

# Tips for Easier, Safer Phacoemulsification: Part 1

BY LOUIS “SKIP” D. NICHAMIN, MD; LUTHER L. FRY, MD; RICHARD S. HOFFMAN, MD;  
AND THOMAS KOHNEN, MD

*I invited several skilled surgeons to describe important techniques that, when used in the course of phacoemulsification, make the procedure easier and concurrently diminish the risk of complications. The diversity of their pearls is fascinating. Look for another installment next month!*

—William J. Fishkind, MD, Section Editor

## LOUIS “SKIP” D. NICHAMIN, MD

My preferred technique for routine phacoemulsification continues to be that of a chopping approach, using both a vertical and a horizontal component in each case. I find that the initial cleavage plane is best created with a vertical or downward vector force, after I first place the chop instrument just in front of the buried phaco needle. The chopping motion is initially

downward (with the sideport incision serving as a fulcrum) and then back toward the impaled needle. As the cleavage plane appears, the instruments are separated horizontally in order to propagate and complete the nuclear division. I create subsequent planes of division more in the classic Nagahara or horizontal fashion: the nucleus is pulled centrally with vacuum, and the chopping instrument is passed around the equator of

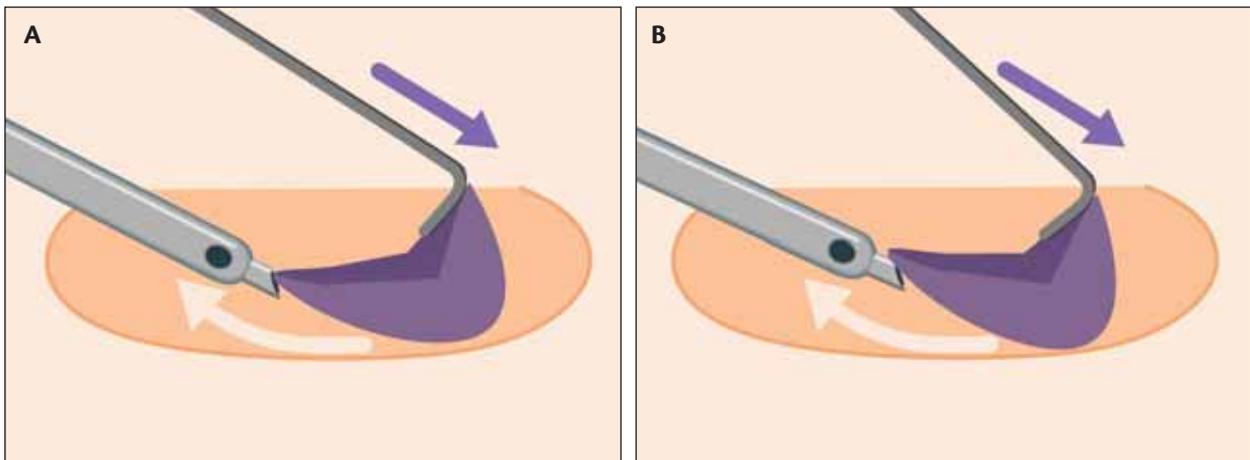
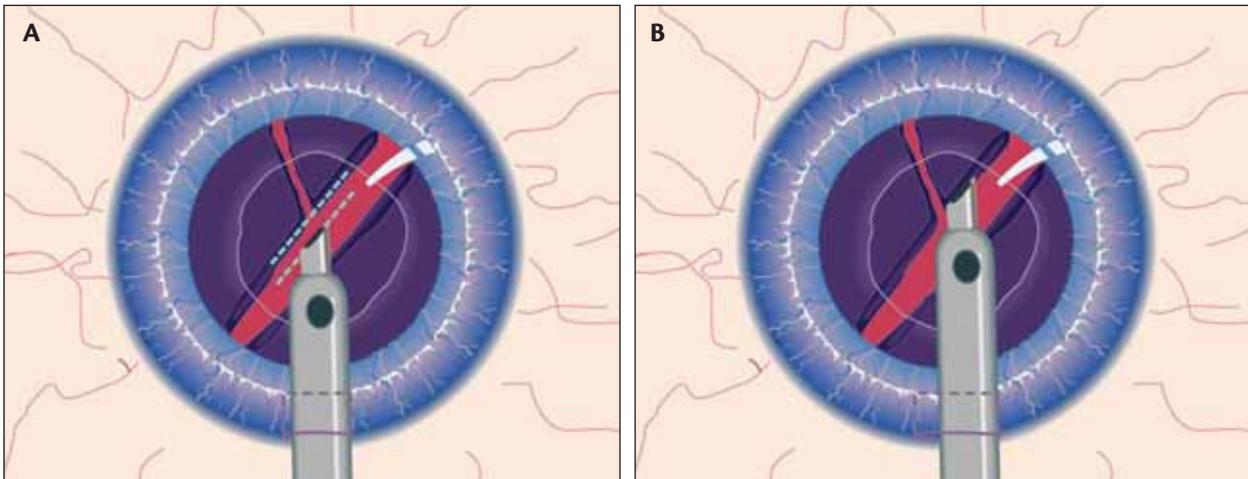


