Combining Phacoemulsification With Astigmatic Keratotomy

The goal of surgery is best UCVA.

BY LEE T. NORDAN, MD

Around 1990, a noted European cataract surgeon and I engaged in a passionate, late-night debate. The topic of our discussion was the relative merits of phacoemulsification versus extracapsular cataract extraction. My colleague explained to me his truly exquisite technique for extracapsular cataract extraction, outlined how few complications he had, and told me that virtually every patient with a healthy macula could be corrected to 20/20 postoperatively within a few days.

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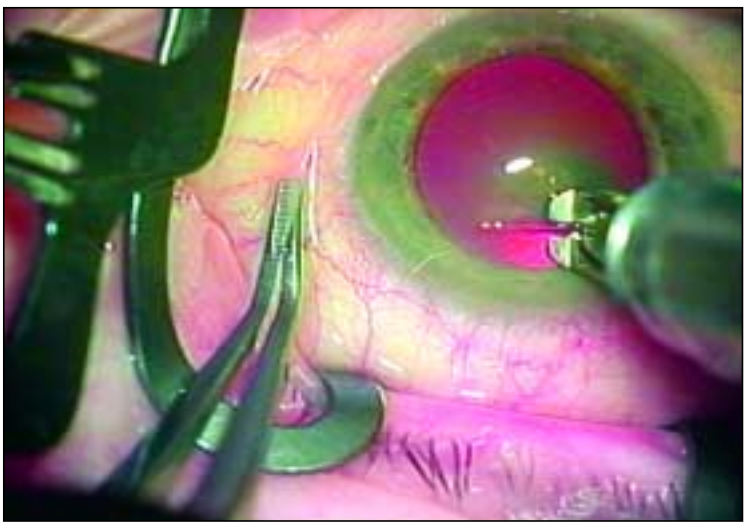
When I asked my friend to define the goal of cataract surgery, he cited performing an excellent cataract procedure and implanting the IOL perfectly. I told him he was missing the entire point of cataract surgery. Performing a technically correct procedure was not the goal of cataract surgery, I said. The surgical technique, I argued, was only the means of achieving the goal, which was to enable a patient to see as well as possible without glasses. I commented that a surgeon who did not take astigmatism into account with his surgical technique was not achieving the best possible results.



(Courtesy of Robert H. Osher, MD.)

Figure 1. Dr. Osher performed an AK in conjunction with cataract extraction by phacoemulsification and the implantation of a PCIOL.

THE GOAL OF CATARACT SURGERY

The conversation I have described continued. I requested that my friend and I compare patient charts on the following

day. Specifically, I predicted the following: (1) a patient whose eye had no preoperative corneal astigmatism would achieve a UCVA of 20/30 after cataract surgery with IOL implantation; (2) a patient with 2.00 D of preoperative, with-the-rule corneal astigmatism would have a UCVA of 20/20 after cataract/IOL surgery; and (3) a patient with 2.00 D of against-the-rule, preoperative corneal astigmatism would have a UCVA of 20/80 after cataract/IOL surgery. When we reviewed the charts on the next day, the visual acuities were as I had anticipated. I emphasized the fact that all of the patients had certainly not fared equally well regarding UCVA, and I went so far as to say that 20/80 UCVA represented poor cataract/IOL surgery.

> "Combining phacoemulsification and astigmatic keratotomy demonstrates a surgeon's commitment to the best results possible from cataract surgery."

My friend was both irate and crestfallen, but he also asked me how I had predicted these patients' postoperative visual acuities. I explained that a superior corneal incision of 7 mm in length flattened the vertical meridian by approximately 2.00 D. If a patient's preoperative astigmatism were with-the-rule, then the postoperative result would be a spherical cornea. The reverse would be true for an against-the-rule cornea, which would become more astigmatic. A preoperatively spherical cornea would become approximately 2.00 D against the rule.

My friend then smiled and said that, in order to achieve the goal of cataract/IOL surgery (which is best UCVA), the cataract surgery technique would have to take into account the level of preoperative astigmatism. If the astigmatism were low, then a surgical technique with a small wound would preserve a spherical cornea, or a longer wound could be used to flatten a steeper meridian in order to create a spherical cornea.

I added that, because 85% of preoperative cataract patients had a corneal cylinder of 1.25 D or less, a smaller wound technique such as phacoemulsification would produce better visual results. In contrast, if a cornea had a larger degree of cylinder preoperatively, phacoemulsification would not be the best choice, unless the wound were altered after the procedure to correct the astigmatism or a separate procedure were used to change the shape of the cornea.

By the end of our discussion, my colleague and I were closer friends.

THE CONTRIBUTIONS OF OSHER AND OTHERS

The story I have told is true. Robert Osher, MD, of Cincinnati probably had many such discussions with colleagues as he recorded his postoperative results with phacoemulsification. In 1982, he was the first surgeon to systematically combine peripheral corneal relaxing incisions with phacoemulsification in order to reduce postoperative astigmatism and improve patients' UCVA (Figure 1).

The concept of *best UCVA* is the backbone of refractive surgery. Combining phacoemulsification and astigmatic keratotomy (AK) demonstrates a surgeon's commitment to the best results possible from cataract surgery. Dr. Osher's use of a keratorefractive technique to achieve superior outcomes after cataract/IOL surgery was a milestone in anterior segment surgery.[1] Other surgeons, including Richard Kratz, MD; Cliff Terry, MD; William Maloney, MD; Jim Little, MD; and W. Andrew Maxwell, MD, were also deeply involved in research on the correction of corneal astigmatism combined with phacoemulsification/IOL surgery.

REFRACTIVE CATARACT SURGERY

Currently, phakic IOLs are poised to change the refractive surgery landscape dramatically. There is no distinct line between cataract/IOL surgery and refractive surgery: IOL implantation is a form of refractive surgery.

Refractive surgery emphasizes a single goal: best UCVA. Because this should also be the aim of cataract/IOL surgery, the techniques of phacoemulsification, IOL implantation, and refractive surgery should remain closely entwined.

Corneal astigmatism is a major determinant of the clinical success of cataract/IOL surgery, as well as of corneal transplant surgery. Since Dr. Osher's important decision to combine phacoemulsification and AK in 1982, the surgical options for the correction of astigmatism have increased. In addition to AK and wound dehiscence, the options of astigmatic photorefractive keratectomy, LASIK, and toric IOL implantation are now available. Dr. Osher's innovative spirit should serve as a guiding light for all anterior segment surgeons, who should use whatever combination of surgical techniques will achieve the best UCVA for the patient. ■

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1. Osher RH. The evolution of refractive cataract surgery. In: Wallace RB, ed. *Refractive Cataract Surgery and Multifocal IOLs*. Thorofare, NJ: Slack, Inc.; 2001: 1-7.