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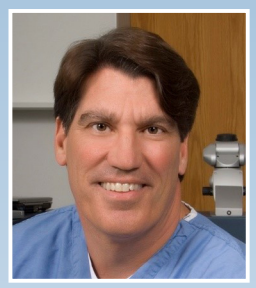
Exploring the next generation of laser refractive outcome goals, and practice



Karl Stonecipher, MD

Economic and demographic changes are transforming the LVC market

For the first quarter of 2016, Market Scope estimated that laser vision correction (LVC) and non-laser refractive procedures combined showed a 13.7% increase year over year.[1]

However, even these positive statistics illustrate that 2015 demonstrated a decline. Moreover, if we recall the peak refractive procedure volume, it is little more than half of what it once was. When Stein et al. gauged interest by examining the Google query rate for "LASIK" from 2007 to 2011, they found it decreased in the United States by 40%.[2]

Economic and demographic changes, as well as other factors, have transformed the LASIK market. The U.S. millennial population (born between 1982 and 2000) now exceeds the baby boomer population (83.1 million vs. 75.4 million, respectively).[3]

Accelerating LVC adoption: Successful growth strategies for your refractive practice

by Karl Stonecipher, MD

Baby boomers interested in LVC have either had the surgery or are beyond the optimal age range. However, patients in my practice who had LASIK from 1995 to 2000 often return early for cataract surgery with premium intraocular lenses because they do not want to wear reading glasses, similar to results reported by Yesilirmak et al.[4]

Although millennials may show less interest in LVC and often lack the income for out-of-pocket procedures, I think they offer the most potential in growing our LVC practices.

Segmented strategies

Market segmentation is a useful tool in reaching potential LVC candidates. However, when we target groups through different means, it is important to convey the same messages, or we must segment our marketing dollars toward generation-directed advertising.

Word of mouth and physician referrals account for our highest numbers among older patients, so we usually attract millennials by talking to their parents or grandparents. We also email information about LVC specials to our patients who received the procedure 10 or 15 years ago, advertising LVC as a graduation or holiday gift for their children or grandchildren.

Excellent outcomes also attract new patients. New technology allows us to treat patients who were previously ineligible and provides better outcomes on postoperative day 1.[5]

When we achieve 20/15 visual acuity after surgery on the next morning, patients experience a "wow" factor that we reinforce, comparing their previous and current vision on the eye chart. This visit is also the perfect time to ask patients whether friends or family members might be interested in LVC.

However, millennials like fashion eyeglass frames, so they may be less interested in LVC, but they do not want to wear glasses for certain activities. Therefore, we explain that they can still wear glasses after LVC but will not need them. Although this seems obvious, sometimes individuals do not register this concept. In fact, websites now sell nonprescription glasses as a fashion accessory.

To reach millennials through social media, we have an employee in this age group who mines potential candidates through Facebook and Twitter. If we offer free exams and can encourage the patient to come in for an evaluation, roughly 70% to 75% of candidates choose to have the procedure. We are also optimizing our website's search engine performance. Without an optimized website you will lose the millennial quickly. Market Scope respondents rated websites as their most effective marketing tool.[1]

Patient education

To educate patients, we use a range of tools, including tablets and videos, which drive patients to our website, and encourage them to read the latest research.

Surgeons need to counter common misconceptions about LVC. For example, patients may be concerned about post-LASIK dry eye. However, when Price et al. performed a 3-year survey in patients with LASIK vs. contact lenses, LASIK did not significantly increase dry eye and patients were more satisfied.[6]

In the beginning of the process, we explain that presbyopia will eventually change their vision and that can be corrected when they have cataract surgery, if applicable. We don't discuss this with a 22-year-old, but we start the conversation when patients are 35 to 40 years of age.

Patients also need to know an enhancement does not mean the procedure has failed but that we need to fine-tune their results. If this concept is not explained early, it will lead to a long conversation

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Ophthalmologists who participate in this activity will:
• Describe how next generation diagnostics and ablation profiles will impact patient safety, efficacy, and overall outcomes for the modern refractive practice.