Figure 1. Dr. Nichamin increases his purchase on nuclear material by chopping two or more segments before removing the first fragment (A) and by tipping the segment's central apex upward with the manipulator while engaging the fragment posteriorly with the phaco tip (B). (Reprinted with permission from Slack Incorporated. Nichamin LD. Vertical chopping: principle and pearls. In: Chang DF, ed. *Phaco Chop: Mastering Techniques, Optimizing Technology, and Avoiding Complications*. Thorofare, NJ: Slack Incorporated; 2004.)



**Figure 2.** Dr. Nichamin maximizes occlusion by moving the bevel of the needle (A) so that it is against a flat surface of the chopped segment. (Reprinted with permission from Slack Incorporated. Nichamin LD. Vertical chopping: principle and pearls. In: Chang DF, ed. *Phaco Chop: Mastering Techniques, Optimizing Technology, and Avoiding Complications*. Thorofare, NJ: Slack Incorporated; 2004.)

the lens, and then I chop horizontally. Performing hydrodelineation in addition to hydrodissection facilitates these maneuvers.

In order to impale the nucleus deeply, it is important to retract the silicone sleeve and expose 1.5 to 2.0 mm of the phaco needle. I find it is easier to liberate chopped segments if I nudge a piece of the nucleus out toward the equator of the capsular bag with the chopper. This technique causes the apex of the segment to present upward, in a more anterior position, and thus allows the phaco tip to slip under it, which assists with occlusion and removal (Figure 1). The bevel of the needle should be opposed to a flat surface of a chopped segment to maximize occlusion (Figure 2). Finally, if I cannot easily mobilize a chopped segment (assuming that it has been thoroughly cleaved), I leave it in place and chop additional segments; subsequent divisions will create more working space and loosen the previously chopped pieces.

#### LUTHER L. FRY, MD

The adverse effect of Flomax (Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT) on the iris was first reported by Campbell and Chang on the ASCRS Cataract Chat List in late 2004. Richard Packard, FRCS, FRCOphth, of London recommended the use of intracameral phenylephrine in late 2006, but most US surgeons did not adopt this approach due to the unavailability of the drug in this country. Instead, some US surgeons started using epinephrine 1:1000 diluted one quarter with BSS Plus (or BSS, both from Alcon

Laboratories, Inc. [Fort Worth, TX]). The solution is called *epi-Shugarcaine* after Joel Shugar, MD, who developed and popularized it.

I tried preoperative atropine, extra dilating drops, and stopping Flomax prior to surgery but found all of these measures to be ineffective at managing a floppy iris. I started using *epi-Shugarcaine* in early 2007 and was surprised to learn it really works.

My scrub technician draws up into a syringe one part 1:1000 epinephrine and three parts Shugarcaine (or BSS). She then draws up 0.25 mL epinephrine and 0.75 mL Shugarcaine for 1 mL total. Normally, I use most of this milliliter to irrigate under the iris on both sides of the pupil. This volume is much larger than my usual 0.2 mL of lidocaine for a standard case, but I have not seen any signs of toxicity. The solution does not increase pupillary dilation, but it stiffens the iris and makes it much more manageable during surgery. Also, whereas bimanual pupillary stretching is ineffective for the floppy iris, I find the technique works fine when I have pretreated the iris with *epi-Shugarcaine*.

