



Trends-in-Medicine

September 2003

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SUMMARY

Instead of a summer slump in refractive surgery procedures, there has been a pickup the past three months, due in large part to wavefront technology, but it is doubtful that this level can be sustained through the end of the year. The outlook is for 2003 procedure volume to be only slightly ahead of 2002, and if the economy stumbles at all, that would lower estimates.

Wavefront is increasing procedure prices, but patients reportedly are not balking at an additional \$200-\$350+ per eye. The conversion to wavefront may be going faster than expected; and doctors with wavefront available are now using that technology for more than half of all their procedures.

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Trends-in-Medicine

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Refractive Surgery Update

Based on a check of 10 high-volume refractive surgeons, 11 referring optometrists and three industry experts, refractive (LASIK) procedures have picked up over the past few months. Doctors are encouraged by the increase in volume and are optimistic that the trend will continue. However, in the current uncertain economic climate, most sources agreed that it is premature to predict whether the recent increase is a blip or the beginning of a turnaround.

Ophthalmologists mostly credited wavefront technology for their increase in volume, while optometrists said referrals have increased due to a combination of lower LASIK prices, increased word-of-mouth, and better feelings about the economy. Surgeons and optometrists agreed the two main reasons patients do not choose refractive surgery are the expense and fear of a less-than-perfect outcome.

Wavefront technology measures all aberrations of the eye, including higher order aberrations – those beyond the simple sphere (myopia and hyperopia) and cylinder (astigmatism), which are evaluated by common eye refraction. Higher order aberrations represent about 20% of a typical eye's total optical aberrations. However, in some patients, such as those with keratoconus and, in some cases, following previous corneal surgery, most aberrations may be higher order. Wavefront technology essentially draws a three-dimensional map of the eye. A California surgeon said, "Typically, we're getting better results with wavefront than with glasses, so it's a paradigm shift. With traditional LASIK we say that the patient will be able to see as well as with glasses or contacts, but, with wavefront, most of the time we actually get them to see better than with glasses."

CustomCornea is the name of the combination of wavefront measuring and guided ablation used by Alcon's LADARVision, which was approved by the FDA in October 2002 to treat patients with up to 6 diopters of myopia, but only in patients with less than 0.5 diopters of astigmatism. Visx's CustomVue, which uses the Visx WaveScan system, was approved by the FDA in May 2003. CustomVue is approved for up to 6 diopters of myopia and 3 diopters of astigmatism, giving it a broader label than CustomCornea. Many if not most Visx users upgraded their lasers to make them CustomVue-capable even before CustomVue was approved by the FDA. Bausch & Lomb has an approvable letter from the FDA for its wavefront technology, Zyoptix.

Visx is the gorilla in the laser eye correction market, both in terms of lasers and procedures. An expert estimated that about 16% of all procedures are done at a TLC center or with a TLC mobile laser.

Seven refractive surgeons use Visx machines, and three use an Alcon laser. Sources did not suggest that either company has been more successful in spurring procedure growth, simply that the technology has boosted awareness and increased advertising. A California doctor commented, "I use Alcon. There isn't a large difference in the two technologies, though there are subtle but important differences."

U.S. LASIK Market

Company	% of Installed lasers	% of procedures
Visx	~60%	~60%
Alcon	~20%	~20%
Bausch & Lomb	~8%	~8%
Nidek and others	~12%	~12%

Source: Dave Harmon, Market Scope

For nearly two years, surgeons and the refractive surgery industry have been hoping for a pickup in procedure volume, and they predicted that this would occur when the economy improved. Yet, fewer refractive surgery procedures were performed in the first half of 2003 than in the first half of 2002, and industry experts are predicting 2003 volume to be a little higher than 2002. Dave Harmon of Market Scope (www.market-scope.com) is projecting only a 2% increase for 2003 over 2002; Irving Arons of Spectrum Consulting (www.expertsinternational.com/aron) is more optimistic, predicting a 12.5% increase year-over-year.

Eight of the 10 refractive surgeons interviewed said they have seen a pickup in procedure volume in June, July and August 2003, and seven of the 11 optometrists said their referrals have increased in the past few months. None reported seeing a drop in procedures or referrals. A California ophthalmologist said, "The number of procedures is up, but I don't know by how much." Another ophthalmologist said, "I think that 2003 should be up 25% over last year." An optometrist said, "I've definitely seen an increase in patient interest in laser vision correction with corresponding increased referrals. During the first six months of 2003, there was no serious patient interest at all. Since July, the pent-up demand has burst forth." A Florida optometrist said, "Each month I mention it to more patients and refer more patients for topography and pachymetry."

