

Tips for Easier, Safer Phacoemulsification: Part 2

BY GARRY P. CONDON, MD; ELIZABETH A. DAVIS, MD; AND SUSAN M. MACDONALD, MD

A second set of surgeons describes important techniques that make phacoemulsification easier and lessen the risk of complications.

GARRY P. CONDON, MD

When faced with the intimidating dense, dark brown cataract, I prefer to fall back on a modified divide-and-conquer approach. Although it sounds unsophisticated in a world full of fancy phaco chopping, this form of emulsification along with supplemental viscoelastic can predictably produce clear corneas on day 1. I have achieved this result even with very dense lenses requiring far more phaco energy than the average case. The key factors contributing to a relaxed and successful case are the creation of very deep, extra wide grooves and the replenishment of viscoelastic before the removal of nuclear quadrants.

Regardless of how one segments a dense lens, all of the

“With the intimidating dense, dark brown cataract, I ...[use] a modified divide-and-conquer approach.”

—Garry P. Condon, MD

nuclear material must be emulsified to travel up the phaco tip. Expending the vast majority of ultrasonic energy posterior to the iris plane, as far from the cornea as possible, places the least stress on the endothelium and permits the emulsification of smaller nuclear quadrants in the anterior chamber. I find that injecting more

(Courtesy of Garry P. Condon, MD.)

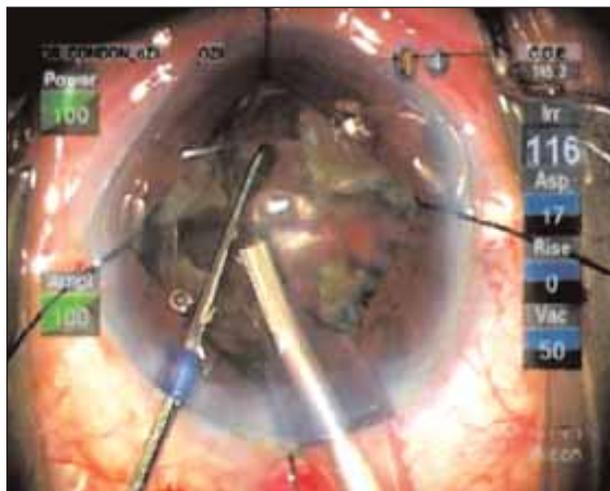


Figure 1. Creating overly deep and wide nuclear grooves produces smaller quadrants requiring less energy and manipulation in the anterior chamber.



Figure 2. Despite a cumulative dispersed energy of 138 in this eye, less work in the anterior chamber and replenishing viscoelastic results in a clear cornea on day 1.

(Courtesy of Garry P. Condon, MD.)

Viscoat viscoelastic solution (Alcon Laboratories, Inc., Fort Worth, TX) prior to removing the quadrants maximizes endothelial protection and thus results in clearer corneas.

Using 100% torsional and longitudinal phacoemulsification, I create overly wide and deep nuclear grooves within the capsular bag (Figure 1). The cumulative dispersed energy is already greater than 100, but that is not the whole story in that all of this energy has been expended within the capsular bag. The resultant small quadrants require less energy to emulsify more anteriorly

with pure torsional ultrasound under added Viscoat. The cornea in this case is crystal clear on day 1, despite a cumulative dispersed energy of 138 (Figure 2).

With a hard brown cataract, the techniques I have described allow me to relax, spend less time and energy in the anterior chamber, and get better results on day 1.

ELIZABETH A. DAVIS, MD

My current phaco procedure is supracapsular high-vacuum phacoaspiration. I prefer this technique, because I find it minimizes capsular/zonular stress and

(Courtesy of Elizabeth A. Davis, MD.)

