and secondary refractive errors, even in the presence of a mildly irregular corneal surface. If a surgeon wishes to expand the scope of his corneal rehabilitative capacity, then Table 1 may indicate a new indication for PRK.

This guide indicates a rationale with respect to treating corneal disease. Of course, reasonable surgeons may have differing opinions. For example, based upon my experience, I believe the following. First, lamellar keratoplasty does not provide a permanent solution for keratoconus, and corneal irregularity will usually recur after several years. Second, collagen-shrinking procedures provide temporary results, which

TABLE 1. A PRACTICAL GUIDE TO CORNEAL PROBLEMS

CORNEAL SIGN	CORNEAL LOCATION	POSSIBLE CAUSE	POSSIBLE TREATMENT
Irregularity	Epithelium	Superficial punctate keratitis, dry eye, abrasion	Steroid drops, artificial tears, contact lens, patch
Irregularity	Bowman's membrane	Wrinkled LASIK flap	PRK with mitomycin C
Irregularity	Anterior stromal scar	PRK	Repeat PRK with mitomycin C
Irregularity	Stroma	Weakness (keratoconus)	Contact lens, PRK (mild keratoconus), penetrating keratoplasty
Refractive error	Stroma	Improper corneal curvature	LASIK, PRK, phakic IOL
Opacity	Middle-to-deep stroma	Traumatic injury, surgical trauma	Lamellar keratoplasty followed by PRK
Epithelial bullae	Endothelium	Combined (Fuch's) dystrophy	Penetrating keratoplasty, endostromal transplant
Presbyopia	Crystalline lens	Aging lens	Phakic multifocal IOL, keratorefractive surgery for monovision

NORDAN'S PERSPECTIVE

may be a blessing or a curse. Third, removing a clear crystalline lens and implanting a pseudophakic bifocal lens will not be the procedure of choice for correcting presbyopia in 5 years. Fourth, endostromal transplantation holds immense promise but currently does not allow for better than 20/30 BCVA in a majority of cases. Fifth, PRK is an effective means for treating mild keratoconus. Finally, lamellar grafts are the preferred procedure in cases of middle-to-deep corneal stromal opacity with a normal endothelium.

OTHER OPINIONS

The procedures and concepts just mentioned may or may not be useful for another surgeon with a different experience from mine. My point is that I constructed Table 1 in order to indicate my preferences for the treatment of certain corneal conditions. Other surgeons might consider constructing a table such as this one for a quick review. It might simplify and focus their efforts with respect to corneal problems and force them to reconsider and/or reinforce the rationale and success rate for a current stable of procedures. ■

Lee T. Nordan, MD, is a technology consultant for Vision Membrane Technologies, Inc., in San Diego. Dr. Nordan may be reached at (858) 487-9600; laserltn@aol.com.

WHAT DO YOU THINK?

What do you consider to be the major issues facing refractive surgeons today? Is there a topic that you would like to broach for discussion? Share your suggestions or feedback with Lee T. Nordan, MD, at the e-mail address listed at the end of his article.