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(Left) Co-managing OD workshop on the new EX500 excimer laser. San Francisco optometrists watch the patient treatment data screen. Electronic communication between the treatment data on the screen and the position of the excimer bed insures that the treatment is initiated only when the eye under the laser tracker corresponds to the correct eye on the treatment screen. **(Middle)** The LASIK patient at the EX500 workshop was Katya Campos - PVI's front desk patient coordinator. **(Right)** ABC7 News KGO-TV is filming a news segment at PVI on the EX500 laser. PVI is one of the first three centers in the US, and the only center on the West Coast, to receive the EX500 for LASIK/PRK.

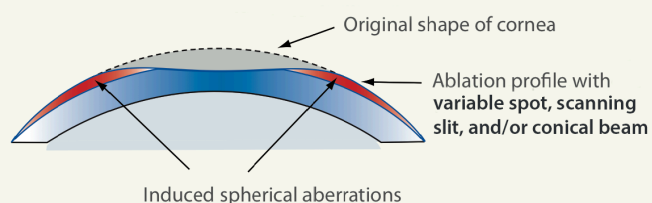
New excimer laser is an important advance in LASIK/PRK

With the new Wavelight EX500 Alcon excimer laser, a -10D myope becomes an emmetrope in 14 seconds. At this speed, EX500 is the fastest FDA approved excimer laser. The benefits of the fastest vision correction time are obvious to patients - less time under the laser, more comfort, less anxiety. The EX500 also has the fastest eye tracker than any other laser used for LASIK/PRK. It can track the eye 10x faster than the eye is even capable of moving.

But the most significant innovation in the EX500 laser is the shape of its laser beam - a flying small spot cylinder. There are six other FDA-approved excimer lasers that are used today - VISX STAR S4 IR, Wavelight Allegretto 200 Hz, Wavelight Eye-Q 400 Hz, Nidek, Technolas, and Meditec. In some of them, the laser beam is too wide (variable spot- scanning beam of the VISX Star S4 IR laser and scanning slit beam of the Nidek laser). In others, the beam is shaped like a cone (Wavelight Allegretto 200 Hz, Wavelight Eye-Q, Technolas, and Meditec). Wavelight EX500 laser is the only laser where the beam is not only very small in diameter (flying spot) but is also shaped like a cylinder. As a result, every laser pulse delivers the full, precise amount of the programmed energy to the corneal surface. Larger and conical laser beams (even when they are wavefront-guided or wavefront-optimized) result in either overlapping patches of energy (too much energy) or dissipation of energy as the conical beam hits the periphery of the treatment zone (too little energy). In either case, the corrections may be inaccurate: over- and under-corrections.

Moreover, when the periphery of the treatment zone is under-treated, the cornea loses its naturally prolate (curved out) corneal shape and becomes oblate (curved in or flat) instead. Such a cornea presents a new type of optics to the brain it hasn't seen before and the visual system interprets it as glare and haloes at night. Maintaining a naturally prolate corneal shape is, therefore, essential to preserving good night-time vision without glare and haloes. The flying spot CYLINDRICAL laser beam of the EX500 achieves the fully programmed correction of both the central zone and the transition zone. This allows both accurate correction AND preservation of NATURAL CORNEAL SHAPE which is essential to preventing glare and haloes at night.

VISX, Wavelight EyeQ, Wavelight Allegretto,
Nidek, Meditec excimer lasers



EX500 excimer laser

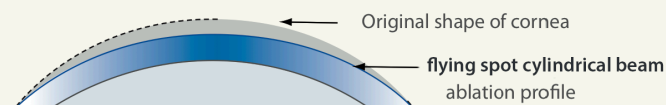
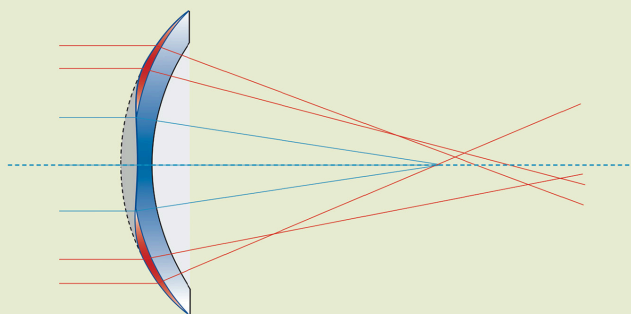


Figure 1. (Left) Excimer laser treatment with variable beam (both wavefront-guided and wavefront-optimized) results in flat or curved-in corneal shape. This leads to spherical aberrations and glare/halos at night. (Right) Cylindrical laser beam of the EX500 excimer laser preserves the natural, curved out, corneal shape. This minimizes glare and haloes and preserves good night vision.

