Diagnosis and Management of Traditional Penetrating Corneal Transplant Astigmatism

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The problem of high astigmatism in the corneal transplant patient stimulated much of the initial work on astigmatism surgery. Troutman published his initial work on corneal wedge resection in 1970. Since then, we have seen numerous advances in the management of corneal astigmatism. Nevertheless, graft astigmatism remains perhaps the most difficult refractive challenge we commonly face. Even the most meticulously performed surgery can be complicated postoperatively by factors such as irregular wound healing, recurrence of disease, and trauma.

Why Graft Astigmatism Occurs

The challenge seems very straightforward: (1) make a round hole, (2) make a round peg, (3) sew the peg in symmetrically, and (4) remove the sutures when healed. What’s the big deal?

There are a lot of ways that astigmatism can sneak into the picture. A useful way to look at the problem is to break up the causes of astigmatism into 2 parts:

1. Astigmatism the patient brings to the table.

Eyes that need corneal transplantation have a much higher average astigmatism than healthy eyes have. In keratoconus surgery, much of the diseased tissue is removed, but the bed still has keratoconus. Many pseudophakic bullous keratopathy eyes have had large incision cataract surgery or repeated limbal surgery such as secondary intraocular lenses (IOLs) or IOL exchanges. Traumatic corneal lacerations flatten the cornea as much as radial keratotomy incisions do. Scarring from Herpes simplex may come in on a frond in one quadrant (Figure 23-1). Bacterial infections and rheumatoid melts set up wherever they please. Of course, grafting for a failed graft brings in another whole set of astigmatism possibilities—cutting full thickness through a cornea that has already had a full thickness incision. Eyes that are very soft or actively leaking are very hard to cut, and the recipient bed may be irregular. Make no mistake about it: what the patient brings to the table definitely affects final astigmatism.