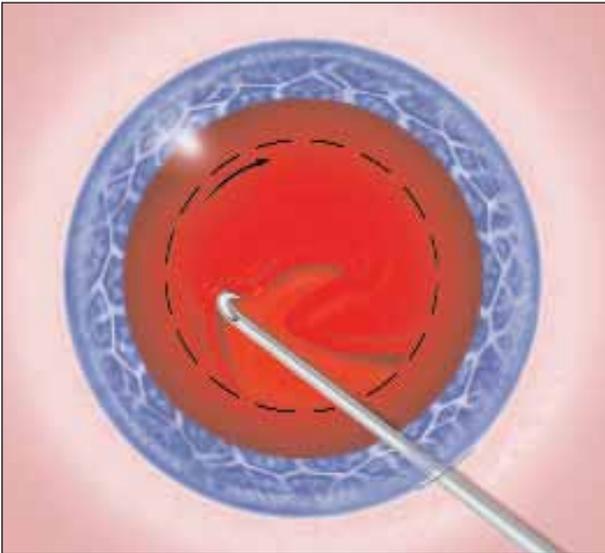


Figure 3. The surgeon creates a capsulorhexis of at least 5 mm to permit safe hydrodissection.

(Courtesy of Elizabeth A. Davis, MD.)



Figure 4. Hydrodissection continues until one nuclear pole prolapses.

(Courtesy of Elizabeth A. Davis, MD.)

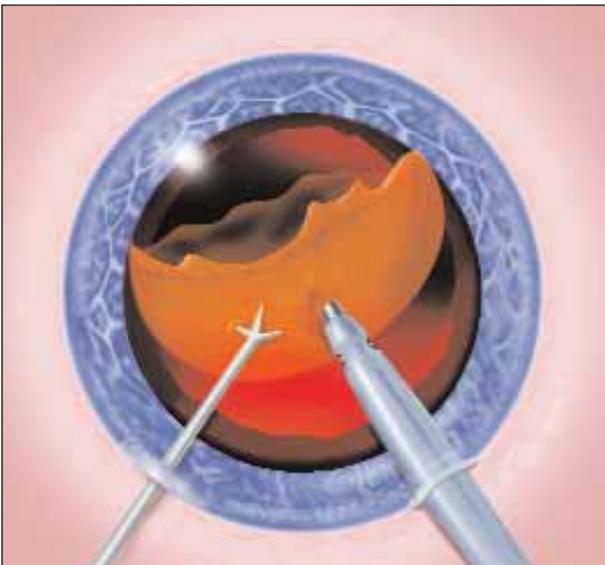


Figure 5. The surgeon performs phacoemulsification under high vacuum.

(Courtesy of Elizabeth A. Davis, MD.)

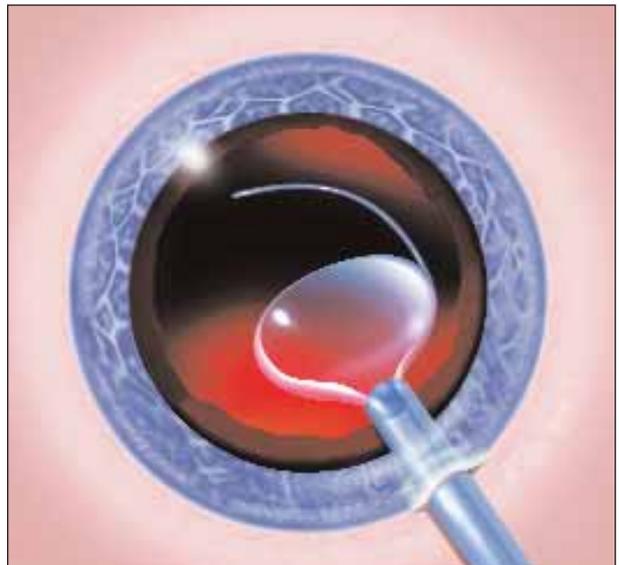


Figure 6. The surgeon removes cortex and inserts the IOL.

almost eliminates the risk of capsular rupture. Employing mostly high-vacuum aspiration and mechanical disassembly of the nucleus conveys little risk of endothelial damage from phaco energy. Here are some tips that I consider key to successful outcomes with this procedure:

1. The capsulorhexis must be at least 5 mm in diameter to permit safe hydrodissection and allow me to prolapse one pole of the nucleus above the anterior capsular border (Figure 3).

