

LASIK LASER Eye Surgery

Consumer Awareness Guide

Spend a Few Minutes Learning About Your LASIK Center or A Lifetime Wishing You Had

Refractive surgery is the most popular elective surgery in the United States. It has provided excellent vision and freedom from eyewear and contact lenses for millions of people including many professional athletes and celebrities. The LASIK procedure is by far the most popular procedure being performed. Although it has proven to be an excellent procedure, there are still many factors involved in making sure you have the kind of outcome you want. Not all Laser vision centers are the same and it is getting harder for potential candidates to be able to assess the quality and value of each center. There are many different types of refractive surgery procedures. Many patients are not candidates for LASIK and some of the other procedures are certainly the better, safer choice for many patients. That is a very important point since many patients will be told by a doctor that they are not a candidate when in fact the real truth is that the doctor is only able to perform **one or two** of the many procedures. The patient leaves thinking he/she is not a candidate when in reality they may be a great candidate for a different refractive procedure. That is why it's so important to go to a center skilled **in all procedures**. You'll also learn about one test that must be performed for your safety that is only performed by a small percentage of doctors. Others haven't even invested in the expensive instrument needed for the test. They would rather risk your vision than spend the money to give you the best care. This has resulted in disastrous results for many patients!

This booklet was written to provide you with some of the key questions you need answered before you decide to have your LASIK procedure. This is no-nonsense information based on documented facts. No sales fluff allowed. Take the time to review these questions with your LASIK center so your LASIK experience will result in a lifetime of excellent vision.

LASERS

(Light amplification by stimulated emission of radiation)

Lasers are devices that emit UV light in a very narrow beam. There are only three types of medical lasers. Thermal (heats tissue), mechanical (cuts tissue), and photochemical (interacts directly with molecules). Argon lasers heat tissue and are used in the treatment of diseases such as glaucoma and diabetic retinopathy. YAG lasers break tissue bonds and are used to remove tissue growth following cataract surgery and for treating certain types of glaucoma. The excimer laser is the only one suited for corneal refractive surgery (PRK, LASIK, etc) because it does not heat or mechanically damage tissue which minimizes possible scarring. The excimer is also very precise. It only removes 0.25 microns of tissue at a time (1/28 of a red blood cell) in four billionths of a second. This allows the surgeon to safely remove as much tissue as is needed and no more.



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To learn the details and general information of excimer lasers click here:

<http://www.mastereyeassociates.com/laser-lasik-refractive-surgery/>

MODERN EXCIMER LASERS

Slit Scanning Lasers

Slit lasers use relatively small beams linked to a rotational device with slit holes that enlarge. The laser beams scan across the slits to create a gradually enlarging zone of treatment (ablation zone). This provides a uniform beam and possibly smoother ablations than broad beam lasers which are now obsolete. The risks are greater incidence of decentration and overcorrection unless an eye tracker is being used with the device.

Spot Scanning Lasers ("flying spot")

These are the most common and use small diameter beams (0.8-2mm) which scan across the cornea to create an even smoother ablation zone. They are better for more customized ablations and for correcting irregular astigmatism.

Wavefront-Guided Lasers

These are linked to a special mapping device which obtains detailed information about the corneal shape in order to give the most customized laser treatment. Both slit and spot scanning lasers have the ability to be wave-guided lasers.

*The following is a chart with all of the current FDA approved lasers. Keep in mind that it is very important to discuss your specific case because results depend highly on your prescription, pupil size (optical zone or OZ should be larger than your pupil in dim lighting), and your surgeon's experience and practice philosophy. Some surgeons are much less conservative than others and may treat a refractive error that is out of the FDA recommended guidelines.