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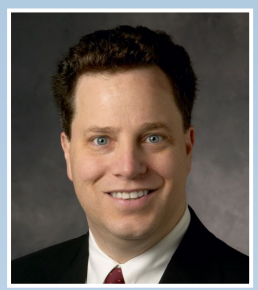
The next generation of laser vision correction is now: Highlighting advanced wavefront-guided ablations

by Edward Manche, MD



Edward Manche, MD

Laser vision correction (LVC) technology enables surgeons to deliver excellent visual outcomes, however, laser-induced aberrations may affect visual quality.

But with new generation Hartmann-Shack aberrometry, advanced wavefront-guided ablation measures data over a 7-mm pupil (vs. 6-mm pupil with previous technology), achieving significantly greater capture.[1–3] Furthermore, it offers approximately five times the resolution of previous technology, increasing accuracy in measuring aberrations over a larger diameter.

This technology enables us to image eyes that could not be captured with older technology, such as eyes with keratoconus, previously treated eyes, and eyes with irregular astigmatism.[4]

Clinical data

In a 2-year multicenter clinical study of 344 eyes, 6 months after advanced wavefront-guided LASIK, 98.2% had uncorrected visual acuity (UCVA) of at least 20/40, 82.6% were at least 20/20, and 61.7% were at least 20/16.[5] The study determined that it was safe and predictable in this time period.

We performed wavefront-guided LASIK in 78 eyes of 39 consecutive patients with advanced wavefront-guided LASIK with a customized nomogram. Four months postoperatively, vision was 20/16 or better in 47%, 20/20 or better in 95.5%, and 20/25 or better in 100% of eyes.

When Shaheen et al. treated 20 eyes with highly irregular corneas with advanced wavefront-guided LVC, 10% had uncorrected distance vision of 20/20 or better, 40% 20/25 or better, 90% 20/40 or better, and 100% 20/50 or better.[6] No patients lost vision.

Shaheen et al. also reported that corrected and uncorrected distance vision improved significantly after advanced wavefront-guided PRK in patients with keratoconus who had collagen crosslinking at least 1 year previously.[7]

Optimizing outcomes

I use advanced wavefront-guided ablations for nearly all of my LVC patients with naturally occurring myopia and astigmatism. However, this technology has not been approved in the U.S. for PRK or to treat hyperopia, hyperopic astigmatism, or mixed astigmatism or patients who have had previous refractive surgery. I use wavefront-optimized or topography-guided ablation in cases where I am unable to use advanced wavefront-guided treatments.

With any LVC procedure, careful patient selection is critical. We also need to exclude eyes at risk of corneal ectasia by examining corneal topographies carefully. Wavefront-guided ablation removes slightly more tissue than other procedures, so we should be mindful of the posterior stromal limit, leaving 250 µm or more tissue. In addition, we need to ensure scans are high quality.

To obtain the most accurate results with this technology, surgeons need to develop their own personalized nomograms based on their outcomes or eyes may be under- or overcorrected.

Conclusion

Offering greater resolution and greater dynamic range, advanced wavefront-guided ablation represents a significant step forward in treating naturally occurring refractive error and highly aberrated eyes. Not only does it enable us to achieve high quality results in primary eyes, it is a useful tool to help rehabilitate eyes that have had previous surgery or trauma that we could not treat previously.

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later. We provide materials covering these items before surgery. However, it is difficult to get patients to read them, so we created documentation for our chart record, which can come in handy later if a patient challenges the surgeon regarding outcomes.

Our messages never include prices, but it is important to advertise that we offer financing options and specials to make LVC more affordable. We may target individual groups with our specials, such as teachers in the summer, or we may target broader audiences with a Christmas special.

Shaping the message

To reach LASIK candidates in a shifting environment, market segmentation is a useful tool, however, surgeons need to be sure their messages are focused and consistent.

