



Advances in refractive, corneal, lens, and cataract surgery



A year in review

As the year is coming to the end, we review top advances that significantly influenced clinical and surgical care of our patients. Staying at the forefront of research and development and bringing our patients the very best that medicine has to offer is essential to giving our patients the best results, regardless of their age, eye condition, and vision needs. We value our partnership in co-managing patient care. We believe it is an integral component of top-notch health care that all of our patients deserve.

REFRACTIVE SURGERY

5th generation iFS femtosecond laser for LASIK

Many different femtosecond lasers are now FDA approved for LASIK flap creation. Most, however, remain in the early stages of application and provide limited customizability. The most advanced model we now have is the iFS 5th generation femtosecond laser. This year, all of the LASIK procedures we performed at Pacific Vision Institute were done with the 5th generation iFS femtosecond laser. There are several reasons for this. First of all, we can create the most customizable LASIK flap with this laser, regardless of the patient's eye shape. Predictable flaps can be safely created in patients with flat corneas, steep corneas, small corneas, large corneas, vascularized corneas, and in patients with corneal scars. The 5th generation iFS laser can also be used to create an oval flap – a feature that helps optimize outcomes in patients with astigmatism. With this laser, we can also create a reverse bevel side

cut – a feature that improves corneal nerve re-apposition and reduces the incidence of dry eyes.



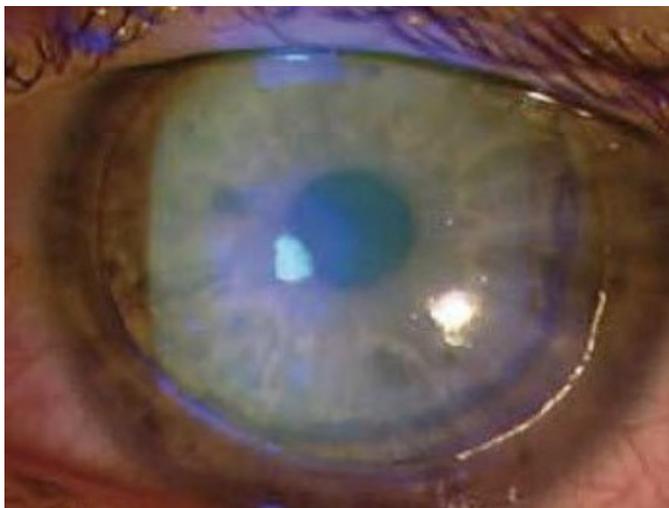
Figure 1. Dr. Faktorovich doing LASIK with the 5th generation iFS femtosecond laser

CORNEA

COMBINED Intracorneal Ring Segments (ICSR) and Collagen Crosslinking (CXL) to treat keratoconus and other corneal thinning disorders

Each treatment modality has been found to be effective in improving corneal shape and vision in patients with keratoconus and other corneal thinning conditions. Together, the effect may be even more significant. When planning the combined treatment, it is best to perform intracorneal ring segment placement either before collagen crosslinking or concurrently, rather than after collagen crosslinking. This year, more data has become available on the outcomes of the treatment.

Figure 2. Intracorneal ring segments and collagen crosslinking



LENS

Lens implants improve vision in patients with keratoconus and other corneal thinning disorders

During the past year, we have been using ICL phakic IOLs to correct vision in younger patients with keratoconus who have mostly myopia and low amounts of astigmatism.

We have treated older patients who are either pre-presbyopes or presbyopes with refractive lens exchange (RLE). In these patients, we have replaced their crystalline lens with a toric IOL. Excellent uncorrected and best corrected vision has been obtained. Some patients with very low amount of cylinder may benefit from Crystalens. Small residual refractive error in patients with mild corneal irregularity can be corrected with PRK. Multifocal IOLs need to be avoided in any patient with irregular corneas, such as those with keratoconus and other corneal thinning conditions, for example.

