

Why We Prefer Bimanual Microincisional Phacoemulsification

The procedure is better than coaxial phacoemulsification because it is performed in an almost completely closed system.

BY I. HOWARD FINE, MD; RICHARD S. HOFFMAN, MD; AND MARK PACKER, MD

With bimanual microincisional phacoemulsification, we are able to achieve nearly watertight conditions and an almost completely closed system. We are using smaller incisions, which are inherently safer, and we have improved followability because the fluid enters the eye from one side and leaves through the other. This flow avoids creating competing currents around the phaco tip, such as in coaxial phacoemulsification. In addition, the incoming irrigation flow can be used as a tissue manipulator, which aids in directing tissue to the phaco tip. We use the incoming fluid stream to facilitate flipping the epinucleus after purchasing its rim and

roof in the distal quadrant with the phaco tip and achieving vacuum on the roof and rim.

We believe that the anterior chamber is much more stable with bimanual microincisional phacoemulsification than with coaxial phacoemulsification. In fact, in a couple of instances when we tore the posterior capsule, the constancy of the irrigation high up in the anterior chamber allowed us to reach down into the bag of the posterior capsule and remove material with the phaco tip. With coaxial phacoemulsification, the incoming fluid would have gone down into the capsular bag along with the phaco tip, almost certainly extending the tear. Also, subincisional cor-



Figure 1. The authors use bimanual microinstrumentation to facilitate intraocular cautery. An irrigating handpiece is inserted into one side of the eye (left) while a microincisional cautery is placed through the sideport incision on the other side of the eye (right).



Figure 2. When faced with a patient with zonular dialysis in the left side of his eye, bimanual microincisional phacoemulsification enables the surgeon to switch phacoemulsification to his left hand and irrigation to his right hand.

tex has long been recognized as more accessible with bimanual microincisional instruments.

ANCILLARY TECHNIQUES

Bimanual microincisional phaco instrumentation and technology have led to innovative spin-offs, of which we have been able to take advantage. The capsulorhexis forceps enables us to be safe and precise in difficult and challenging cases, especially in the presence of compromised zonules or subluxated cataracts, because there is no loss of viscoelastic or shallowing of the chamber during creation of the capsulorhexis. With a large incision and standard forceps, the chamber is quite unstable. In addition, we have been able to utilize bimanual microinstruments for intraocular cautery (Figure 1), with an irrigating handpiece coming in through one side of the eye and a microincisional cautery entering through the other sideport incision. We are able to identify bleeding points by pinching the irrigation tubing, thus allowing the bleeding to commence, and then to perform cautery under direct visualization.

ZONULAR DIALYSIS OR SUBLUXATED CATARACTS

Bimanual microincisional phacoemulsification is invaluable in the presence of zonular dialysis or subluxated cataracts because we are able to switch hands. If the zonular dialysis is toward the left side, we can use the phaco tip in our left hand and the irrigating chopper in our right hand (Figure 2). With vacuum and flow activated, movement of the lenticular material is toward the area of dialysis or weakened zonules rather than away from it (with the possibility of extending the dialysis). Posteriorly subluxated cataracts can be more easily brought up into the anterior chamber and phacoemulsified bimanually rather than coaxially. Bimanual microincisional refractive lens exchange allows us to hydroexpress the lens out of the capsular bag and carousel it in the plane of the capsulorhexis, where we remove the lens with vacuum and no phaco energy (Figure 3). This is a minimally invasive, very safe procedure that is mandatory in a refractive practice.

INCISIONS

We use incisions that are approximately 1.0 mm internally and 1.2 mm externally, and, with our new irrigating choppers, we are able to insert our instruments comfortably into the eye and to maintain stable chambers. Power modulations allow us to optimize the parameters of all phaco machines available in the US and to perform bimanual microincisional phacoemulsification with each of them.

We recently compared our bimanual microincisional outcomes to our coaxial phaco outcomes using chi-square analysis and found that our results are as good or better with the former procedure in patients with clear corneas (Tables 1 and 2).

The incision for implanting the IOL is placed between the two sideport incisions, because the manipulation of these microincisions stretches them a little and they will seal much better than if they are not enlarged for IOL implantation. We are commencing trials of the Thinoptx IOL (Thinoptx, Abingdon, VA) and injectable IOLs, such as the SmartIOL (Medennium Inc., Irvine, CA), both of which are inserted through microincisions. We will continue to use an incision between the two sideports, however, until we have a lens that will pass through the unenlarged sideport microincision.

CONCLUSION

Many surgeons say that they will wait to perform bimanual microincisional phacoemulsification until they have a lens that can pass through a microincision. This

TABLE 1. PERCENTAGE OF EYES WITH CLEAR CORNEAS 2 TO 24 HOURS POSTOPERATIVELY*

Machine	Coaxial Results	Bimanual Results
Series 20000 Legacy with Neosonix (Alcon Laboratories, Inc., Fort Worth, TX)	98%	100%
Millennium with Phaco Burst (Bausch & Lomb, Rochester, NY)	100%	100%
Staar Sonic Wave (Staar Surgical Company, Monrovia, CA)	95%	100%
Sovereign phaco system with Whitestar Technology (Advanced Medical Optics, Inc., Santa Ana, CA)	100%	97%

*P>.05 for all comparisons

TABLE 2. PERCENTAGE OF EYES WITH A UCVA OF 20/40 OR BETTER 2 TO 24 HOURS POSTOPERATIVELY

Machine	Coaxial Results	Bimanual Results
Series 20000 Legacy with Neosonix	96%	93%
Millennium with Phaco Burst	100%	95%
Staar Sonic Wave*	74%	100%
Sovereign phaco system with Whitestar Technology	94%	95%

*P<.01



Figure 3. The authors feel that bimanual refractive lens exchange is a safe procedure. Vacuum, rather than phaco energy, is used to remove the lens.

decision reminds us of the early 1980s when we were trying to convert people to phacoemulsification and their response was, “What is the point? You have to enlarge the incision anyway to put in an IOL.” The point is that phacoemulsification is a better procedure than extracapsular extraction, and bimanual microincisional phacoemulsification is superior to coaxial phacoemulsification. ■

I Howard Fine, MD, is Clinical Professor at the Casey Eye Institute, Department of Ophthalmology, Oregon Health &

Science University, and is in private practice at Drs. Fine, Hoffman & Packer, LLC. He is a paid consultant for Advanced Medical Optics, Inc., and Bausch & Lomb, and he receives research and travel support from Alcon Laboratories, Inc., and Staar Surgical Company. He states that he holds no financial interest in any of the products or other companies mentioned herein. Dr. Fine may be reached at (541) 687-2110; hfine@finemd.com.



Richard S. Hoffman, MD, is Clinical Associate Professor of Ophthalmology at the Casey Eye Institute, Department of Ophthalmology, Oregon Health & Science University, and is in private practice at Drs. Fine, Hoffman & Packer, LLC. He states that he holds no financial interest in the products or companies mentioned herein. Dr. Hoffman may be reached at (541) 687-2110; rhoffman@finemd.com.



Mark Packer, MD, is Clinical Assistant Professor at the Casey Eye Institute, Department of Ophthalmology, Oregon Health & Science University, and is in private practice at Drs. Fine, Hoffman & Packer, LLC. Dr. Packer is a paid consultant for Advanced Medical Optics, Inc. He receives travel and research support from Staar Surgical Company, and Alcon Laboratories, Inc. Dr. Packer states that he holds no financial interest in any of the products or other companies mentioned herein. Dr. Packer may be reached at (541) 687-2110; mpacker@finemd.com.