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Michael Gordon, MD

The next generation of laser vision correction is now: Highlighting topography-guided ablations

by Michael Gordon, MD

Regardless of the technology used, the goal of laser vision correction (LVC) is to optimize patients' uncorrected visual acuity and quality of vision. Toward achieving this goal, I think topography-guided LASIK combines advantages of wavefront-optimized and wavefront-guided ablations.

A step further

Wavefront-optimized ablation is performed using the central corneal curvature measurement, an assumed corneal shape based on a population's average Q value, and the patient's prescription. After we input this information, the laser selects a file based on those criteria to treat the patient.

Topography-guided ablation takes this one step further. It incorporates the patient's corneal curvature, actual Q value measurement, prescription, and higher-order aberrations of the patient's cornea to generate a customized shot-by-shot treatment pattern. It treats aberrations of the cornea, on the cornea—not internal aberrations on the cornea. Treatment is centered over the corneal apex, not the center of the pupil.[1]

Clinical data

Data from the U.S. Food and Drug Administration (FDA) clinical trial for 249 eyes without previous surgery treated for myopia with or without astigmatism showed an uncorrected visual acuity (UCVA) of at least 20/12.5 in 31.6% of eyes, at least 20/16 in 68.9%, and at least 20/20 in 92.7% of eyes 3 months after topography-guided LASIK.[2]

We have used topography-guided LASIK for more than a year, treating several hundred patients, and nearly 80% of our patients achieve UCVA of 20/15 or better, and most others are 20/20. We have performed only two enhancements.

Patient selection

Topography-guided ablation has been approved to treat up to 9 D of spherical equivalent, 8 D of sphere, and 3 D of myopic cylinder. We use this technology for anyone who fits within that range and for whom we can obtain good quality topography images.

Topography-guided ablation is particularly useful in treating asymmetry as it relates to corneal higher-order aberrations.

To optimize results from topography-guided ablations, surgeons and technicians need to obtain good, consistent topographic images. Surgeons need to develop confidence in planning treatments, which is not as simple as entering the patient's prescription and corneal keratometry. However, I think any surgeon who performs LASIK can perform this procedure.

Topography-guided LASIK carries the same potential risks as traditional LASIK, such as dry eye, infection, undercorrection, overcorrection, glare and halos at night, and flap complications; however, these are much less common when femtosecond lasers are used.

Topography-guided ablation has not been approved for therapeutic applications in the U.S., but it has been used in Europe primarily as a therapeutic device.

In a patient with progressive keratoconus, Kanellopoulos et al. reported improved vision and stability when topography-guided PRK was performed 1 year after UVA collagen crosslinking.[3]

In 32 patients with post-LASIK corneal ectasia, Kanellopoulos et al. stated that the Athens Protocol (topography-guided PRK with same-day UVA collagen crosslinking) showed stability, as well as improved visual acuity in 17 of 32 eyes.[4]

Reinstein et al. reported that topography-guided ablation significantly reduced stromal surface irregularity and improved visual quality and topography in a patient with irregular astigmatism after LASIK.[5]

Conclusion

Topography-guided LASIK combines the best of wavefront-optimized and wavefront-guided LASIK in one treatment. We can achieve visual outcomes better than 20/20 in a majority of our patients, with better quality vision and less chance of glare and halos.

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Finding the ideal refractive target: The importance of obtaining beyond 20/20 vision

by Colman Kraff, MD

Colman Kraff, MD

Optimal visual outcomes after surgery drive patient satisfaction

Today's laser vision correction (LVC) technologies enable surgeons to achieve visual outcomes exceeding 20/20, boosting patient satisfaction. Research has demonstrated that patient satisfaction correlates strongly with postoperative visual acuity and quality.[1,2]

Optimization strategies

Several factors contribute to outcomes beyond 20/20.

Careful patient selection is key. Patients need to have normal, healthy eyes and corneas, with a normal shape and thickness.

In addition, high quality preoperative data are necessary, as well as customized laser systems that provide high resolution treatments.