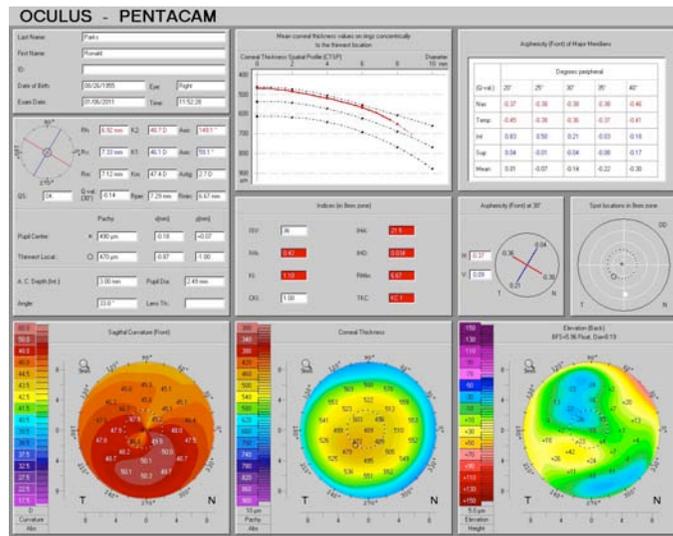


Figure 3. Patient R.P. is a 56 year-old man who presented for LASIK consultation. His manifest refraction was $-6.50-1.75 \times 065$ OD and $-7.25-2.00 \times 110$ OS. Best-corrected vision was 20/25 OD and 20/20 OS. On topography and Pentacam, we detected keratoconus. We recommended RLE with toric IOL OU. At eight months postoperatively, his uncorrected vision is 20/20 OD and 20/25 OS. Best corrected vision is 20/15 OU.

CATARACT

Femtosecond laser-assisted cataract surgery

This past year, we have begun to embrace a revolutionary technology – femtosecond lasers for cataract and lens replacement surgery. We all know how this technology has improved LASIK, and we have no doubt that it will have a similar impact on cataract and RLE surgery by enabling exquisitely precise and customizable incisions in the cornea and lens. Specifically, we can use the laser to create all the corneal incisions (i.e., cataract incision, side port incision, and limbal relaxing incisions) as well as cut the lens capsule and nucleus. This is taking our refractive results to the next level. This also introduces a new level of safety to the surgery particularly in challenging situations such as pseudoexfoliation, phacodonesis, ectopia lentis, and mature cataracts.

As one of the first US surgeons to perform femtosecond laser assisted-cataract surgery and author a peer-reviewed article in the *Journal of Cataract and Refractive Surgery*, Dr. Neil Friedman knows first-hand how remarkable this technology truly is. Since 2007, Dr. Friedman has worked with Opti-Medica's Catalys Precision Laser System (commercially available outside the US, and pending FDA approval), both in the lab and in human trials. This technology is superior to the currently available lasers for a number of reasons.

- The Catalys device utilizes a novel non-applanating Liquid Optics patient interface, which is positioned on the eye and docks to the laser without causing corneal distortion or a significant IOP elevation. The absence of corneal folds results in perfect incisions every time and a minimal rise in IOP means that patients do not experience any discomfort or amaurosis.
- The Catalys is the only device containing the Integral Guidance system, which combines integrated OCT and advanced software algorithms. The system images all the anterior segment structures in 3D, automatically identifies and registers the tissue surfaces, sets safety margins, and enables the surgeon to control every aspect of the laser cuts. With other laser systems, precise visualization may be challenging resulting in perforation of the posterior capsule.
- The Catalys system rapidly performs the entire procedure (approximately 2 minutes from docking to undocking the patient), which is significantly faster than other systems that require the surgeon to manually identify the ocular structures and adjust the boundaries.

At PVI, we are excited about this technology and about bringing it to our Bay Area patients. It will enable more patients to truly benefit from refractive cataract and lens surgery.

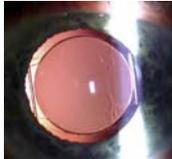


Figure 4. Dr. Neil Friedman performing femtosecond laser cataract surgery with OptiMedica's Catalys Precision Laser System.



QUIZ

- When implanting a Crystalens accommodating IOL, it is important to:
 - suture the wound to prevent anterior chamber shallowing
 - rotate and rock the lens to position the haptics in the correct position
 - use atropine to cycloplege the eye
 - create a properly sized and centered capsulorhexis
 - all of the above



- A 20-year-old contact lens wearer with refraction $-7.50D$ has less than $0.5D$ change for 1 year. He has regular symmetric topography and central corneal thickness of 540 microns. The best refractive surgery procedure for him is
 - LASIK
 - PRK
 - ICL
 - RLE
 - all of the above
 - none of the above

- The ICL phakic IOL is composed of:
 - acrylic
 - collamer
 - silicone
 - polymethylmethacrylate



QUIZ ANSWERS

- E – All of the above. The keys to successful outcomes with the Crystalens are to pay careful attention to detail and perform meticulous surgery. All of the steps listed are important for proper functioning of the lens.
- A - LASIK. FDA guidelines indicate that LASIK is approved for patients who are 18 years-old and older. This patient, therefore, is within this range. Moreover, his refraction has not changed by more than $0.5D$ over 1 year. While PRK and ICL can also be performed for this patient, LASIK is the best option.
- B – Collamer. The Visian ICL is made of a biocompatible collagen copolymer called Collamer that does not cause any inflammatory reaction in the eye.

Sight Gags by Scott Lee, O.D.

Book on Amazon.com



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Become a PVI co-managing doctor



We welcome the opportunity to help your patients with refractive surgery, cornea, cataract, and lens implant considerations.

Please call us at [415-922-9500](tel:415-922-9500) to schedule a surgical consultation for your patients.

You can also e-mail us at comanagement@pacificvision.org if you have any questions.

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