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FDA Approved Lasers

Model	Indication	Type of Laser Beam	Optical Zone (OZ) and Treatment Zone (TZ)	FDA Approval Year
Alcon LADARVision 4000 & CustomCornea (laser plus wavefront device)	Myopia: up to -8.00 D astigmatism up to -4.00 D	Scanning spot (0.8 mm)	OZ: 5.5 mm	2002 myopia with or without astigmatism
	Hyperopia: up to +5.00 D astigmatism up to -3.00 D		TZ: 7.5 mm	2006 hyperopia and hyperopic astigmatism
Bausch & Lomb Technolas 217A and Technolas 217z Zyoptix (laser plus wavefront device, approved 2003)	Myopia: up to -12.00 D astigmatism up to -3.00 D	Scanning spot (2.0 mm)	OZ: 6.0 mm	2000 myopia from -1.00 to -7.00 D
	Hyperopia: up to +4.00 D astigmatism up to +2.00 D		TZ: 7.0 mm	2002 myopia up to -11.00
Carl Zeiss Meditec MEL 80	Myopia: up to -7.00 D astigmatism up to -3.00 D	Scanning spot (0.7 mm)	OZ: 6.0 to 7.0 mm	2003 hyperopia with astigmatism
		Gaussian profile with more energy applied centrally	TZ: 7.7 to 8.9 mm	2006 myopia with astigmatism
Nidek EC-5000	Myopia: -1.00 to -14.00 D astigmatism less than 4.00 D	Scanning slit (7.0 x 2.0 mm)	OZ: 5.5 mm	2000 myopia from -1.00 to -14.00 D
	Hyperopia: +0.50 to +5.00 D and up to +2.00 D astigmatism		TZ: 7.0 mm	2006 hyperopia and hyperopic astigmatism
Visx Star S4 & WaveScan WaveFront System (laser plus wavefront device to guide laser)	Myopia: up to -6.00 D astigmatism up to -3.00 D	Variable scanning spot beam (0.65 mm to 6.5 mm)	OZ: 4.0 to 9.0 mm	2003
			TZ: 4.5 to 9.5 mm	
Visx Star S4 IR & CustomVue (laser plus wavefront device to guide laser)	Hyperopia: up to +3.00 D and up to -2.00 D of astigmatism	Same as S4	OZ: 6.0 mm	2005
			TZ: 9.0 mm	
WaveLight Allegretto Wave	Myopia: up to -12.00 D astigmatism up to -6.00 D	Scanning spot beam (0.95 mm) with emphasis on applying more energy centrally (Gaussian profile)	OZ: 4.5 to 8.0 mm	2003 (myopia and hyperopia)
	Hyperopia: up to +6.00 D with or without astigmatism up to -5.00		TZ: 5.2 to 8.7 mm for spherical treatments; 7.0 to 9.0 mm for cylindrical and spherico-cylindrical treatments	2006 (mixed astigmatism)
	Mixed astigmatism: up to 6.00 D			
WaveLight Allegretto Wave With Allegro Analyzer (laser plus wavefront device)	Myopia: up to -7.00 D astigmatism up to 3.00 D	Same as Allegretto Wave	OZ: Same as Allegretto Wave	2006
	Mixed astigmatism: up to 6.00 D		TZ:	2007 (mixed astigmatism)



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EYE TRACKING

Most modern lasers have eye tracking systems included which keep the laser on target. Studies have shown that eye trackers produce better outcomes and decrease complications.

PUPIL SIZE

In recent years evidence suggests that the ablation zone may be too small for people with large pupils. If your pupil expands in low light to an area larger than the ablation zone, you may have vision problems at night including glare and halos.

It is thought that the diameter of the LASIK treatment zone should be larger than your pupils in dim light. It is important to have the treatment by a laser that has a treatment zone larger than your pupil size and also that has a significant blend zone to transition the treated corneal area into the peripheral cornea that is not treated by the laser.

Laser Conclusion

- *Lasers with eye trackers produce less complications*
- *Wavefront-guided lasers reduce visual aberrations at night (glare, halos, etc)*
- *The OZ of the laser should be larger than your pupil size in dim lighting*

LASIK

(Laser-Assisted In Situ Keratomileusis)

LASIK

Lasik is the most commonly preformed refractive surgery procedure due to great accuracy and relative lack of pain afterward. Recent studies show that 95% of people were happy with the quality of their vision after surgery. People with all types of refractive errors can benefit from LASIK including, nearsighted (myopic), farsighted (hyperopic) and even astigmatism which results from an irregular cornea or lens shape. The procedure uses a laser to reshape the cornea and focus light onto the retina therefore improving vision. The first step in LASIK is to remove a layer from the top of the cornea leaving a portion attached in order to create a flap. The flap is then folded back and very small areas of the underlying tissue are removed (ablated) with an excimer laser in order to change the shape of the cornea so it can better focus light onto the retina. Once the correct amount of tissue is removed, the flap is laid back in place covering the area where the tissue was removed. The flap acts as a bandage to decrease pain and healing time.

