

Laser Cataract Surgery: the Next New Thing in Ophthalmology

Mainstream consumers' experiences foster more rapid adoption across the spectrum of technological innovation, including what you have to offer as an eye surgeon.

BY SHAREEF MAHDAVI

In 2010, ophthalmologists became aware of the next big revolution in the field: using a femtosecond laser to perform cataract surgery. Seemingly out of nowhere, four companies emerged with announcements, booth demonstrations, and approvals. Those fortunate to be at the Aspen Invitational Refractive Symposium in March of that year sat in awe as Stephen Slade, MD, showed videos of his first cases. These were performed not experimentally outside the United States but commercially, and fully FDA approved, in his Houston-based office. Yes, his office, not the surgery center or hospital.

Later in the year, Alcon Laboratories, Inc. (Forth Worth, TX), acquired LenSx Lasers Inc. (Aliso Viejo, CA), a move that validated this new category as “for real,” given that the acquisition took place prior to any revenue-based shipments. There is much excitement and anticipation among surgeons who want to offer laser cataract surgery to their patients. Is the buzz warranted? This article examines the main questions that seem to be on everyone's mind.

WHO WILL PAY FOR IT?

Many surgeons wonder, who is going to pay for the procedure? That answer is easy: the patient. Refractive surgery—and all of elective medicine—has been developed on the premise that patients are consumers who pay directly for their elective procedures. Laser vision correction is just one of myriad procedures that patients choose to pay for to see, look, sleep, smile, and feel better.

Cataract surgery has a refractive component that the Centers for Medicare & Medicaid Services (CMS) deemed

elective when they began allowing patients to pay separately for the use of specific IOLs (presbyopia-correcting or toric) and/or specific devices that may improve their refractive outcomes. The femtosecond laser is another tool that is showing great promise for delivering a clinical benefit in terms of both improved visual results and fewer complications.

A recent survey of cataract and refractive surgeons (N = 53; cataract procedures per year = 50,100) who are planning on adopting the femtosecond laser showed a range of opinions as to what percentage of their current base of cataract patients will choose to have laser cataract surgery. Broken down into three groups of patients (current premium IOL, additional premium IOL, and standard IOL patients with astigmatism), opinions vary widely among surgeons as to how many of their patients will also choose (and pay for) use of the laser. Further analysis of survey data shows that surgeons predict that approximately 30% of their cataract patients will also have their procedure performed with a laser (Table 1).

DO WE NEED IT?

Some observers may contend that cataract surgery is already safe and effective. It is, after all, the most widely performed surgical procedure in the United States. Based on my communications with several surgeons involved in laser cataract surgery, however, data still document intra-operative complications, as evidenced by reports that three to five vitrectomy packs are sold for every 100 phaco packs. Of these, one can be attributed to a planned proce-

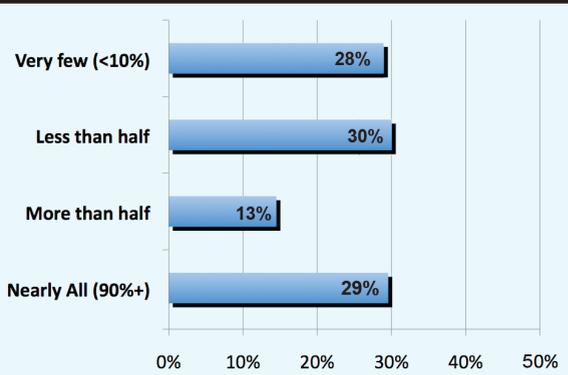
**IMPACT OF THE FEMTOSECOND LASER ON PATIENTS' DECISION MAKING IN CATARACT SURGERY
SURVEY OF CATARACT AND REFRACTIVE SURGEONS (N = 53)**

KEY DEMOGRAPHICS OF SURVEY

- **Total number of surgeons:** **53**
- **Total cataract procedures/year:** **50,100**
- **Average procedures per surgeon:** **945**
(range, 100-4,000)
- **Conversion rate to premium IOL:*** **26%**
(range, 7%-75%)

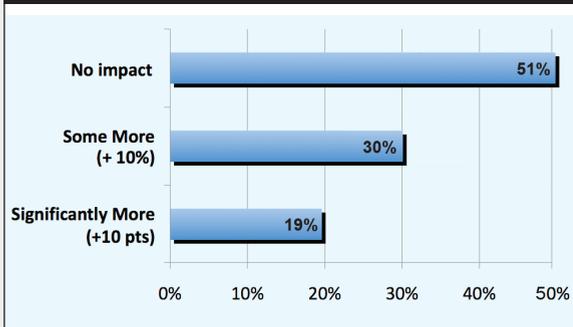
(*Premium IOL includes presbyopic and toric.)

