

The Quest for Smaller Incisions— Kelman Had It Right

Exactly 3 years ago, the first clinical description of Advanced Medical Optics, Inc.'s WhiteStar technology appeared in the inaugural issue of this publication.¹ Wound temperature studies conducted by Randall Olson, MD,² and others have since demonstrated that WhiteStar indeed represents a "cold" phaco technology—one that will not produce thermal damage to tissue. Although pioneers such as Amar Agarwal, MD, and Hiroshi Tsuneoka, MD, had previously published articles on bimanual phaco techniques,^{3,4} the ability to perform sleeveless phacoemulsification with a commercially available phaco machine jump-started a worldwide curiosity in bimanual microincisional phacoemulsification that has been growing ever since.

At first, because of limited inflow with the earliest irrigating choppers, vacuum settings had to be lowered in order to avoid chamber collapse. This drawback spawned a host of compensatory instruments and technologies such as front-irrigating choppers, separate chamber maintainers, forced-infusion pumps, and Staar Surgical Company's Cruise Control device. The articles in this month's cover focus demonstrate that, thanks to these developments, we can now safely use high vacuum levels to remove all grades of nuclei with this instrumentation.

What is the future of bimanual microincisional phacoemulsification, and should most cataract surgeons start to experiment with this technique? Based on my own experience, I believe that this is definitely a viable cataract procedure. However, I still find coaxial phacoemulsification to be faster and more efficient, and it continues to be my preferred technique. Whether the development of microincisional IOLs will drive surgeons to switch to bimanual phacoemulsification also remains to be seen. Sub-3-mm temporal, clear corneal incisions are already self-sealing and astigmatically neutral. Furthermore, it is not inherently obvious that reducing the incision size further will provide significant benefits. Certainly, future IOL selection will primarily be driven by optical benefits (eg, multifocality, adjustability, wavefront-correction, and true or pseudoaccommodation) rather than by incision size. After all, it is the IOL, not the

incision, that is the lasting result of surgery, and a surgeon would not compromise permanent optical benefits for the sake of small differences in incision size.

Nevertheless, this is an appropriate time to evaluate and celebrate the current state of the art of bimanual microincisional phacoemulsification. Most notably, this concept has evolved dramatically in a short period of time. Thanks to innovations in ultrasound power modulation, fluidics, instrumentation, and technique, bimanual microincisional phacoemulsification has become a safe and efficient procedure within just a few years. In addition, the development of hyperpulse phaco technology such as WhiteStar has culminated a decade-long search for alternatives to ultrasound. In the quest to reduce heat and energy, we have tried Erbium and Yag laser phacoemulsification, phacotomesis, sonics, AvantiX (Bausch & Lomb), and AquaLase (Alcon Laboratories, Inc.). It is quite ironic that, after all of this research and innovation, the best modality for removing a lens in 2004 is still ultrasound. In fact, it is the only technology that can remove a brunescens nucleus through a paracentesis-sized incision. We should all pause to reflect upon and marvel at this fact: that we are still using essentially the same ultrasound instrumentation—coaxial irrigating sleeve and all—that Charles Kelman, MD, first dreamed up in the late 1960s. In all of medicine, and in this era of rapidly evolving technology, what a unique situation that must be. ■



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3. Soscia W, Howard JG, Olson RJ. Microphacoemulsification with WhiteStar. A wound-temperature study. *J Cataract Refract Surg*. 2002;28:1044-1046.

4. Agarwal A, Agarwal A, Agarwal S, et al. Phakonit: phacoemulsification through a 0.9 mm corneal incision. *J Cataract Refract Surg*. 2001;27:1548-1552.

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