- **BEFORE LASIK**

You must have an evaluation prior to surgery in order to determine that you are a good candidate. Your doctor will first examine your eyes and if the amount of correction needed is too much or too little, you will not be a candidate. The



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doctor will also examine you for dry eye, which must be treated and corrected before the procedure. There are also some medications and/or health problems that would disqualify someone from LASIK. A topographical map will be taken of the cornea prior to surgery so the surgeon knows where and how much tissue to remove. The topography can sometimes show evidence of corneal disease or disorder that would prevent LASIK as a possibility. The corneal thickness must also be measured in order to be sure that the cornea will not be too thin after the procedure.

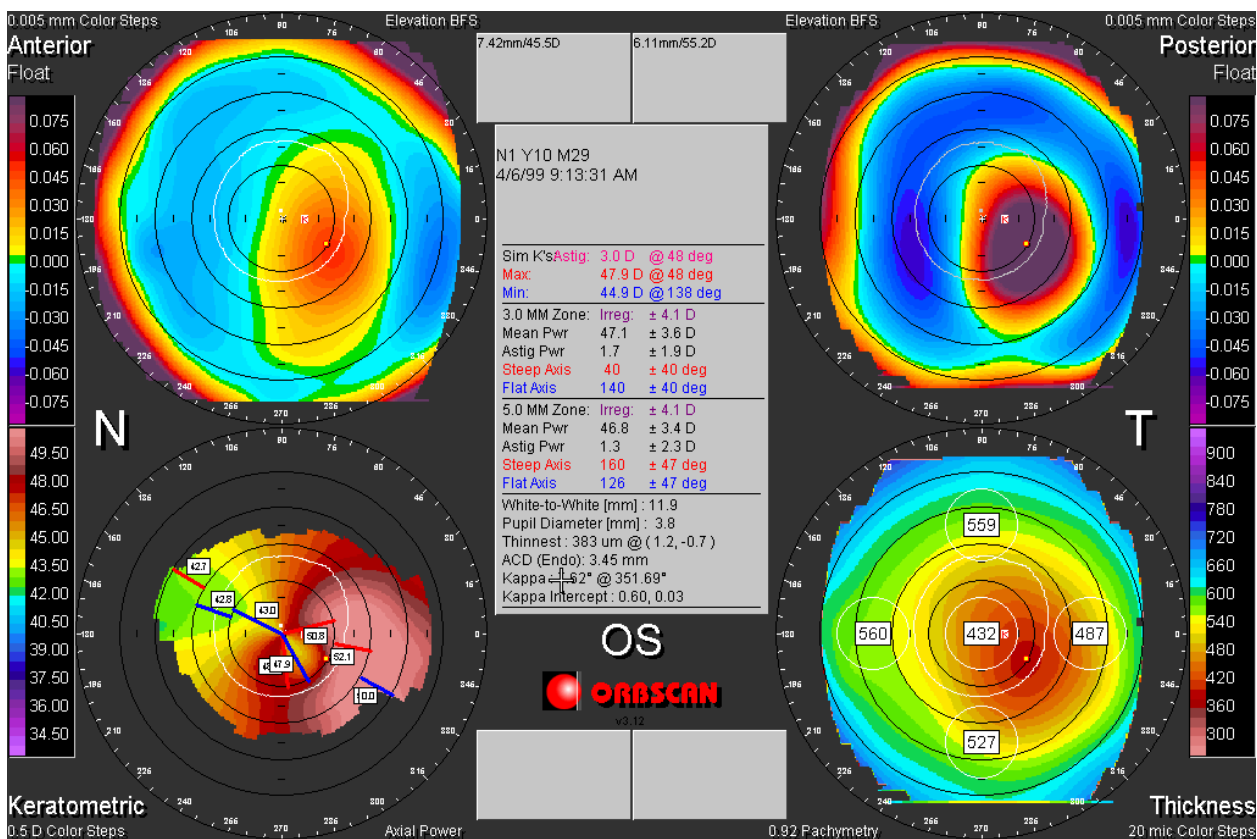
Does the doctor use an Orbscan instrument to evaluate your cornea prior to refractive surgery?

The Orbscan IIz is an instrument manufactured by Bausch & Lomb that measures both the front **and back** surface of the corneal curvatures/topography and the thickness of the cornea in five different areas around the cornea. The Orbscan is the only instrument in the world to measure this combination of corneal detail.