On average, these doctors predicted that 2003 volume will be 19% ahead of 2002. Eight ophthalmologists expect 2003 procedures to be ahead of 2002, but two predicted 2003 will be flat compared to 2002. A Missouri ophthalmologist said, "Procedures are already up 40%, and I expect a continued increase." Most optometrists also said they expect an increase in referrals. A California ophthalmologist said, "The number of procedures is up, but I don't know by how much." Another West Coast physician said, "I think that 2003 should be up 25% over last year".

Doctors are not sure whether the pickup in LASIK procedures is a leading indicator of an economic turnaround or a blip that will soon disappear. A California physician said, "We are very dependent on the economy. Refractive surgery is a very good leading indicator of the economy, and I think our up-tick

says the economy is turning around a little bit. Will it sustain? I don't know. The last three to four months have been up, so that's a good feeling." A New Jersey ophthalmologist said, "People seem to have a little bit more money." Another surgeon said, "It may be a blip due to the war. Things were slow during the Iraq war, so there may be a blip because people weren't doing much during that time. Then there was the publicity about wavefront, and people waited for that. The results with wavefront are substantially better. It is technically possible for consumers to understand and easy for them to appreciate the advantages."

Estimates of U.S. Refractive Surgery Procedures
(total in millions and year-to-year change)

Expert	2002	2003	2004	2005
Market Scope	1.176 down 13.2%	1.200 up 2.0%	1.500 up 25%	1.700 up 13.3%
Spectrum Consulting	1.200 down 11%	1.350 up 12.5%	1.553 up 15%	1.785 up 15%
Wachovia Securities	1.114 down 15.5%	1.120 down 0.5%	1.265 up 13.0%	1.414 up 11.8%
ThinkEquity Partners	1.120 down 13.3%	1.123 up 0.3%	1.185 up 5.5%	1.245 up 5.1%
First Albany Corp.	1.129 down 17.5%	1.132 up 0.3%	1.195 up 5.5%	1.257 up 5.2%
Average	1.148 down 14.1%	1.185 up 2.9%	1.340 up 7.8%	1.480 up 10.1%

* Source: Irving Arons and Medical Laser Report

Most doctors expect procedures and referrals to slowly increase in 2003 and 2004 – provided the economy is fairly stable. Several sources warned that any "correction" in the economy or negative news would be likely to dampen demand for LASIK. A Florida optometrist said, "I expect to see a slow and steady increase in LVC volume, driven by growing confidence in the economy, better publicity, and new technology like CustomCornea. The ability to safely and successfully perform multi-focal correction would be a huge boost because this population can most easily afford my cosmetic procedure." A Georgia optometrist said, "I see new technology with the promise of less risk and higher success rates – as defined as a higher percentage of patients achieving 20/20 or better with one procedure on each eye. When will that happen? Who knows, but I think the pendulum is already swinging somewhat back toward an increase in refractive surgery volume for now, although not necessarily for all surgeons performing refractive procedures. I think it's fair to say that psychology may play a role here, just as it does in the stock market. If the news media and advertisers consistently report that the recession is over and it's time to get back to stock investing, many people will simply feel more secure and dive in, never mind that the fundamental economic outlook may not have changed appreciably. Similarly, if we read that more Americans are having refractive surgery – whether it's true or not—more people will be interested in it and probably more will have it because they have some reassurance that 'everyone is doing it' so it must be OK. It's the herd mentality." Industry experts also link procedure volume to the economic outlook. Irv Arons said, "It really is too early to tell

if there will be a recovery in procedures. As usual, I'm optimistic, but there's not enough hard data to really tell. Even if there hasn't been a recovery in jobs, economists say that the economy is better." Market Scope's Harmon predicted, "There is a close correlation between consumer confidence and procedure volume. If the consumer confidence index ticks up to where it was in 2000, then I think we will see procedures return to some level of growth, but until that happens, I don't think we will see dramatic procedure growth."

Surgeons gave most of the credit for the increased procedure volume to the introduction of wavefront technology, but several also cited advertising and a perception that the economy has become more stable as important factors.

