

Which Phaco Tip?

Surgeons share their choices and reasoning.

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Phaco tips, we are always looking for a better one! I have experimented with thick, thin, square, single-beveled, double-beveled, and flared ones and even some that looked like a chisel. I found that the standard tips performed the best.

I have been using the 0° degree tip since Kunihiro Nagahara, MD, introduced the concept in the mid-1990s. The design makes sense to me. The tip focuses power directly before it (Figure 1), and it maximizes aspiration forces directly in front of it. As a result, there are no gymnastics rotating the tip to engage nuclear fragments. Because the tip is not sharp like a 30° design, it is friendlier to the capsule.

I perform vertical chopping. Because I do not sculpt, I do not need a bevel. Impaling the tip within the endonucleus for chopping is effortless, and mobilizing fragments is straightforward. With the phaco energy and aspirating forces directly in front of the tip, emulsifying those fragments is no problem. Why use an angled Kelman tip that sprays energy in an uncontrolled fashion throughout the anterior chamber, thus damaging the endothelium or the iris vessels and blood-aqueous barrier (Figure 2)?

With a 0° phaco tip, the quality of the emulsification is similar whether the instrument's diameter is 19, 20, or 21 gauge. The smaller the diameter, the longer the emulsification time, and the more manipulation necessary to emulsify the fragments. A 20- or 21-gauge needle is nec-

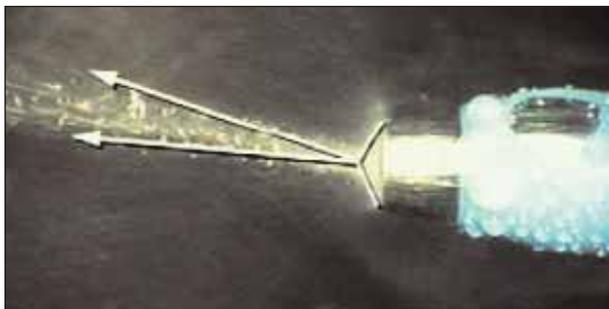


Figure 1. Enhanced cavitation indicates that the propagation of cavitation energy occurs directly in front of the tip. It allows both the jackhammer energy and cavitation energy to work on axis and in unison.

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—William J. Fishkind, MD, FACS

essary for bimanual microincisional cataract surgery.

At this time, a 0° tip represents the best properties of a phaco needle.

BARRY S. SEIBEL, MD

I use a 30° Microflow needle (standard size) with the Millennium microsurgical system (both Bausch & Lomb, Rochester, NY) and a 30° straight Flare Tip ABS (standard size) with the Inifiniti Vision System (both Alcon Laboratories, Inc., Fort Worth, TX). These tips have a variably sized internal diameter with a large distal opening that allows a greater grip for a given level of vacuum as opposed to a small diameter. The large distal dimension also improves efficiency during the emulsification of large volumes of nuclear material compared with a uniformly small-diameter needle. The small-diameter proximal shaft functions to obtund potential postocclusion surges through higher fluidic resistance unlike one of larger diameter. This resistance enhances the stability of the anterior chamber.

Although a Kelman-style bent tip is excellent for sculpting, I think that straight needles form a tighter vacuum seal when embedded in the nucleus and thus produce a stronger grip for such maneuvers as chopping.

I prefer the 30° tip angulation. It gives me maximum flexibility in ensuring that the aspiration port and the surface to be occluded are parallel so as to facilitate effective occlusion. A 0° tip, by comparison, must always be oriented 90° to the nuclear face for the most effective occlusion.

STEVEN DEWEY, MD

I use a bent 19-gauge needle with a 30° bevel (Dewey Radius Tip; Microsurgical Technology, Redmond, WA). For horizontal chopping, the tip stabilizes the nucleus against

the second instrument (Goldberg Nucleus Rotator, Rhein Medical Inc., Tampa, FL) to initiate cleavage without impaling. The tip works for divide and conquer as well.

For efficiency, a bevel increases the size of the lumen's opening, which raises the amount of nucleus exposed to vacuum and ultrasound. The downward bend really changes the way the needle functions. First, it allows the surgeon to work at or below the iris plane through a longer tunnel incision with less "oar-locking" or striae. Second, with the posterior angulation, a 30° bevel has an opening that is vertical in the eye and maintains this vertical apposition to the face of the cleaved nucleus over a rotation of 90° clockwise or counterclockwise. The angulation also allows the surgeon to reach side to side by turning the handpiece with less pivoting of the needle through the incision.

For safety, the Dewey Radius Tip has smooth, completely round edges, which permit the capsule and iris to be aspirated into the lumen of the needle without the subsequent damage usually observed with sharply edged needles. The vertical opening makes it much more difficult to occlude the tip with the capsule. Any bevel oriented upward decreases the risk of aspirating the capsule, but, without the Kelman angulation, the bevel will both direct the ultrasound energy toward the cornea and require the surgeon to work with nuclear fragments more anteriorly.

TERUYUKI MIYOSHI, MD

I either perform coaxial phacoemulsification through a 3.0-mm clear corneal incision or microincisional bimanual phacoemulsification through a 1.6-mm clear corneal incision. I prefer a straight, 19-gauge, 30° ultrasonic tip for both procedures.

I perform zero-time phacoemulsification on cataracts of less than 3+ density (approximately 40% of my cases). My vacuum setting is 400mmHg, the aspiration flow rate is 30mL/min, and the bottle height is 76cm. I use no phaco power, thus the term *zero-time phaco*. I do not believe it is possible to perform this procedure with anything other than a 19-gauge, 30° straight tip.

For cataracts of 3+ density or higher, I use phaco power in a traditional manner. I prefer to mobilize the nucleus into the center of the anterior chamber as soon as possible. I feel it is easier to emulsify a large nucleus, without excessive chatter, by means of the aforementioned tip. It also seems to contribute to an appreciably more rapid and controlled procedure.

During bimanual microincisional phacoemulsification, I insert the same tip, but without a coaxial sleeve, through a 1.6-mm clear corneal incision. I have been impressed to find that the handling of the phaco needle and the progression of the phaco procedure are remarkably similar to standard



Figure 2. In this enhanced-cavitation view, weak cavitation energy can be seen to emanate at a 30° angle to the tip. Strong cavitation energy is visible emanating in the region of the bend. There is no fusion of cavitation and jackhammer energy.

coaxial phacoemulsification. I then enlarge the incision to 2.2mm before injecting an MA60AT IOL with a Monarch II Injector (both Alcon Laboratories, Inc.). ■

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