Some ocular diseases manifest on the posterior corneal surface. **It is vital to your future ocular health and vision clarity to have this test performed before refractive surgery.**

You must have this test performed and interpreted by an experienced and knowledgeable doctor to know if you are a good candidate for refractive surgery.

DO NOT have refractive surgery without first having the Orbscan test! Do NOT accept a substitute instrument that “does the same thing”. No other instrument can do all that the Orbscan IIz can do!



Orbscan Analysis Report showing a patient that should definitely not have LASIK.



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The Orbscan IIZ has prevented many problems for many patients by exposing hidden problems on people that otherwise appeared to be good candidates. If a problem develops because the Orbscan test was not performed, the poor results may not be evident for 2-4 years after the procedure.

Be safe..... Not sorry!

- **DURING LASIK**

The day of your procedure you will need to bring someone to drive you home. You will walk into the laser center and you may be given an oral sedative to take that morning, but you will be awake during the procedure. The surgeon will anesthetize the eyes so that little to no pain is experienced. You will be told to look at a target light and the procedure takes about 5 minutes. The surgeon will do one eye and then the other. You will rest for a short period of time afterward and then go home that day. You should notice an improvement of vision immediately and it may continue to improve over the following days. The surgeon will give you drops that need to be taken after the surgery as well as pain meds, though most people only experience mild discomfort.

- **AFTER LASIK**

Some people can go back to work the next day, but it is advised to rest for a couple days. No strenuous exercise should be done for the first week and you should not rub your eyes during the healing process.

LASIK Complications

The complication rate for LASIK is well below 1% as long as the doctors involved and surgeons are responsible when picking “good” candidates for surgery. However, this is a surgical procedure and sometimes even under the best conditions things can go wrong.

- **OVER or UNDERCORRECTION/REGRESSION**

This happens when the correction done during surgery was too much or not enough. Regression means the vision seems great at first and over the healing process it becomes worse. The symptoms will be blurred vision and they can be corrected by glasses, contact lenses, or retreatment with the laser if possible.

- **DECENTERED ABLATION**

This means the laser treatment was not perfectly centered and can cause some types of aberrations which can include glare, halos, ghosting, starbursts, double vision, low contrast sensitivity, or decreased night vision. It may be possible to have retreatment if this happens.

- **PUPIL SIZE TOO LARGE**

If the pupils are too large it will also cause various aberrations especially at night. Pupils should be measured in dark and light conditions prior to surgery to avoid this.

- **DRY EYE**



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Experienced by almost half of all patients that have LASIK. Dry eyes are caused by LASIK when the corneal nerves that provide “feedback” to the lacrimal glands are damaged during the laser procedure. Dry eye attributed to LASIK typically improves after 6 months as the corneal nerves regenerate. Eyes may be itchy, red, irritated and occasionally painful. This is treated with standard dry eye treatments including prescription drops, artificial tears, omega 3 supplements and lacrimal punctal occlusion (silicone plugs inserted into the tear drainage ducts).

- **INFECTION (very rare)**

Eyes will be very red with a lot of discharge and possible pain. Infection would be treated with prescription eye drops and oral medications.

- **FLAP COMPLICATIONS**

Though they are rare, free caps (flaps that become completely detached), partial flaps, buttonhole flaps (flaps that are improperly formed) are all complications that can occur while cutting the flap. These can create corneal irregularities after healing which cause aberrations or blurred vision. Flap complications are not a factor with PRK, LASEK, or epi-LASIK.

- **DIFFUSE LAMELLAR KERATITIS (DLK)**

This is an inflammatory condition due to cellular debris left under the flap during the healing process. The cornea develops inflammation due to the foreign material and if not treated immediately and aggressively it can cause scarring which can reduce vision. It can be treated with topical steroids and it's possible the flap may need to be lifted and rinsed.

Symptoms of DLK include blurred vision, eye irritation and sometimes even mild eye pain. This is a serious condition if left untreated that can create long-term vision loss. This condition is rare, but if it occurs will usually become apparent during the first week after LASIK. Be sure to visit your doctor on the one day post-op and then again within one week. Some doctors maintain patients on corticosteroids longer than 4-5 days to be certain that DLK does not develop.

