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**REFRACTIVE SURGERY**

**Laser vision correction: 20 years of personal experience**

by **Raymond Stein, M.D.**

Laser vision correction has been an exciting and innovative area of clinical practice. I feel fortunate to have been involved in excimer laser treatments over the past 20 years. I have used excimer lasers that were the size of a small bus. I performed treatments that took as long as a full song by the Beatles. I saw patients in the early laser days who if they had to rate their post-op pain on a scale of 1-10 with 10 being the highest, they rated it an 11. Despite this level of discomfort, they all came back for their second eye. I witnessed the development of PRK, LASIK, wavefront-guided, wavefront-optimized, and topographically based procedures. Patient indications and contraindications have evolved, leading to enhanced safety and more predictable outcomes. Every day I am reminded of the impact of laser vision correction on patients' lives. I feel fortunate to be an ophthalmologist and working in the field of refractive surgery.



**A surgeon performs LASIK at an Allegretto machine**  
Source: [eng.rjeye.com](http://eng.rjeye.com)

My grandfather, Maxwell Bochner, M.D., founded the Bochner Eye Institute in 1929. This past year we celebrated our 80th anniversary as one of the oldest private eyecare facilities in North America. Our goal has always been to provide the best possible care delivered in a kind and compassionate way. In the modern era of high technology, we feel it is especially important to carry on Dr. Bochner's tradition of caring for the individual patient.

Over the past 20 years at the Bochner Eye Institute, every day has been an exciting day for our patients, our staff, and our surgeons. Patients' lives are enhanced with a painless, quick, and safe procedure. The most common regret that patients tell us is they wish they had the surgery when they were younger. Today patients who have laser surgery range in age from 18-65 years. In the early days of laser vision correction, it was primarily the risk takers who underwent the procedure. Skydivers, bungee jumpers, and motorcycle riders were commonplace. Today I see a high percentage of chess players, actuaries, accountants, and surgeons who are undergoing the procedure. Many patients don't have any specific problems with their glasses or contact lenses but want to be free to live their life without any optical aids.

I have used many excimer platforms over the years: VISX 20/20 A (Abbott Medical Optics, Santa Ana, Calif.), VISX 20/20 B (Nidek, Fremont, Calif.), LaserSight (Winter Park, Fla.), VISX Star, VISX Star with iris registration, Allegretto Wave 200 KHz (Alcon, Fort Worth, Texas), and Allegretto Wave 400 KHz. Over the past 8.5 years I have been using the Allegretto platform.

One of the side benefits of having surgical experience with multiple technologies has been observing the impact on patients immediately before, during, and after surgery. Patient flow is excellent with the Allegretto, allowing staff to focus more on the patient and less on moving the patient around or other operative logistics. In my experience, the small size (footprint and height) of the Allegretto laser means that patients are not as intimidated when they walk into the laser suite. The small laser spot size of the Allegretto results in very little noise during the entire ablation. As a result, patients are not startled at the beginning of or throughout the procedure. Importantly, the rapid speed of the 400 KHz laser makes for a much shorter ablation time in the treatment of myopia, hyperopia, and astigmatism, which means it is relatively easy for patients to fixate. The ablation is so smooth that at the conclusion of the procedure, patients are typically amazed at what they can see. All of these clinical points enhance the patients' overall experience.

From an engineering standpoint, I think the Allegretto Wave 400 KHz is a technological marvel. I want to emphasize that I am not a consultant for Alcon, and I paid full price for my laser. The Allegretto laser is ergonomically designed to be easy for surgeons. Clinical studies with the Allegretto have shown that there is no difference in outcomes between the wavefront-guided ablation and the wavefront-optimized for 95% of eyes. The only eyes that may benefit from a wavefront-guided treatment are those with a high level of higher-order aberrations. The reason that the wavefront-optimized ablation does so well is because of all the advanced features in this platform: flying spot, large optic zones with transition zones, and fast hertz rate that reduces the risk of dehydration. Today there is still a lot of confusion in the market with regard to wavefront-guided and wavefront-optimized treatments. All the initial studies with other laser platforms compared wavefront-guided to standard treatments. As predicted, the wavefront-guided outcomes were superior to the standard treatments. But essential information regarding the additional changes made to enhance the ablation was never discussed in presentations or scientific papers. These changes include moving from a broad beam to a flying spot, the elimination of the prophylactic central island treatment, and enlarged optical zones.

While the wavefront-guided platform yielded superior outcomes, the question remained as to whether they were due to the treatment of higher-order aberrations or to all of the other platform changes. I believe it was the latter. In our clinical protocol, we do perform wavefront measurements on all

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patients; however, over 95% of eyes are treated with the wavefront-optimized approach. With a high percentage of eyes seeing 20/15 on the first day post-op—and maintaining this level of vision—it is difficult to argue about technology. The majority of patients report better quality of vision post-op than what they had with their contact lenses or glasses.

Regardless of the laser platform being used, surgeons must be careful when performing wavefront-guided ablations in eyes whose higher-order aberrations are primarily from the lens. Most patients over 40 years of age have higher-order aberrations that are a result of lenticular changes. Certainly it does not make sense to correct these aberrations on the cornea. Unfortunately, most wavefront units are unable to differentiate aberrations from the lens from those of the cornea. The lenticular aberrations will continue to change. In addition, when these patients undergo cataract surgery, the post-op quality of vision will be diminished because of induced corneal aberrations that are not offset by the IOL.

There has been a large impact on my refractive staff. They love the Allegretto Wave. The calibration of the laser is simple. The fluence is very stable throughout the day. In fact, I do not recall one day in over eight years that we had to cancel patients because the laser was not functioning. This is spectacular for our practice and patient care. We have smoother and shorter surgery days with more smiles from my staff, which also has a positive impact on patients and seems to reduce the fear and anxiety that are normal pre-op emotions. Indeed, the efficiency of our system helps us be more effective in our interactions with patients.

I look forward to work every day. I have a great staff, meet interesting patients, and use superior technology that results in a very low enhancement rate and provides a high level of patient satisfaction. The next 20 years will probably show significant advances, but they will essentially be baby steps compared to the giant strides that have been made to date.

#### ABOUT THE AUTHOR

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