VISX, Wavelight EyeQ and Allegretto, Nidek, Meditec excimer lasers
Induced spherical aberrations



EX500 excimer laser
Aspheric shape, minimized spherical aberrations

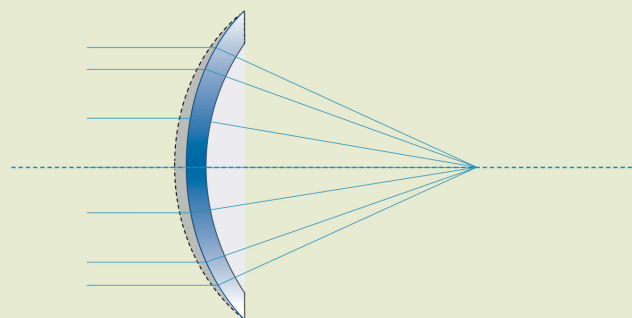


Figure 2. (Left) Corneal shape after treatment with older technology may result in multiple focal points, leading to glare and haloes at night. (Right) Cylindrical beam of the EX500 excimer laser preserves the natural shape of the cornea that focuses light in a single point, minimizing glare and haloes at night.

PVI EX500 Excimer Laser workshop for co-managing ODs

During the workshop, the doctors observed live patient surgery and had an opportunity to practice PRK on pig eyes. The doctors also had an opportunity to do a LASIK flap with iFS femtosecond laser.



Figure 3. Dr. Jeff Rich (Left) and Dr. Mark Yeh (Right) at the EX500 excimer laser



Figure 4. Dr. Chester Quan (Left) and Dr. Jeff Lem (Right) at the iFS femtosecond laser

LASIK results with EX500 Excimer Laser (Figure 5)

LASIK outcomes with older technology, Wavelight Eye-Q 400 Hz excimer laser, were compared with the Wavelight EX500 500 Hz excimer laser (Cummings A, Wellington Eye Clinic, February 2012). Patients treated with EX500 had better uncorrected visual acuity (UCVA, Figure 5A), more predictable sphere (Figure 5B) and cylinder corrections (Figure 5C), and more stable outcomes long term (Figure 5D). Nearly 25% of patients GAINED best corrected vision after surgery (Figure 5E). This was significantly higher than patients treated with Eye-Q 400 Hz laser.