- **EPITHELIAL INGROWTH**

Sometimes epithelial cells from the cornea can begin to grow under the flap causing it to lift up which creates an irregular surface and visual aberrations. These cells can be removed.

BLADE VS BLADELESS

Traditionally LASIK was preformed with a machine called a microkeratome which suctions onto the eye and has an oscillating blade that cuts the flap in about 3 seconds. Most surgeons agree that the best ones have few moving parts, are easy to assemble and disassemble. The blades should revolve at very high speed to ensure a smooth and precise incision. The microkeratome should hold up well against the harsh treatment of frequent, high temperature sterilization. The original microkeratomes had a much higher complication rate than the newer, modern microkeratomes. The newer ones such as the Amadeus II have no gears so there is no chance of gears jamming during the procedure and it can be



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used for epi-LASIK as well. These microkeratomes are precise and fast which increases the patient comfort when compared with bladeless LASIK.

In 1999 another method of cutting the flap was introduced which used a laser. The laser is called a femtosecond laser. The most widely used femtosecond laser brand is **Intralase**. This laser can be programmed to penetrate a certain depth within the cornea and causes a bubbling of the tissue without damage to the surrounding tissue. The laser hits points throughout the cornea until a flap is created. Most doctors believe there is less chance of corneal flap complications using the Intralase.

It creates a more uniform flap and some surgeons believe there is a decreased occurrence of free caps or buttonhole flaps. It also creates a vertical edge, instead of a slanted edge, which has been thought to cause less epithelial ingrowth and less chance of flap decentration after surgery.

The main difference between these two methods is the chance of complications at the time of the procedure. Some studies have shown that the visual results are the same with the two procedures (Mayo Clinic 2006 study of 20 patients 6months after surgery) while others have shown that Intralase or bladeless LASIK gives better long term visual outcomes (*journal of refractive surgery* Nov 2007). The debate continues so be sure to ask your surgeon which procedure he or she regularly performs.

What maintenance and service standards are applied to the microkeratome?

The blade speed should be tested before each surgery day as well as a full inspection of the unit being used. There should be extra parts or a second unit on hand to use if necessary. All manufacturers provide detailed service and testing instructions. Since the blades are so fine, they should be replaced after each patient, not sterilized and reused, after each patient.

Conclusion:

The Intralase is a very good instrument but does not eliminate all complications. The good news is that **both automated mechanical microkeratomes and the Intralase are excellent devices** with extremely high success rates.

However, we certainly believe that using the Intralase blade-free procedure for creation of the corneal flap is the safest method of performing LASIK.

CUSTOM LASIK

This is also known as wavefront guided LASIK. LASIK corrects our vision when we are nearsighted, farsighted or have astigmatism. These are all considered lower-order aberrations. Although LASIK corrects the lower-order aberrations, it can sometimes cause more higher-order aberrations like halos, glare, or decreased contrast sensitivity all of which greatly decrease night vision. Custom LASIK was created to reduce the higher-order aberrations which can possibly be induced by the LASIK procedure.



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It works by using a wavefront analyzer to take a 3-D topographical map of the cornea before surgery. Light is sent into the eye and bounces off the retina, returning back through the cornea to the machine which then creates an accurate map. This information is sent directly to the laser before surgery. Custom LASIK has been proven to significantly improve the quality of vision when compared with non-custom LASIK. In 2003 only 10% of surgeons were doing wavefront guided LASIK versus over 74% today.

LASEK

(Laser Epithelial Keratomileusis)

LASEK was developed for people who are not good candidates for LASIK due to a thin or very steep cornea. LASEK is similar to PRK (Photorefractive Keratectomy) which is a laser procedure that was widely used before LASIK but became less popular due to increased pain and healing time after the procedure.

PRK is a procedure in which the excimer laser is applied directly to the top (epithelium) of the cornea instead of the middle (stroma) as in LASIK. There is no flap, so the laser burns through the epithelium which is left to slowly grow back afterward. Contact lenses are used to decrease the discomfort.

In LASEK, a very small blade is used to cut just under the thin layer of epithelium and then an alcohol solution is poured over the cornea which further loosens it creating a very thin flap. The epithelium is then rolled back with a small tool and the cornea underneath is ablated with the excimer laser. The thin cell layer is then rolled back into place to heal. Contact lenses are used the first few days to decrease the discomfort and promote healing.