“I find [diagonal quick chop] to be the safest and easiest method of nuclear disassembly.”
—Susan M. MacDonald, MD

2. Gentle and complete hydrodissection must continue until nuclear prolapse occurs (Figure 4).

3. A second instrument should support as well as mechanically chop and fragment the nucleus while the surgeon employs high vacuum to aspirate nuclear particles (Figure 5). Attaching a high-resistance outflow device such as Cruise Control (STAAR Surgical Company, Monrovia, CA) or Stable Chamber Tubing (Bausch and Lomb, Rochester, NY) to the aspiration line on the phaco handpiece will prevent postocclusion surge. I like to work from the outside inward. I aspirate the soft outer shell of the nucleus first and rotate it as I work toward the denser core.

4. Except in cases of 4+ nuclei, almost no ultrasound energy is required if lenticular particles are broken into small pieces. Although a little extra time may be required, the average total surgical time is typically 10 minutes or less.

5. Cortical cleanup and the IOL's insertion are standard (Figure 6).

Supracapsular high-vacuum phacoaspiration has served my patients and me well over the years. I find it to be efficient, safe, and fun. I have taught the procedure to my fellows, many of whom have adopted it as part of their standard technique.

SUSAN M. MACDONALD, MD

My current phaco technique is diagonal quick chop, which I find to be the safest and easiest method of nuclear disassembly. As with all phaco procedures, a well-constructed wound and capsulorhexis are critical. Equally important is generous hydrodissection resulting in a freely rotating nucleus.

My next step is to put the phaco tip and chopper

(Seibel nucleus chopper; Ambler Surgical Corp., Exton, PA) in the anterior chamber. I bury the phaco tip in the center of the nucleus with a short burst of phaco power (20% to 30% ultrasonic power for 20 milliseconds). I adjust the power depending on the nuclear density. If using torsional phacoemulsification, I adjust the amplitude to between 30% and 50% with a short burst, which limits movement of the phaco needle and allows me to bury it. I then allow vacuum to build in foot position two (dynamic rise of two, vacuum setting of 425 mm Hg).

I place my second instrument ahead of the phaco tip, push the chopper down into the nucleus, and pull peripherally toward a point between the main incision and the paracentesis. I chop the nucleus into four to seven pieces (fewer for a soft nucleus, more for a hard one). Once the nucleus has cracked, I change the phaco settings to 100% linear torsional continuous. If not using torsional ultrasound, I will employ a pulsed linear phaco setting.

I find this technique safe and easy to learn. It expends limited energy in the eye, and all of the phacoemulsification occurs in a safe zone. ■

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.

Garry P. Condon, MD, is Associate Professor of Ophthalmology at Drexel University College of Medicine in Pittsburgh. He is on the speakers' bureau for Alcon Laboratories, Inc. Dr. Condon may be reached at (412) 359-6298; garlinda@usaor.net.



Elizabeth A. Davis, MD, is a partner at Minnesota Eye Consultants, PA, and is Director of Minnesota Eye Laser and Surgery Center, both in Bloomington. Dr. Davis is also Adjunct Assistant Clinical Professor of Ophthalmology at the University of Minnesota in Minneapolis. She is a consultant to Advanced Medical Optics, Inc., Bausch & Lomb, and STAAR Surgical Company. Dr. Davis may be reached at (952) 567-6067; eadavis@mneye.com.



Susan M. MacDonald, MD, is Assistant Clinical Professor at Tufts School of Medicine in Boston and Director of Comprehensive Ophthalmology at the Lahey Clinic in Burlington and Peabody, Massachusetts. She acknowledged no financial interest in the products or companies mentioned herein. Dr. MacDonald may be reached at (978) 538-4400; susan.m.macdonald@lahey.org.

