

Femtosecond Cataract Surgical Technology

BY DAVID F. CHANG, MD; RICHARD S. HOFFMAN, MD; JAY S. PEPOSE, MD, PhD;
STEPHEN G. SLADE, MD; KARL G. STONECIPHER, MD; STEPHEN A. UPDEGRAFF, MD;
AND JOHN A. VUKICH, MD

Femtosecond lasers for cataract surgery may be available sooner than most surgeons anticipated. What is your current opinion of this technology? In what ways do you think femtosecond cataract surgery will transform your practice, domestically and internationally, with regard to cataract extraction and the IOL's placement?

DAVID F. CHANG, MD

As the medical monitor for LensAR, Inc. (Winter Park, FL), I have used the company's system in Mexico to perform cataract surgery. It is definitely a "wow" technology. That the laser can automate some of the most critical steps of cataract surgery will appeal to many surgeons. How this will be paid for and how it will become integrated into our ORs without compromising efficiency are important, but unanswered, questions. To some surgeons, femtosecond cataract technology may simply represent a more expensive way to do what they are already comfortable doing. I, personally, am interested in the technology's potential advantages for the brunescient nucleus, which still challenges most phaco surgeons.

RICHARD S. HOFFMAN, MD

It is extremely exciting that femtosecond lasers can be used to disassemble the lens nucleus and create a perfectly centered capsulorhexis. They can also be used to perform limbal relaxing incisions and perforating keratotomies for lens aspiration and the IOL's insertion. Femtosecond lasers for intraocular use may become the preferred technology for cataract surgery in the near

future, but first, many obstacles will need to be overcome. Most important are the forces within health care delivery that will be stressing lowering costs. This technology will add expense to an already poorly reimbursed procedure. The ultimate question ophthalmologists will need to ask themselves is whether it is worthwhile to purchase an expensive femtosecond laser with high yearly maintenance fees in exchange for small gains in precision for the capsulorhexis' and the corneal incision's creation. If the technology can be implemented in the OR for a reasonable cost to the surgeon and patient, then femtosecond lasers for cataract surgery may prevail, assuming that technological limitations do not become an issue (ie, scarred corneas, fibrotic capsules, or dense cataracts block laser energy from passing into deeper structures of the eye).

JAY S. PEPOSE, MD, PhD

The application of femtosecond lasers to cataract surgery has a transformative potential in contrast with many iterative changes that have been made in phacoemulsification over the past 15 years. The technology offers the benefits of a central, round, computer-controlled capsulotomy; flexible lens-cutting patterns; and a precisely located, sized, and constructed incision. The challenges to the technology's widespread adoption will be the need to develop user-friendly interfaces, ergonomic designs, reasonable throughput in different surgical settings with varying numbers of simultaneous users, and a business model that works for patients, surgeons, and industry. Many new technologies seem to be vying for the premium IOL patient's out-of-pocket outlay. Given price elasticity, time will tell which of these technologies prove to be truly cost effective and to provide better outcomes and enhanced safety. That "value" proposition may have a different appeal to specific subsets of patients in both domestic and international settings.

STEPHEN G. SLADE, MD

I am impressed with femtosecond laser technology for cataract surgery. We were fortunate to be the first in the United States to use the laser for the cataract procedure, and we have been very happy with the results. I believe the femtosecond laser will add precision and safety and will produce better refractive results for our cataract patients. In my experience, patients' acceptance has been outstanding.

KARL G. STONECIPHER, MD

As with any new technology, we have to wait to see what will come to fruition. However, we already know several things about this technology, including that femtosecond lasers have improved the safety of refractive surgery by fourfold.¹ They have also reduced surgical time, and patients perceive femtosecond lasers as a safe technology.

While attending the ASCRS meeting in Boston last month, I asked several attendees what they found to be the most exciting topic presented. Without a doubt, everyone I asked answered femtosecond cataract surgery. The future of cataract surgery looks bright with this technology on the horizon.

STEPHEN A. UPDEGRAFF, MD

The introduction of femtosecond cataract removal linked with the precision of optical coherence tomography is going to revolutionize ophthalmology. The applications will be endless as the lasers and imaging capabilities are refined. Intercapsular (within the bag) cataract removal through a microscopic anterior opening is now feasible, heralding the use of new IOL materials and designs that will be more effective at reversing the effects of presbyopia. Other uses of the infrared femtosecond laser will include photobleaching of the chromophores in the aging lens and preventing the onset of visually significant cataracts, which could be a major step in controlling the number-one cause of blindness worldwide.

JOHN A. VUKICH, MD

Femtosecond-assisted cataract surgery is the first major innovation since the introduction of phacoemulsification. Although we are currently achieving good results with cataract surgery, we have reached a plateau in how accurate we can be with manual incisional techniques. The use of a precision-guided laser to create corneal incisions and capsulotomies and to soften the lens will bring a greater level of consistency and, ultimately, better visual outcomes. Three companies are simultaneously developing this technology, LenSx

Lasers, Inc. (Aliso Viejo, CA), LensAR, Inc., and Optimedica Corporation (Santa Clara, CA). That multiple companies are racing to bring a femtosecond cataract laser to market is a strong indication that many believe the market potential is significant. ■

Section editor John F. Doane, MD, is in private practice with Discover Vision Centers in Kansas City, Missouri, and he is a clinical assistant professor with the Department of Ophthalmology, Kansas University Medical Center in Kansas City, Kansas. Dr. Doane may be reached at (816) 478-1230; jdoane@discovervision.com.

David F. Chang, MD, is a clinical professor at the University of California, San Francisco. He is a consultant to and medical monitor for LensAR, Inc. Dr. Chang may be reached at (650) 948-9123; dceye@earthlink.net.

Richard S. Hoffman, MD, is a clinical associate professor of ophthalmology at the Casey Eye Institute, Oregon Health & Science University, and he is in private practice at Drs. Fine, Hoffman & Packer in Eugene, Oregon. Dr. Hoffman may be reached at (541) 687-2110; rshoffman@finemd.com.

Jay S. Pepose, MD, PhD, is the director of the Pepose Vision Institute and a professor of clinical ophthalmology and visual sciences at the Washington University School of Medicine in St. Louis. Dr. Pepose may be reached at (636) 728-0111; jpepose@peposevision.com.

Stephen G. Slade, MD, is a surgeon at Slade and Baker Vision in Houston. He serves as the medical director for LenSx Lasers, Inc. Dr. Slade may be reached at (713) 626-5544; sgs@visiontexas.com.

Karl G. Stonecipher, MD, is the director of refractive surgery at TLC, in Greensboro, North Carolina. Dr. Stonecipher may be reached at (336) 288-8523; stonenc@aol.com.

Stephen A. Updegraff, MD, is the medical director of Updegraff Vision in St. Petersburg, Florida. Dr. Updegraff may be reached at (727) 822-4287; updegraffmd@upvision.com.

John A. Vukich, MD, is a partner at the Davis Duehr Dean Center for Refractive Surgery in Madison, Wisconsin. He is a consultant to and investigator for Optimedica Corporation. Dr. Vukich may be reached at (608) 282-2000; javukich@facstaff.wisc.edu.



1. Stonecipher K, Ignacio TS, Stonecipher MN. Advances in refractive surgery: microkeratome and femtosecond laser flap creation in relation to safety, efficacy, predictability, and biomechanical stability. *Curr Opin Ophthalmol.* 2006;17(4):368-372.