LASEK takes longer to heal and longer for the vision to improve, usually 5-7 days. There is also more pain than is experienced with LASIK. A study done in 2008 by the *journal of Refractive Surgery* showed that people healed a little faster and with slightly less pain after PRK than butterfly LASEK (a type of flap thought to increase comfort and healing time). In 2007 the *journal of Cataract and Refractive Surgery* concluded that the outcome of LASEK depended greatly on the surgeon's experience with the procedure.

epi-LASEK

This is a hybrid procedure between LASIK and LASEK. As in LASEK, a flap is created with just the epithelium so it is much thinner than LASIK but a blunt plastic oscillating blade is used instead of the much thinner blade used with LASEK. An epithelial separator is then used to pull the layer of epithelium up so that the excimer laser can be used underneath. No alcohol solution is used to separate the layer which eliminates any cellular reaction to the alcohol. After the excimer laser reshapes the cornea, the flap is folded back with a small spatula. A contact lens is applied over the flap to facilitate the healing of the epithelium. There may be mild pain after the procedure which should be manageable with over-the-



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counter pain meds. The pain is reportedly less than PRK or LASEK. The contacts can usually be removed after three days and the vision will gradually improve anywhere from a week to 6 months. Though the vision is much slower to improve with epi-LASIK, the advantages are that it can be done on thinner corneas and there is no chance of the flap becoming dislodged. It cannot be done on people with very steep corneas which is usually the case if the person has high myopia.

LASIK ENHANCEMENT

LASIK surgery is meant to decrease dependence on contact lenses or glasses. The visual result will not always be crystal clear but it should be enough to function without the need of additional correction. The vision may take weeks to months to completely improve, but if it does not then an enhancement may be required. There are many factors affecting the outcome or satisfaction after surgery including shape of corneas, refractive error, tear quality, age and expectations. If an enhancement is determined to be needed then the eyes will be evaluated the same way they were before the first procedure. If it is safe to proceed, then the procedure is done almost the same way. The only difference is that the flap is lifted at the same point with a special tool so no cutting is necessary. Studies show the rate of enhancements necessary is anywhere from less than 5% to more than 15%. If a surgeon does more enhancements it does not necessarily mean they are not as good as another. Some surgeons do more enhancements in order to get better results while others will only do an enhancement if the vision very reduced. The rate of enhancements is also dependent on the types of patients and each individual situation will be different based on the factors discussed above.

Surgeon's Qualifications/Choosing a Laser Center/Surgeon

Choosing a surgeon is the most important decision you will make regarding your refractive procedure. These are not the most difficult procedures to perform, but if the outcome is bad it will have an enormous impact on your quality of life.

Many refractive surgery centers will advertise on TV, radio, or newspaper. This can be a place to start, but do not believe everything you read in the ads. If the price advertised is exceptionally low and seems too good to be true...it probably is.

Price vs. Value

- **Do I get the best care from the most expensive LASIK center?**

No, in fact, many times it may be just the opposite. Your outcome will vary based on the following:

1. Type of refractive surgery performed (wavefront vs. traditional LASIK vs. LASEK, etc.)
2. The surgical technique
3. Brand of laser



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4. Quality of laser calibration and laser maintenance
5. Accuracy of pre-surgical tests
6. Orbscan test result

Cost is a factor - for a laser center to afford the best available technology they must charge enough to afford and properly maintain that incredible technology. Additionally, to take all the safety precautions previously mentioned costs more in manpower as well as disposable instruments and supplies. Therefore, there is a certain level of expense that can't be avoided to provide you the ultimate in accuracy and safety. **The most expensive is definitely not always the best, but don't be fooled by ads or rumors about LASIK as low as \$599.**

It simply isn't possible to pay \$599 per eye and get the quality care and outcome you desire. The actual hard costs in supplies, royalty fees, laser fees, etc. are much, much higher than that. Throw in other overhead of staff salaries, rent, utilities, insurance, etc. and \$499 is merely a figment of some bait and switch advertiser's imagination! In fact, when ABC television sent in secret shoppers and interviewed many people leaving a so-called \$599 nationally advertised LASIK center they could not find anyone who was charged that fee. In fact, the average fee was almost three times that fee per eye and that was not even for wavefront LASIK!

Any laser center should be able to quote a price over the phone for a specific refractive procedure if they know your eyeglass prescription **and if you meet other criteria for safety.**

Beware of those who say you must come in to get a price. Be ready for high pressure sales and a bait and switch offer.

