

## Why Advanced Surface Ablation is Safer than LASIK but Most Surgeons Still Perform LASIK

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Laser Vision Correction (LVC) is now the second most common form of eye surgery performed in the United States (after cataract surgery). Each year, nearly one *million* eyes undergo LVC in the US, and cumulatively, nearly 40 million eyes have been corrected by LVC in the US alone. Clearly, LVC is a mature technology and has been accepted by both the ophthalmic community and the lay public as a safe alternative to glasses/contacts.

There are, however, two “dirty little secrets” about LVC. First, the number of people who newly need glasses/contacts every year is actually greater than the number of eyes lasered--even though for *years* we have been able to correct farsightedness, astigmatism, and presbyopia (but the public generally doesn't know this). Second, although recent surveys have shown that refractive surgeons are *four times* as likely than the general public to get LVC (Journal of Cataract & Refractive Surgery 41.9 (2015): 1826-1832. doi: 10.1016/j.jcrs.2015.10.027), when ophthalmologists are polled about what refractive procedure they would choose for themselves, they favor surface ablation over LASIK. However, these same eye surgeons are preferring LASIK for their own patients.

Refractive surgery has always been the “orphan stepchild” of ophthalmology. Many retinal sub-specialists will say if asked at cocktail parties, “I don't believe in LASIK”, like LASIK is some kind of bogus religion. Would you ever hear a cornea surgeon say, “I don't believe in laser photocoagulation for diabetic retinopathy?” Of course, not--it would sound strange! So why tolerate such prejudicial statements about an entire subspecialty? My own uncle, a prominent retinal surgeon with a fellowship program at Harvard's Massachusetts Eye & Ear Infirmary (where I did my residency), would say this same thing (not in my presence, of course). If I had a dollar for every time I heard an eye MD say something like “I personally don't approve of operations on eyes that are correctable to 20/20”, I could retire today. But such statements upon inspection are not even logical.

Statistically, Advanced Surface Ablation, or ASA (defined as LASEK or “alcohol-assisted PRK, and epi-LASEK, which is the same as the less accurate term epi-LASIK) *has been shown to be safer than long-term contact lens wear*. To be more precise, when you take the annual risk of significant visual loss (two or more lines of Snellen acuity) from contact lens wear (mostly due to ulcers and scarring), and multiply that by 10 (to equal a decade's worth of risk), that number is higher than the incidence of significant visual loss after LASEK. So with LASEK you take on some added risk, but that incremental risk is lower than the risk you would have (unknowingly) endured over the next decade of contact lens use. By getting LASEK you are actually *decreasing* your overall lifetime risk of visual loss, compared to not getting LVC and just remaining in contacts!

All people--even medical professionals--are notoriously bad at estimating risk. One common error is comparing the new state against nothing instead of comparing against the current state. Clearly, getting LASEK is less safe than being naturally 20/20, or only wearing glasses (which can protect against trauma). But this is not the real situation for people deciding whether or not to get LVC. The vast majority of patients considering LVC are currently not just in glasses, but also in contacts (over 85% of the patients in my practice).

During my Corneal Transplantation and Refractive Fellowship at Emory University in Atlanta, I had preceptors who were world-famous: George Waring III, MD, the “Father of American Refractive Surgery,” and Doyle Stulting, MD PhD, a past President of ASCRS. I did my fellowship in 1996-97, which was the dawn of refractive surgery. LASIK had just received FDA approval, so there were few refractive fellowships in the US (unfortunately, things today are not much better; my fellowship is only one of a dozen in the official match program). This was back when we were doing one eye at a time “for safety reasons” without formally studying this practice. Doyle made me and a research fellow survey patients to see how far they were driving to come for LASIK--far, as few surgeons were doing LASIK, so we were drawing from three states. We also pulled data from Georgia DMV about the accident rate per mile driven. Turns out, by requiring patients to come in twice for their preop, op, and postop, we might be virtually eliminating a catastrophic outcome in both eyes--but we were significantly *increasing their risk of being injured in a car accident* by doubling the number of miles driven!

Even ignoring non-ophthalmologic risks, we usually ignore that doing one eye at a time actually increases other risks. This is best illustrated by a story from my childhood, when I had a friend whose parents flew to Europe on two different planes “because they didn’t want to both be in a plane crash”. Now that I have studied statistics at Columbia (MD) and NYU (MBA), I realize that by taking two planes, they were doubling the risk that one of them would die. By operating on one eye at a time, we are *doubling* the risk of having an infection in one eye!