- A California ophthalmologist said, "Wavefront is definitely attracting more interest, both on the part of practitioners and on the part of patients. We're seeing conditions that were previously difficult to treat that are now approachable. Patients are concerned about the quality of their vision after the procedure and seeing that they have a good chance of getting 20-20 vision post-operatively."
- Another California surgeon said, "I'm seeing a 50% increase in procedures in the last three months, since wavefront has gotten well known. My procedure volume is up a lot, but I don't think the industry as a whole is up that much. As wavefront gets better known, it will drive people to it."
- A New Jersey surgeon said, "I think that wavefront may have something to do with it."
- A Missouri doctor said, "I think that the economy, new technology, and advertising all contributed to the increase. With the new wavefront procedure we have more advertising to increase awareness, and sales are up. Wavefront has definitely generated additional volume for me and for the industry as a whole, especially as it becomes generally more available and as the treatment range is expanded."
- An optometrist added, "The new technology is creating more interest from my patients, although I'm not convinced that it will benefit the average patient".

However, most optometrists did not credit an increase in referrals to wavefront technology, saying that their patients generally are unaware of it. An Alabama optometrist said, "The average patient hasn't even heard of wavefront. I'm definitely more interested, and I talk it up to patients as an option to glasses or contact lenses." A Georgia optometrist said, "I think that some patients are aware of it, but most don't really understand it. For some it's probably more of a sense that there's something new rather than a firm understanding of the technology. Personally, I'm interested in the technology, but I believe that the jury's still out on whether this translates into a stunning improvement in LASIK/PRK outcomes or if the hype exceeds the real benefits. Having said that, I've seen some interesting data, and it does appear that outcomes are somewhat better with wavefront/CustomCornea. But time will tell." A third said, "Wavefront is creating a small increase in patient interest, and allows referring optometrists to expect an

even greater percentage of patients who are very satisfied with their outcomes." A Florida optometrist said, "I don't think that patients understand the issues well enough. As a practitioner, I think it will be great for patients with irregular corneas."

Only a few optometrists believe that news stories about wavefront technology is piquing patient interest. One said, "It's probably just a normal pendulum swing of interest and possibly the press that the new wavefront/CustomCornea procedure is getting." Another doctor said, "I think the news stories about the new technology has renewed some interest... It is positive press contrasted to the negative press that (refractive surgery) received a few years back."

Instead, optometrists more often mentioned the economy, lower pricing, and word-of-mouth as reasons for the increase in interest in LASIK and in referrals. A Georgia doctor said, "I don't know the exact reason, but I suspect several factors come into play, including the economy. Perhaps there's more awareness because of increased news coverage or advertising. There's also price competition. It could simply be a short-term trend." Another optometrist said, "My best guess is that most people realize that they are going to keep their jobs and retain an income stream. The sky isn't falling, and people may be willing to start spending money on themselves after a long period of self-denial." Another optometrist said, "I see lower pricing, word-of-mouth from satisfied patients, and coverage of the cost by employers' perk packages. Employer coverage is rare, but some companies do it – at least until lots of employees start taking advantage of it." An Alabama optometrist said, "My guess is that the individual's personal economy has improved to the point that he or she can now justify the expense."

Cost and worry about complications or a poor outcome are the key factors holding patients back from LASIK, sources agreed. A Georgia optometrist said, "I believe that there are two major things holding people back. For some, money is the problem. For others, it's the fear of having an elective surgical procedure that could possibly result in harm to their eyes." An Alabama doctor said, "It varies from patient to patient. For one patient it may be cost, and for another it is definitely fear." A Florida optometrist said, "The biggest factors holding back people from LVC (laser vision correction) in our office are fear, out-of-pocket cost, the inability of LVC to provide multi-focal correction, and satisfaction with their current contacts, in that order." Another Florida optometrist said, "Price is an issue. If insurance paid, more patients would have it, but fear of paying and not having an excellent outcome is the main factor. If outcomes were guaranteed, then cost wouldn't be a barrier."

While optometrists cited lower LASIK prices, refractive surgeons said pricing for LASIK has been fairly stable. This difference in perception may be due to a segmentation in the market. A California surgeon explained, "Prices are generally stable. What I see is three segments in the market, and they are evolving into a pretty stable market:

1. Large clinics that do a lot of advertising and charge very low prices, but advertise even lower prices. There's a lot of bait-and-switch there. I'd guess the average advertised price is \$499, but the price is really \$1,000 or \$1,200 or more.
2. The professional individual doctor who is charging in the range of \$1,600 to \$2,000 per eye. You see that a lot at TLC Laser Center.
3. The well-known LASIK sub-specialist, who works in the \$2,400 to \$2,800-per-eye range."

However with the introduction of wavefront technology, pricing is edging up. Wavefront technology is expensive, with laser centers pay an additional \$150 per eye (over and above the \$100 they were already paying) to Alcon for CustomCornea. Visx charges doctors \$2,450 for 10 CustomVue cards, but that includes two re-treatment cards, which makes the average cost \$204. The cost of the card is only part of the additional costs associated with wavefront; sources said wavefront procedures are more time-consuming to perform and take more time to explain to patients.