#### RICHARD S. HOFFMAN, MD

My current phaco technique is a bimanual microincisional approach with horizontal chopping. With any chopping procedure, several maneuvers will facilitate the lens' extraction. First, performing adequate cortical cleaving hydrodissection followed by 180° to 360° rotation of the lens will ensure the lysis of the cortical capsular connections and the free mobility of the epinucleus. Hydrodelineation of the endonucleus from the epinucleus fol-

lows. If hydrodelineation precedes the rotation of the nucleus, it is possible that inadequate cortical cleaving hydrodissection will result in endonuclear mobility alone, with the epinucleus and cortex still fixed to the capsular bag. Therefore, I always perform the hydro-steps in the following order: hydrodissection followed by the complete rotation of the lens and then hydrodelineation. This chronology facilitates the removal of both the epinucleus and the cortex.

The most common mistake surgeons new to chopping make is not positioning the phaco needle and chopper sufficiently deep during the chopping maneuver. After placing the horizontal chopper deep into the golden ring or endonuclear/epinuclear interface, I bury the phaco needle as proximally as possible to a depth of 2 mm (more superficial insertions can be used for softer lenses). On coaxial cases, setting the irrigation sleeve to expose 2 mm of the phaco needle's tip allows me to bury it completely to the irrigation sleeve without worries of penetrating the posterior capsule. The proper depth of both the chopper and phaco needle will guarantee a good chop. When addressing the residual heminucleus, placing the chopper first before burying the phaco needle will avoid dislodging the nuclear fragment from the needle, as might occur if the chopper were inserted last.

### THOMAS KOHNEN, MD

For better access to the eye, I find a temporal, posterior limbal incision to be astigmatically neutral in 90% of cases. I shift to the steep meridian when the astigmatism is between 0.50 and 1.00 D in that meridian. If the amount of astigmatism is larger, I use limbal relaxing incisions and toric IOLs.

I create the cataract incision with a 2-mm steel knife and then proceed with cortical removal and hydrodissection. For phacoemulsification in 90% of my cases, I use an advanced divide-and-conquer technique, because the new phaco machines are so efficient. I regularly use both the Inifiniti Vision System (Alcon Laboratories, Inc.) and the Stellaris Vision Enhancement System (Bausch & Lomb, Rochester, NY), but I also occasionally work with the Sovereign cataract extraction system (Advanced Medical Optics, Inc., Santa Ana, CA) and the Geuder Megatron S3 (not available in the US; Geuder AG, Heidelberg, Germany). For very hard nuclear cataracts, I switch to chopping. I remove cortex with the Koch/Kohnen bimanual A/I system (not available in the US; Geuder AG).

To maintain astigmatic neutrality, I use IOLs that fit through a 2-mm incision. I prefer the AcrySof SA/N series with the D cartridge (Alcon Laboratories, Inc.) for

a wound-assisted technique or the MI60 lens (Bausch & Lomb). I remove the ophthalmic viscosurgical device (Provisc [Alcon Laboratories, Inc.] or Healon, Healon GV, or Healon5 [Advanced Medical Optics, Inc.]) from behind the IOL first and then from in front of the lens.

My colleagues and I do not add antibiotics to the irrigating solution or inject them intracamerally, because the infection rate at our hospital is very low (fewer than one in 3,000 cases).

I always conclude the phaco procedure by closing the incisions (hydrating the two 0.9-mm paracenteses and the 2.0- to 2.1-mm cataract incision) and ensuring that they are watertight. ■

*Section Editor William J. Fishkind, MD, is Co-Director of Fishkind and Bakewell Eye Care and Surgery Center in Tucson, Arizona, and Clinical Professor of Ophthalmology at the University of Utah in Salt Lake City. He is a consultant to Advanced Medical Optics, Inc. Dr. Fishkind may be reached at (520) 293-6740; wfishkind@earthlink.net.*



*Luther L. Fry, MD, is in private practice at Fry Eye Associates in Garden City, Kansas, and he is Clinical Assistant Professor of Ophthalmology at the University of Kansas Medical Center in Kansas City. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Fry may be reached at (620) 275-7248; lufry@fryeye.com.*



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



*Thomas Kohnen, MD, is Professor of Ophthalmology and Deputy Chairman at the Johann Wolfgang Goethe-University Clinic in Frankfurt, Germany, and he is Visiting Professor at the Baylor College of Medicine in Houston. He is a scientific advisor to Alcon Laboratories, Inc., and Bausch & Lomb. Dr. Kohnen may be reached at +49 69 6301 6739; kohnen@em.uni-frankfurt.de.*



*Louis "Skip" D. Nichamin, MD, is Medical Director of the Laurel Eye Clinic in Brookville, Pennsylvania. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Nichamin may be reached at (814) 849-8344; ldnichamin@aol.com.*