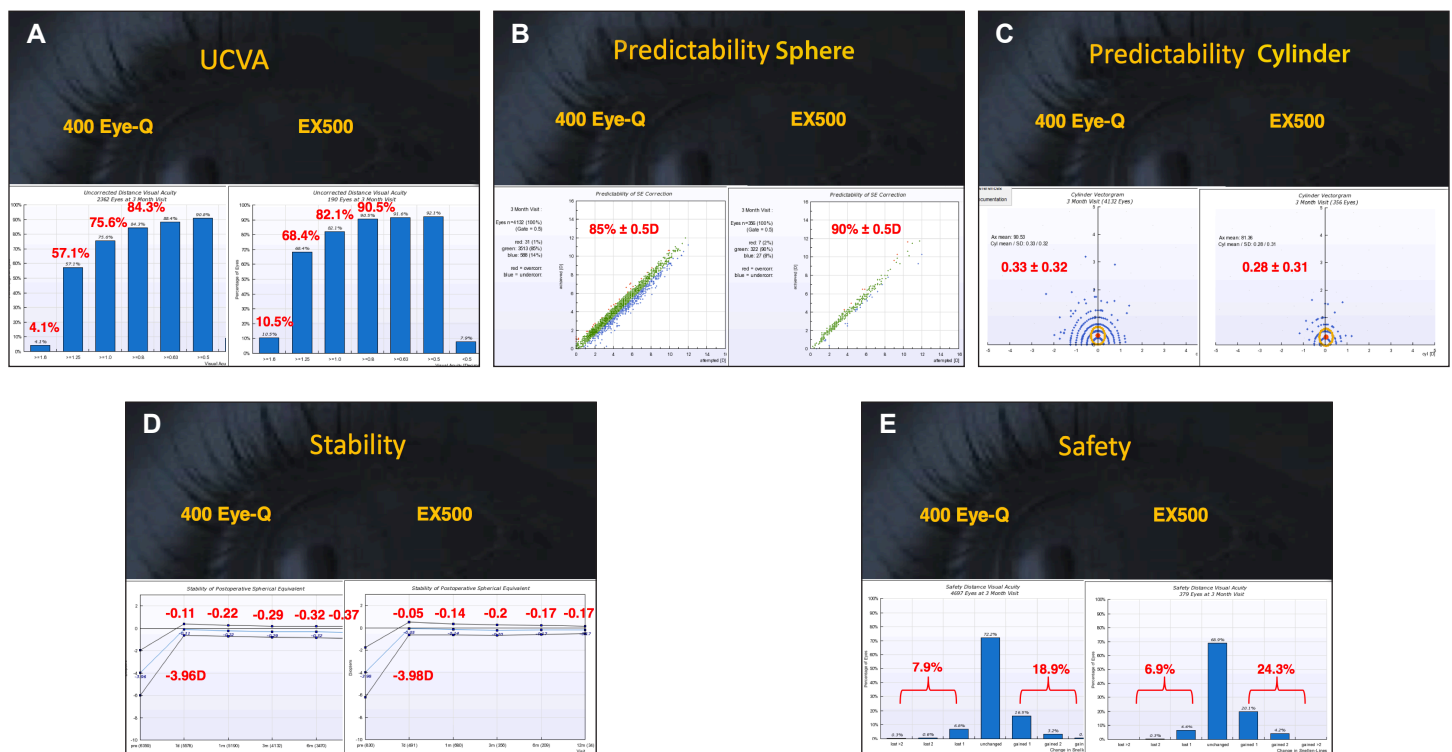


Figure 5. LASIK results with EX500 laser vs. older technology Wavelight Eye-Q 400 Hz laser

PRK results with with EX500 Excimer Laser

The results of vision recovery after PRK with the non-cylindrical beam laser were compared with the EX500 excimer laser (Fakto-rovich E, Pacific Vision Institute, February 2013). 85% of PRK patients treated with EX500 achieved 20/20 vision within several weeks postop. With the previous generations of Wavelight laser, many patients would take up to 3 months to achieve 20/20.



QUIZ

- What is the upper limit for myopia correction with the EX500 excimer laser?
 - 10D
 - 12D
 - 8D
 - 6D
- How many different types of LASIK/PRK lasers manufactured by Alcon Surgical are called WaveLight?
 - One
 - Two
 - Three
 - Four
- How soon after LASIK can a patient wear colored plano contact lenses?
 - One day
 - One week
 - Two weeks
 - One month



QUIZ ANSWERS

- (b) EX500 excimer laser is FDA approved for myopia correction of up to -12D of myopia. The treatment time of the -12D correction with EX500 will be 16.8 seconds.
- (d) Alcon manufactures FOUR DIFFERENT TYPES of lasers for laser vision correction, all called WaveLight. One of the WaveLight lasers is a femtosecond laser for LASIK flap creation, called FS200. The idea is similar to IntraLase, although IntraLase iFS laser is the 5th generation of the IntraLase, while FS200 is still the 1st generation of the WaveLight femtosecond lasers. Three of the WaveLight lasers are excimer lasers for the stromal bed reshaping - Allegretto, Eye-Q, and EX500. Of the three excimer lasers, EX500 is the fastest, has the best eye tracker, and, most importantly, is the only one with the cylindrical beam technology capable of reshaping the cornea to preserve its natural shape thereby minimizing glare and halos at night.
- (d) Patients need to wait at least one month after LASIK to wear plano colored contact lenses. They typically chose to wear them for special occasions only, but still need to be advised not to wear the contact lenses overnight.

Become a PVI co-managing doctor

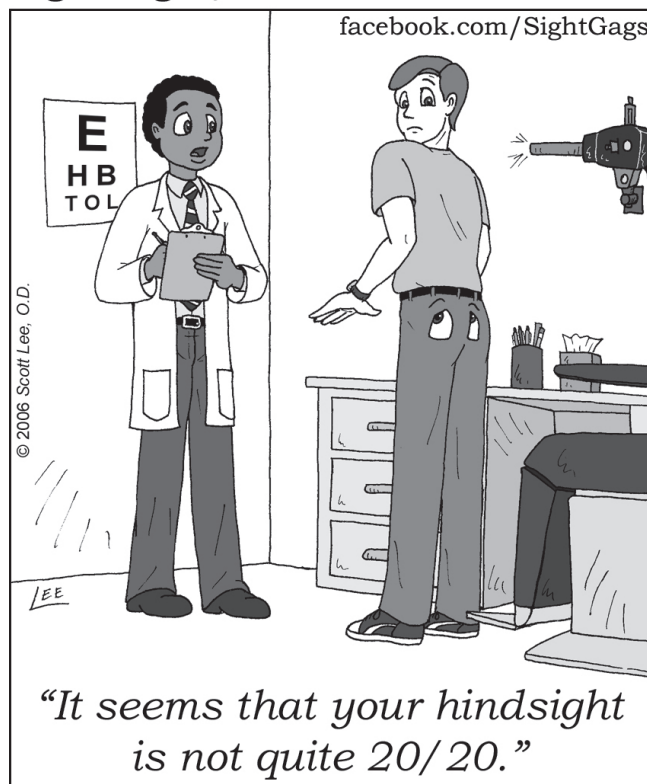


We welcome the opportunity to help your patients with refractive surgery, cornea, cataract, and lens implant considerations.

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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