Most surgeons are passing along the extra wavefront costs to their patients, and that is now raising the price of wavefront-assisted LASIK by \$200-\$350 per eye or more. A Florida physician said, "Prices will go up because of wavefront, but there is a lot of price pressure in the market." Another Florida surgeon said, "I've added \$350 per eye to my cost. Wavefront costs a lot more – in terms of time for me and for my staff, but patients aren't refusing to pay." A New Jersey ophthalmologist said, "I'm passing the costs along. Costs aren't up for anything except Wavefront. Regular pricing isn't up. As you know, wavefront costs more because the keycards have to be custom, you have to pay more for them, and it takes a lot more time. I'm taking 15 minutes to explain the procedure to patients, and I never had to do that before." A Midwest doctor said, "We've increased prices for wavefront procedures." A New York surgeon said, "We're passing along the cost. Visx prices are very high, and so I'm raising my price by \$1,000." A California doctor said, "We're passing the cost along. Alcon is \$100 per eye extra, plus the purchase of the machine which is \$60,000, plus the maintenance contract, plus employee time on measurements – so that's \$300 extra per eye. Wavefront generates a buzz, and a person comes in and is surprised at the high cost, so there's some unneeded confusion there." Industry expert Harmon said, "The average I've found is \$368, with the highest \$700 per eye, but the \$700 is only about 6% of the market."

Harmon also finds a seasonality not only to volume but also to the mix of procedures. He explained, "We see more low-priced procedures on Nidek lasers in the first quarter than other quarters of the year. I think that has to do with employee flex plans. A lot of people, on the edge of making decision, do it because they can get it funded upfront, have it tax deductible, and pay later. They do it in January, looking for a very low price. In every year since 2000, the first quarter (average) price has been significantly lower than the preceding

fourth quarter. The average price (per eye of LASIK) in the first quarter of 2003 was \$1560, but it jumped up to \$1,710 in the second quarter – mainly due to custom cornea – and that's a big jump."

Among the low cost leaders is Laser Vision Institute, which has 20 centers around the country. It has been advertising \$299 per eye, but, reportedly, few people actually choose that option. A source explained, "Only after you pay \$100 for an eye exam do you see the doctor to find out if you are a candidate for LASIK, and then you find that: (1) the \$299 doesn't cover pre-op, (2) patients with astigmatism don't qualify for that price, and (3) the procedure has to be done on the Nidek laser, not the Visx laser, which counselors then claim is better because of its eye tracker. The counselors are paid on a sliding scale, and they get little or nothing for making a Nidek sale. They are highly compensated to up-sell the patient, so they are more like used car salesmen."

According to sources, wavefront advertising has been heaviest in the West, and it has started in the Midwest, but it hasn't really reached the East coast yet. New York ophthalmologist Dr. Emil Chynn commented, "We haven't seen any advertising yet on the East coast. I talked to my Visx sales rep last week, and she said that volume is up in the parts of the country where they've done advertising – primarily in the West. Visx hasn't advertised in the Northeast region yet because of the rollout and because it's more expensive to advertise here. The Northeast economy is a little depressed anyway. Visx is supposed to start advertising in the East in the next few months, but I haven't seen any ads yet. They're supposed to be doing a rollout across the country." A Florida optometrist said, "I can't say that I've noticed any increase in radio or TV advertising. In our market, the only increase in advertising that I've seen is that Bascom Palmer Eye Institute has been running a strong campaign in the Miami Herald about CustomCornea and the Bascom Palmer 'mystique.' Even the junk mail ads have diminished. There's no evidence that I've seen of any price war or decrease in the going rate for LVC. There are probably a few people influenced by the buzz on CustomCornea, but I think personal economy security is the greater motivation."

The conversion to wavefront may be going faster than some experts predicted. Every surgeon contacted has wavefront available or plans to have it soon. On average, surgeons with wavefront available are using it for 45% of their refractive procedures. A New York surgeon said, "Sixty-two percent of our procedures are wavefront. Astigmatism and hyperopia are the major limiting factors now." A Missouri doctor said, "We're just about at the 50% mark and increasing as the public awareness of this technology increases." A New Jersey surgeon said, "I am currently using wavefront for about 40% of the patients who fit the criteria." Another New York surgeon said he's using wavefront for only 10% of his procedures. Market Scope's Harmon added, "Our survey found surgeons offering wavefront-driven LASIK were treating about 30% of their patients with the new procedure."