What percentage of your current premium IOL patients would also have the laser for their cataract surgery?



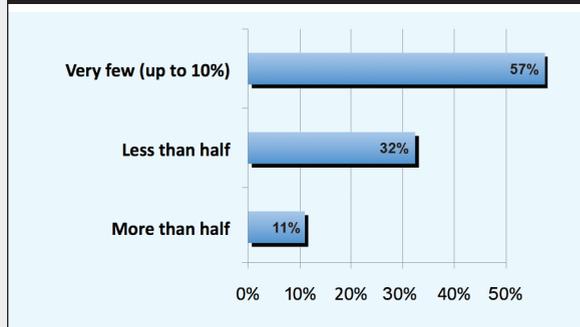
(Fee for premium IOL increases by up to \$1,000 per eye to incorporate laser into their surgery.)

How many more patients would choose a premium IOL if you were able to offer the laser for their cataract surgery?



(Fee for premium IOL increases by up to \$1,000 per eye to incorporate laser into their surgery.)

Among your standard IOL patients who present with astigmatism, how many would choose the laser for their cataract surgery?



(Fee of \$1,000 per eye is charged directly to the patient.)

dures, but vitrectomies handled with Weck-Cel sponges (Medtronic ENT, Jacksonville, FL) are not reported. The balance, unfortunately, are necessitated by broken capsules, which may lead to inferior outcomes.

The promise to make cataract surgery safer and less prone to complications appeals to consumers, especially when they already have to pay out of pocket for added benefits such as presbyopia-correcting IOLs and astigmatic correction. A case in point is LASIK, the first breakthrough use of the femtosecond-wavelength laser. The question, do we need it? was asked 10 years ago (including by the author¹) when the femtosecond laser was being developed to create the LASIK flap. With time, clinical experience, and technological refinement, the IntraLase FS Laser platform (Abbott Medical Optics Inc., Santa Ana, CA) gained

widespread acceptance and was followed by products from several other manufacturers. Today, the femtosecond laser is used to create the majority of LASIK flaps globally. Consumers have shown a willingness to pay several hundred dollars more for the added safety (both real and perceived) that a laser-based flap brings to LASIK.²

Consumers place a high value on safety and reduced risk. Seat belts for driving, insurance against catastrophe, and helmets for bicycling are just three examples of how safety permeates decision making in our society. The same will hold true for laser cataract surgery.

WILL IT GROW THE MARKET?

What will the laser's impact be on the demand for cataract surgery? This may be the wrong question to ask.

In the LASIK category, consumer demand is driven by multiple variables that extend beyond clinical efficacy and safety. They include the economy, positive and negative press, and demographics. Refractive surgeons' revenue and profitability increased with their adoption of the femtosecond laser, and the availability of a laser-created flap permitted patients to choose a premium form of LASIK. In hindsight, it is clear that the market, in a sense, has voted *for* the femtosecond laser's use in LASIK.

With cataract surgery, a very different market dynamic is at work. The demand is already in place, with more than 3.3 million procedures performed in the United States (18.9 million worldwide) in 2010. This market is already three to four times as large as that for LASIK and does not need to be built from scratch year after year.

Surgeons and industry should focus on market conversion rather than expansion. The business objective around conversion is twofold. In the near term, it is about improving the conversion of cataract surgery to premium cataract surgery, where much greater value for the services performed is communicated, accepted, paid for, and realized by both the patient and the surgeon. Several key steps have already been taken, notably the ruling by the CMS allowing surgeons to charge patients separately for premium IOLs, advanced measurements, and enhancements. Collectively, these are part of the transition to labeling cataract surgery more accurately as a lens-based refractive procedure.