Here’s another paradox in risk analysis: why eye surgeons prefer ASA for themselves, but LASIK for their patients. When I questioned a group of 100 ophthalmologists that I was teaching in 2009 in a Harvard-affiliated CME course about this seeming hypocrisy, they said “it’s difficult to convince patients to tolerate a slightly longer recovery and mild discomfort for a small advantage in safety” and “I can do a LASIK in the same 15 minutes as it would take me to convince a patient to have LASEK”. Which is indeed *true* (as I know having performed about 1,000 PRKs, 5,000 LASIKs, and 20,000 ASAs), but might not be *ethically* justifiable. Would a cardiac surgeon still use porcine valves just to avoid spending the time to explain the benefit of Teflon valves?

Here is a *partial* list of LASIK complications that are not even *possible* in ASA: incomplete flap, buttonhole flap, decentered flap, free flap, irregular flap, DLK, debris under flap, flap striae, flap wrinkles, misaligned flap, traumatic flap dehiscence, epithelial ingrowth, flap melt, and post-LASIK light sensitivity syndrome. In addition, the incidence of the worst complication--iatrogenic keratoconus--is *vastly* lower in ASA.

Refractive surgeons are not properly educating the public that ASA is safer than LASIK--indeed, there is an active *bias* against doing so! I was a very early member of Kera-net (I joined in 1997), which is the most prestigious internet usergroup of refractive surgeons in the world. Two years ago, as the only high-volume, 100% ASA surgeon in the US, I got into an exchange with several other group members, where I eventually proved that LASEK is safer than LASIK. Several participants then expressed fear that, “if you make this widely known, you will open us up to lawsuits where patients with bad outcomes will sue us, saying they were not properly informed that there exists a safer option than LASIK”. I stated that they had nothing to fear, as LASIK is a safe and widely-performed procedure--but that as part of their informed consent, they *should* say ASA is slightly safer.

The next day, I found my emails to Kera-net bouncing. When I asked the moderator (a prominent academic ophthalmologist in CA) if he had blocked my account, he denied this, and said, “relax and have a glass of wine”. When I re-asked a few days later when my access was still denied, he said “maybe the other moderator did, but I know nothing of it”. Only when I had an unblocked colleague ask the group publicly about my status did he finally admit, “Yes, I temporarily suspended Emil’s account, for *arguing his case that LASEK is safer than LASIK a bit too strenuously*”. So some LASIK surgeons don’t even want the public to be *aware* that there is another procedure that’s safer than LASIK--even though patients have the legal right to a *fully* informed consent.

So what should we refractive surgeons do better if we wish to decrease the pool of Americans who are still dependent on glasses/contacts? First, point out that that contacts are *not* “risk-free”, so our peers will stop saying “I don’t believe in refractive surgery,” and our patients will stop saying, “I would like to get rid of my contacts but I don’t want to risk getting lasered”. Second, publicize the availability of financing, which allows patients to get LVC for the same monthly spend as they are currently wasting on glasses/contacts. Third, explain to patients and colleagues alike that because *a flap is not cut in ASA*, there is more tissue available to laser, *so most* people who are not good candidates for LASIK can safely get LASEK. Fourth, teach the proper use of intraoperative mitomycin-C, postop oral steroids and a taper of topical steroids over months (not weeks), so refractive surgeons can safely treat prescriptions all the way up to -9D while preventing postop haze. I have successfully treated the highest prescription in the world (-20.00 D) with no haze using this technique.

I have devoted the last 20 years of my professional life to refractive surgery--the last 15 years to promoting the safety advantages of ASA. Having been blessed with a successful career, I now wish to retire from clinical medicine to have the time to bring my patents to market. Instead of selling my practice (for \$2 million), I’ve decided to *give* it away to a well-trained refractive surgeon, without any buy-in--*if* he or she *promises* to continue my life’s work: which is to make the public aware of the advantages LASEK has over LASIK: better safety, less dry eyes because the corneal nerves are not cut when the flap is cut (which causes relative hypesthesia and a decreased blink rate and less neurotrophic factors), and less night glare (because your cornea is not a “2-piece sandwich” with refraction/reflection at the flap interface).

The purpose of this editorial is to state the *facts* so they are archived for posterity in a well-respected online journal. I welcome any honest discussion generated from this editorial that results in greater public awareness about LASIK alternatives.

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