A stable ocular surface is clearly important to optimal visual outcomes.[3] I explain to refractive surgery patients that tear changes occur initially after LVC, and I think this is part of the natural healing process. However, tear film abnormalities may adversely affect the quality of their postoperative vision. Therefore, it is imperative to evaluate and treat the patient's tear film before surgery. Tear osmolarity can be useful in our assessment.[4]

Even when patients have a normal preoperative tear layer, tear quality or tear production may change after surgery. In my experience, this is magnified in certain groups, such as perimenopausal or postmenopausal women or patients taking certain systemic medications.

Surgeons also need to understand differences in treating patients in different age groups. We usually aim to slightly overcorrect patients in their mid-20s by approximately 0.25 D. A higher percentage of these patients typically achieve postop

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outcomes exceeding 20/20 because they are younger, have a clearer lens, and have a better quality tear layer.

During surgery, we focus on meticulous techniques, creating and customizing the flap size and thickness, performing customized laser ablation, and making sure that the ablation is centered within the bed on the visual axis.

After surgery, we need to manage healing when possible. For example, if the tear layer changes, surgeons should manage it with tear supplements, punctal occlusion, or other treatments such as topical anti-inflammatories when needed. Checking for signs of blepharitis and treatment of any meibomian gland abnormalities is important.

If patients are dissatisfied with visual outcomes, surgeons need to be prepared to perform enhancements.

Improving satisfaction

The better a patient's uncorrected visual acuity after surgery, the higher his or her satisfaction will be.

In a retrospective case series of 2,530 patients, Schallhorn at al. reported that 91% of patients were satisfied with their results 5 years after LASIK.[5] Postoperative uncorrected distance visual acuity was most strongly associated with patient satisfaction. Patients with 20/20 uncorrected distance visual acuity were more likely to be satisfied compared with those with 20/25 or worse vision.

This has been a consistent trend in the Optical Express clinical data I have reviewed, regardless of the laser platform. If we can achieve 20/16 or better uncorrected vision postoperatively, we will have a higher percentage of happy patients (personal communication with **Steven Schallhorn, MD**).

Excellent visual results can be quantitated and associated with patient satisfaction. This is especially relevant in an age where patients can access data instantly and comment on their results and experiences on social media.

Conclusion

A multifactorial approach is indispensable to achieving excellent clinical outcomes and patient satisfaction. In addition to ensuring a good clinical outcome, surgeons also need to provide a good experience for the patient on a personal level.

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CME questions (circle the correct answer)

1. A 32-year-old woman with a refractive error of –6.75 +4.75 x 090 in her right eye and –7.00 + 4.75 x 090 in her left eye with normal bow-tie astigmatism and central pachymetry of 570 μm in each eye is interested in laser vision correction. She has normal Pentacam indices and normal anterior and posterior elevation. The patient is not interested in PRK surgery. What would be your preferred surgical treatment?

a. Toric ICL
b. High resolution wavefront-guided LASIK
c. Conventional LASIK
d. Topography-guided LASIK

2. A 25-year-old patient has a refraction of –4.00 + 2.50 x 95 OU and moderate corneal coma. Topography images are good quality. What would be your preferred surgical treatment?

a. Topography-guided ablation
b. Wavefront-optimized ablation
c. Wavefront-guided ablation
d. Any of the above

3. Millennial patients appear disinterested in laser vision correction at your practice. What strategy would help bring patients into your office for a consult?

a. Increasing television advertising
b. Sending e-newsletters to millennials
c. Targeting parents and grandparents, advertising LASIK as a gift
d. Increasing billboard advertising

4. Which of the following preoperative clinical variables are key to achieving the best possible visual outcome in a patient in his/her mid-20s?

a. Low refractive error
b. Aiming for a slight overcorrection
c. Optimizing the tear layer
d. Normal cornea
e. All of the above

5. In perimenopausal or postmenopausal women, what should be discussed to set postoperative expectations

a. Tear film abnormalities are no different than in a younger population
b. They may experience tear abnormalities in the postoperative period even if they have none preoperatively
c. They should expect a result better than 20/20 because their refractive error is more stable at their age
d. All the above

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