In the longer term and with more widespread adoption, femtosecond laser surgery should become a commonly accepted option for cataract patients who see its value and are willing to pay for it. As with any elective procedure, those providers who most effectively educate patients will succeed. This will continue to hold true as long as doctors collect fees directly from patients, because the doctor-patient relationship is also one of doctor-customer.

REVERSING THE TREND TOWARD COMMODITIZATION

Over time, cataract surgery has become commoditized, with third-party payers seeking to reduce its monetary value while surgeons seek to preserve it. The femtosecond laser offers a golden opportunity to *increase* the value of cataract surgery for surgeons and patients. Given the state of the health care system and the intense pressure created by an aging population, no one should expect the CMS or private insurance to pay for laser cataract surgery. That is for the best, in my opinion. The profession would be well served if regulations evolved in a similar fashion as the CMS ruling allowing separate fees for premium IOLs, a decision

that was thought highly unlikely—right up until it happened.

A ROBUST MARKET

The activity among manufacturers is underway, and multiple competitors in this category will form a robust market. Innovation will make these laser platforms increasingly functional and easy to use. Alcon's LenSx laser as well as those from LensAR, Inc. (Winter Park, FL), OptiMedica Corporation (Santa Clara, CA), and Technolas Perfect Vision (St. Louis, MO) were on display at last year's AAO meeting. Technolas has taken an innovative step by showing a combined system that allows the surgeon to use the same laser for cataract surgery as the creation of the LASIK flap. Abbott Medical Optics Inc. has announced plans to upgrade its IntraLase platform to perform at least part of the cataract's extraction.

Companies are refining their plans for commercialization, securing regulatory approvals, and developing the financial models that will allow surgeons to integrate an expensive capital device. There is healthy merger-and-acquisition activity in the field as well, showing that investors believe in the value of this technology. Given the unknowns, manufacturers' help will be essential to ophthalmologists' acquisition and integration of this technology into a surgical practice.

WHAT IS DRIVING CONSUMERS?

The biggest question I am asked is: will consumers actually pay for laser cataract surgery? As with the safety issue, I refer again to the refractive counterpart in ophthalmology: laser vision correction. About 20 years ago, surgeons and industry executives questioned whether anyone would pay for the privilege of having laser surgery. That question has been answered. Today's cataract surgery market is very different than it was 30, 20, or even 10 years ago. Today's cataract patients are well aware that they can visit an eye surgeon and have an outpatient procedure that lets them see without glasses. According to Los Angeles surgeon Samuel Masket, "Many of my patients may not want to pay extra for their cataract surgery, but pretty much all of my patients expect a refractive-like outcome."

Dr. Masket's sentiment captures what has been missing from the cataract surgery equation: LASIK-like unaided vision. LASIK trials indicate that 20/20 vision is routinely achieved in 95% of patients, but this benchmark is only achieved by slightly more than half of cataract surgery patients. The potential to raise the percentage of patients who do not require glasses after cataract surgery—effectively making standard outcomes better—is of huge

interest to all stakeholders: surgeons and patients, manufacturers, venture capitalists, payers, and regulators. LASIK-like outcomes are an emerging goal for the industry that has spawned ORange (WaveTec Vision, Aliso Viejo, CA) and the TrueVision 3D System (TrueVision Systems, Inc., Santa Barbara, CA). These and innovations in the IOL's design will undoubtedly be explored to achieve the goal of a refractive cataract procedure.

The other main factor that will influence the adoption of laser cataract surgery is the reaction of the baby boomer generation. It has transformed virtually every industry it has "touched" over its lifetime; cataract surgery will be no exception. The first boomers turned 65 in January 2011, and this large demographic will create growing demand for cataract surgery, improved outcomes, and a more concierge-like experience. Their expectations, which have been well defined over the years, have several key implications for this category.

No. 1. Do not differentiate based on technology

One of the major mistakes in the commercialization of laser vision correction occurred when manufacturers and surgeons attempted to draw distinctions based on what type of laser was being used. This approach was not meaningful to consumers and served to confuse and delay their decision making. Instead, the discussion should be based on the benefits to the patient, which are similar across all manufacturers. The built-in demand described earlier is already in place; consumers and patients simply need to be educated on how laser cataract surgery is different and what advantages it offers compared with traditional cataract surgery.