Other ways to find a Surgeon

You may want to ask if the surgeon is associated with an academic medical center. These will more likely keep up with current information and technology. They will have more exposure to new procedures. If the surgeon is a Fellow of the American College of Surgeons, they are probably committed to advancing the field of surgery and the credentialing process is very difficult so they are more than likely very skilled.

Ask your regular doctor, whether optometrist or ophthalmologist, for a referral. They have seen many patient results and are therefore a good resource.

What Question to Ask...

Make an appointment for a consultation with your eye doctor and make sure to write down any questions you would like to ask. Here are a few you may consider:

- How long have you been performing refractive surgery procedures? (Not less than three years.)
- How many total procedures have you done? (Not less than 500.)
- How many refractive procedures of the exact type you intend to use for me, with the same equipment, and the same refractive error, have you performed? (Not less than 100.)



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- Will you provide me the names and contact information of at least ten previous patients who have had the exact same surgery with similar refractive error?
- Have you ever had malpractice insurance coverage denied?
- Have you had your license to perform refractive surgery revoked, suspended or restricted?

Also, remember to make sure the surgeon is well versed in many refractive surgeries, not just one or two.

If you would like a second opinion after the consultation, be sure to get one. Make sure you're happy with the surgeon's personality and that you get along with them well and this will make you feel more comfortable throughout the process.

OTHER REFRACTIVE PROCEDURES

CONDUCTIVE KERATOPLASTY (CK)

This is a procedure in which mild heat from radio waves is applied to the periphery of the cornea causing the tissue to shrink up and the cornea to become steeper. It improves vision for someone who is farsighted with presbyopia (losing near vision after age 40) or someone who has presbyopia alone. This procedure is not for anyone who is nearsighted or who has a lot of astigmatism. There are studies being done now to incorporate astigmatism correction, but it has not been perfected yet.

This procedure used to have a high rate of regression (worsening of vision over time) but better techniques have created results which are much more stable and it is gaining popularity.

If it is being done for presbyopia, then one eye is corrected for near and the other is treated for distance if the person is farsighted or left alone if the person has perfect distance vision and just needs help reading. This creates a result called monovision where the dominant eye is for distance and the non-dominant eye is corrected for near vision. It is a good idea to try this out with contact lenses first to make sure you are a good candidate. CK is less likely to blur distance vision with monovision correction than contact lenses or even LASIK.

The procedure is done with a pen shaped probe that emits radio waves. It takes about 15 minutes and usually costs around 1,500.00 per eye. It can be done on prescriptions between +0.75 and +3.25 with no more than 0.75 diopters of astigmatism. The advantage of this procedure over LASIK is that it has much fewer complications during and after.



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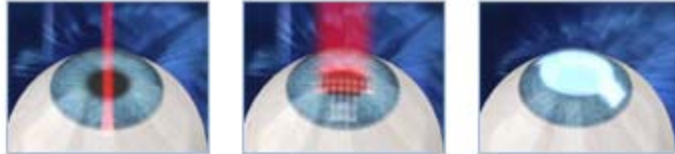
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POSSIBLE FUTURE REFRACTIVE PROCEDURES

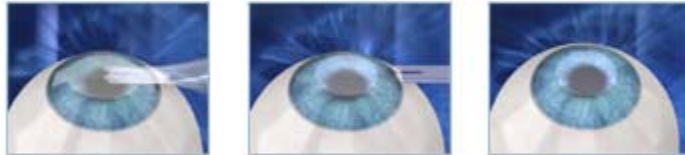
CORNEAL INLAYS

Inlays are made of a material that is very similar to the surface of the eye and is biocompatible. The material is custom molded and placed beneath a superficial flap in the cornea. It could be used like a contact lens except it never has to be removed. This would eliminate much of the complications associated with other refractive surgeries such as LASIK and it is much less invasive than putting a new intraocular lens into the eye. It is done much the same way as LASIK but instead of removing tissue, the material is placed on the eye and covered with the flap to heal without really disturbing the tissue at all. Eventually, it may even be possible to place the material on the eye and reshape it with a laser instead of

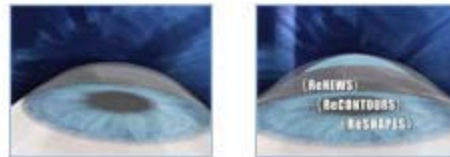
Laser technology is utilized to create a flap in the cornea.



