Favorite Phaco Technique II

BY WILLIAM J. FISHKIND, MD, FACS; JACK A. SINGER, MD; AND DON R. NIXON, MD

WILLIAM J. FISHKIND, MD, FACS

In June's edition of *Cataract & Refractive Surgery Today*, four surgeons responded to the query, "what is your preferred method of phacoemulsification?" In this installment, two more colleagues and I share our choices.

I like to phaco chop and do so whenever feasible. If the nucleus is too soft, I will hydrodissect and aspirate it. With careful, cortical cleaving hydrodissection, the nuclear/epinuclear/cortical complex will spin without restraint inside the capsular bag and is therefore easily mobilized. Hydrodelineation demarcates the endonucleus from the epinucleus.

I vertically chop all but the hardest of endonuclei with a bluntly tipped Nagahara Chopper (Katena Products, Inc., Denville, NJ). One vertical chop usually bisects a soft endonucleus, and I will then elevate each heminucleus to the iris plane for emulsification. With a hard nucleus, I create four or six pie-shaped segments and emulsify them at the iris plane. For the extremely hard nucleus, I use a sharp, Nichamin-style chopper (Rhein Medical Inc., Tampa, FL) to cut the endonucleus into multiple segments until the nuclear rigidity has been counteracted and then, again, emulsify the segments at the iris plane.

With the hardest nuclei, I carefully retract the sleeve to leave 1mm of exposed phaco tip. Doing so allows the tip to enter the nucleus deeply enough for chopping. Otherwise, it is difficult to hold the nucleus on the phaco tip. Applying downward pressure will cause the nucleus to wiggle uncontrollably, often pushing it off the phaco tip. An additional trick is to use brief bursts of phaco power to embed the tip in the nucleus for the first chop. Disproportionate power permits the emulsification of the nuclear material surrounding the tip and defeats the seal around the phaco tip. With subsequent aspiration to hold the nucleus for chopping, fluid flows around the sleeve, and there is inadequate aspiration at the phaco tip to hold the nucleus in place for chopping. The result will be the same as noted earlier.

After the endonucleus' removal, the epinucleus and cortex become flexible. Performing an epinuclear flip is straightforward. I use foot pedal position 0. The vitreous shifts anteriorly and supports the posterior capsule. The phaco tip lightly embeds in the remaining epinuclear material. Gentle forward and horizontal (not downward) pressure away from the incision causes the distal epinucleus to scroll around the equator and present at the plane of the capsulorhexis. Stepping once again on the foot pedal causes the anterior chamber to deepen, and I emulsify the residual epinucleus and cortex at, or anterior to, the plane of the capsulorhexis. If a surge occurs, I am therefore not likely to rupture the posterior capsule due to the space between it and the active phaco tip.

Modern phaco machines give me adequate energy and power modulations as well as sophisticated fluidics so that I can vertically chop almost every nucleus.

JACK A. SINGER, MD

I favor lensquake phacoemulsification, a type of vertical cracking that uses a hexagonal, curved Cobra phaco tip (Surgical Design Corp., Armonk, NY). The tip's shape prevents nuclear rotation around the axis of the phaco needle so that any forces applied by a nucleus manipulator are transferred to the nuclear fault lines that run from the Y sutures to the equator and posterior pole. Moreover, the additional mass and the funnel-shaped head of the Cobra tip focus ultrasonic traveling waves and cavitation inside the tip, thereby enhancing the efficiency of both the lensquake inducement and segmental removal.

I have used the Storz Osher nucleus manipulator (Bausch & Lomb, Rochester, NY) and find it ideal for lensquake phacoemulsification. The instrument has two blunt, finger-like projections that may be used for a variety of maneuvers.

To perform lensquake phacoemulsification, I use the following settings on the Ocusystem Advantage (Surgical Design Corp.). For the initial lensquake of the whole nucleus, I employ linear power increasing from 10% to 60% power, a linear flow rate increasing from 33 to 40mL/min, a nonlinear vacuum limit of 200mmHg, and an adjustable rise time with an activation point of 85mmHg, which triggers a reduced flow rate of 8mL/min. For the subsequent phacoemulsification of nuclear segments and their removal, I use the same power settings, a linear flow rate increasing from between 30 and 40mL/min to between 40 and 48mL/min, a linear vacuum limit rising from 200 to

500mmHg, and the same adjustable rise time mentioned earlier.

DON R. NIXON, MD

My preference for nuclear disassembly is a horizontal chopping technique. Chopping has progressively supplanted the divide-and-conquer approach, mostly because the former replaces phaco energy in the eye with controlled mechanical disassembly.

In my practice, I have a high percentage of grades 3 and 4 cataracts. In addition, greater than 30% of my patients have pseudoexfoliation and inherently weak zonules. I find that horizontal chopping induces the least stress (especially in the anterior/posterior directions) on the zonular network. Proper hydrodissection is essential to allow a point of access for the chopper between the anterior capsule and nucleus 180º away from the incision to extend to the equator of the lens. Properly positioning the phaco needle sufficiently deep into the nucleus, in the same meridian, holds the lens in such a way that there is little if any stress to the zonules during chopping back toward the needle. With adequate hydrodissection, this technique allows the nucleus to rotate free of the epinuclear shell, minimizes zonular stress, and provides a fluid interface that protects the posterior capsule.

I use two types of choppers with this technique depending on the cataract's grade. For dense cataracts, the durable, extended Storz Rosen chopper (Bausch & Lomb) with a sharp back cutting edge works extremely well. For softer cataracts, a wider blade and bluntly tipped surface such as a modified Storz Sweeney (Bausch & Lomb) allows for manipulation in the soft segments without "cheese wiring" through the nucleus. ■

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