No. 2. Do not bash current technology

Phacoemulsification has made cataract surgery a highly safe and effective procedure. It will continue to exist for the foreseeable future, and it is imperative to the new category that surgeons and staff do not degrade a procedure that has been successful for over 40 years.

No. 3. Do not call it *cataract surgery*

This new category should have a name that distinguishes it from what is currently known as cataract surgery. The procedure should be renamed *laser cataract surgery* or *lens-based laser surgery*. A name will help the procedure develop its own "badge" and begin to separate it from traditional cataract surgery and the trend toward commoditization described earlier.

No. 4. Stop using the term *cataract*

The term *cataract* no longer accurately describes what is happening inside the eye. The word is used to

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For more information on getting started with laser cataract surgery, click eyetube.net/video/sex-lies-and-videotape-lessons-for-cataract-surgeons-in-2011/ to view Shareef Mahdavi's talk *Sex, Lies, and Videotape: Lessons for Cataract Surgeons in 2011*



justify reimbursement more than to document the clinical degradation of vision. Harvey Carter, MD, was the first surgeon I heard use the phrase *dysfunctional lens syndrome* with his patients. This is more than just clever; it is an example of effective communication in relevant terms. Dr. Carter of Dallas continues to be one of the nation's leading implanters of presbyopia-correcting IOLs. Atlanta-based surgeon Trevor Woodhams began describing cataract surgery to his patients as the end rather than the beginning of a disease process that happens to most people; it takes place over a period of years, he explains, and significantly affects vision, first with the stiffening of the lens (presbyopia) and ultimately with the clouding of the lens. Vance Thompson, MD, in practice in Sioux Falls, South Dakota, adds the notion of gradual and progressive degradation of the quality of vision.

These surgeons have learned that calling what someone has a *cataract* makes it harder for the patient to understand his or her condition. That term may have served well when the diagnosis and removal of a cataract was defined by regulations and paid for by another entity. Now, and in the future, this medical milestone will be increasingly defined by lifestyle requirements and paid for directly by the patient—at least the refractive portion. Eric Donnenfeld, MD, puts it this way: just as presbyopia becomes associated with "middle age," the term *cataract* becomes associated with "old age." Today's aging baby boomers refuse to be thought of as senior citizens, because people now routinely live into their 80s and 90s. In this emerging context, one's 60s can therefore hardly be thought of as old age.

The convergence of longer life spans and the potential to improve refractive outcomes will stimulate demand for laser cataract surgery.

SUMMARY

The femtosecond laser is a big deal. I do not know if it will become known as "Ophthalmology 2.0" or some-

thing similar, but I do believe that it has the potential to transform lens-based surgery in ways that build upon the decades-long successes of the IOL and phacoemulsification. This transformation will take time, but it will be measured in months and years rather than decades. In the near term, the procedure will complement rather than replace phacoemulsification, attracting the interest of manufacturers and surgeons alike.

The pace of technological innovation is much faster today than it was in the 1970s and 1980s. It took more than 7 years for the first 10 million personal computers, introduced in 1975, to be sold. Launched in 2010, Apple's iPad achieved this same feat in less than 9 months. The adoption rate for Facebook and Twitter has been huge, and Groupon has emerged as the fastest-growing Internet commerce site. These mainstream consumer experiences shape opinion and foster more rapid adoption across the spectrum of technological innovation, including what eye surgeons have to offer.

Consumer trends, as well as ophthalmology's own experience with elective procedures, strongly suggest that surgeons should get involved. The question is, when? Now is the right time to begin thinking and planning, as manufacturers are building their capacity to deliver the devices. Eventually, this technology will make its way into everyone's community. There are still many questions, such as which laser platform is the best, how much will it cost, where will the surgery be performed, which patients qualify, and how much should patients be charged? This is an emerging field; answers will become clear in the coming months, and they will evolve as we learn more about how best to integrate this technology into the practice. The earliest customers will pave the way, and their experiences will help all interested surgeons plan accordingly. ■

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2. Mahdavi S. IntraLase: coming of age. *Cataract & Refractive Surgery Today*, October 2005;5(10):117-120.