Utilizing the RVO™ proprietary inserter system, the 1.5mm PRESBYLENS™ CI is placed under the corneal flap and centered over the pupil of the eye.



Once inserted, the PRESBYLENS™ CI is designed to ReShape and ReContour the surface of the cornea for the purpose of improving near vision.



using the laser directly on the tissue.

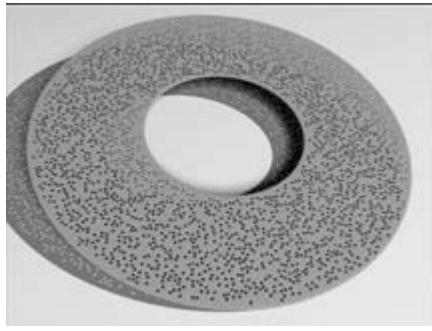
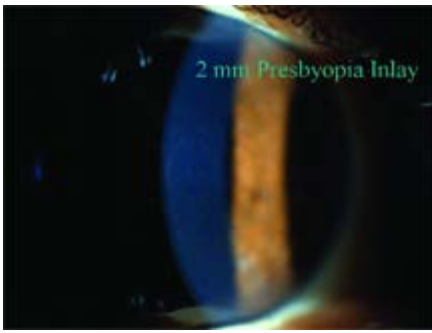
The picture above illustrates the process of inserting the Presbylens inlay from ReVision Optics. This inlay is inserted under the epithelium in the center of the cornea and is used to correct presbyopia.

Testing began in 2006 for the ACI7000 by Acufocus which is designed to correct near vision problems. It works by creating tiny pinholes for light to pass through which gives the eye a large depth of focus making it able to see things up close without compromising distance vision. The inlay is actually clear and cannot be seen easily after insertion.



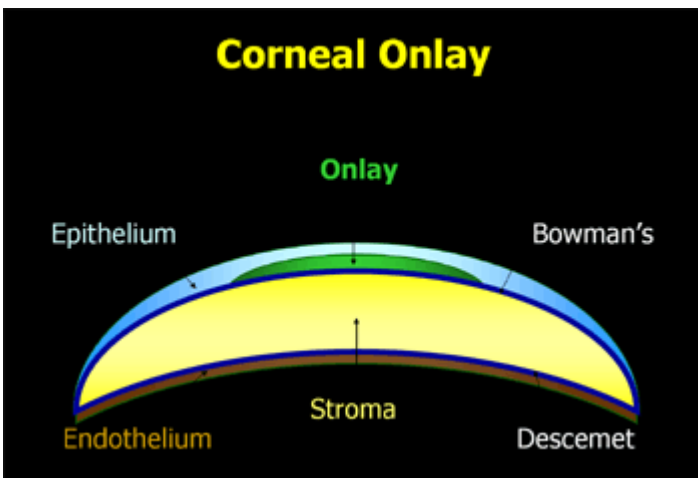
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The procedure takes 15 minutes, can be done in office, and only requires topical anesthesia.

CORNEAL ONLAYS



Onlays are made of a mostly liquid collagen material that is made to sit under the epithelium or outermost layer of the cornea. They do not require a flap to be inserted, just an artificially created pocket under the epithelium which is cut so they can slide in and it then holds the onlay in place until it is completely healed. The onlay could then be lasered as if it was actual corneal tissue again eliminating the need to destroy actual tissue.

MULTIFOCAL (PRESBY) LASIK

This is a type of laser surgery still in experimental phases which corrects distance vision AND near vision decline after the age of 40. It works by ablating different zones within the cornea, some of which focus at distance and others focus at near. It will most likely be in a concentric ring design where the center is either distance or near and the periphery is the opposite.

Studies are still being done to develop the best method, but so far it seems farsighted individuals with presbyopia have much better results. One complication appears to be a loss of contrast sensitivity, which is the ability to read something



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printed on a background with similar coloring such as the black on grey of a newspaper. This does not occur in every case and research suggests it is only temporary for 2 to 6 months.

This does not appear to be a permanent solution to presbyopia as the vision will continue to change after the procedure.

CONCLUSION: There are many options for refractive surgery. It's extremely important to find a good surgeon and discuss all of your options. If you are well-informed, you are sure to be happy with the outcome!



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