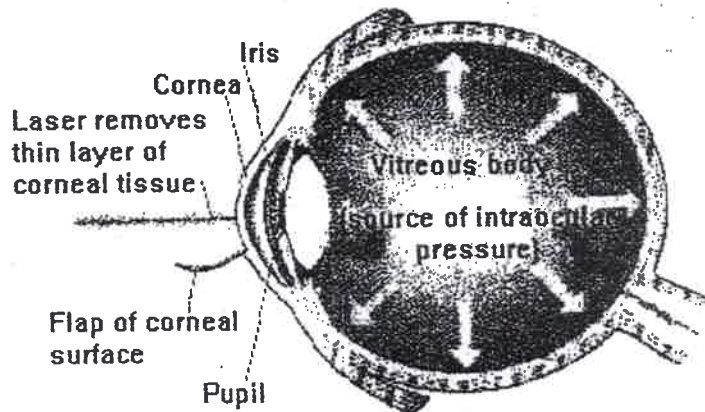


PRK and LASIK

Information Packet



LASIK: Laser Assisted In Situ Keratomileusis

PRK: Photorefractive Keratectomy

INTRODUCTION

This information is being provided so that you can make an informed decision about the use of procedures known as PRK and LASIK. Both procedures are surgical laser procedures to correct myopia, hyperopia and astigmatism.

These procedures, like all surgery, present some risks, many of which are explained below. You should also understand that there may be other risks not known to your doctor, which may become known later. Despite the best of care, complications and side effects may occur; the result might be affected even to the extent of making your vision worse.

UNDERSTANDING THE EYE

The cornea is the clear dome shaped window that forms the front wall of the eye. It acts as a lens to focus incoming light rays onto the retina, the light sensitive tissue in the back of the eye.

In the normal eye, light rays are brought to a single sharp focus directly on the retina, resulting in clear vision without glasses or contact lenses. Any deviation from this normal focusing is called a refractive error. Myopia, hyperopia and astigmatism are all common refractive errors.

In myopia or nearsightedness, the eye is longer than normal. The light rays come together at a point before the retina, and thus are out of focus. Distant objects may appear blurry, whereas near objects may be seen more clearly.

In hyperopia or farsightedness, the eye is shorter than normal. The light rays come together at a point behind the retina, and thus are out of focus. Near objects may appear blurry, whereas distant objects may be seen more clearly.

In astigmatism, the curvature of the cornea (and therefore its focusing power) is not the same in the horizontal and vertical directions. Light rays entering the eye do not focus at a single point, causing distorted vision. Many people with myopia or hyperopia have some degree of astigmatism.

TRADITIONAL CORRECTION OF REFRACTIVE ERRORS OF THE EYE

PRK and LASIK are elective procedures. There is no emergency or other reason that requires or demands you to have it performed.

If you decide not to have PRK and LASIK, there are other methods of correcting your nearsightedness and farsightedness. These alternatives include, among others, eyeglasses and contact lenses.

THE EXCIMER LASER USED IN THE PRK AND LASIK PROCEDURES

Both PRK and LASIK procedures use the excimer laser to reshape the surface of the cornea. The laser was developed by IBM in the early 1980's to etch silicon chips. It was subsequently discovered that the laser could be used to cleanly, and precisely, remove living tissue. The laser's high-energy ultraviolet light pulses break molecular bonds but do not heat or damage surrounding tissue. A thin layer of tissue is removed with each pulse. A computerized shutter controls the distribution of laser pulses on the cornea. With the multiple laser pulses the central cornea can be sculpted, changing its curvature and power.

Clinical treatment of sighted eyes using the excimer laser was initiated in 1998. Clinical excimer lasers are very complicated and sensitive instruments requiring careful calibration, monitoring of energy and regular maintenance.

PRK (PHOTOREFRACTIVE KERATECTOMY)

The PRK procedure involves anesthetizing the eye with eye drops first. Dr. Costello then removes the front surface of the cornea (epithelium). The excimer laser is then used to sculpt a new shape onto the front surface of the cornea. It is this new surface that corrects the refractive error. With PRK, the epithelium repairs itself within three days, growing back from the edges until it resurfaces the front surface of the cornea. Over a period of months following PRK, the epithelium attempts to remodel itself. Therefore, eye drops are used for a period of approximately three months following PRK in an effort to control the remodeling process.

LASIK (LASER ASSISTED IN SITU KERATOMILEUSIS)

In LASIK, a device known as microkeratome is used to shave the cornea to create a flap. The flap is then opened like a page of a book to expose the tissue just below the cornea's surface. Next, the excimer laser is applied to the exposed cornea to remove ultra-thin layers to reshape the cornea and create a new refractive surface similar to PRK. The flap is then replaced to its original position to cover the previously exposed cornea. Mechanical, biological and hydrostatic forces hold the flap in place without the use of sutures.

The day of surgery-

- Please note that you may feel nervous, anxious or excited prior to your procedure, this is a natural process and completely normal.
- Please refrain from wearing perfume/cologne on your surgery date.
- Please arrange alternate transportation for the day of your surgery.
- Please be aware that after your surgery your eyes will be irritated and light sensitive. This usually dissipates within 24 hours after surgery.
- We recommend avoiding alcohol 24 hours prior to 48 hours after your surgery.
- Wear comfortable clothing the day of your surgery.

After Surgery-

- Please be advised that your follow-up care is as important as the actual procedure.
- You are required to return to the office within 24 hours after your surgery for your first mandatory post-op appointment.

Activity Restrictions-

- No water sport activities for two weeks after surgery. This includes hot tubs, saunas and swimming.
- When showering please be careful not to bring water or shampoo in contact with your eyes for two weeks after surgery.
- Please refrain from smoking for the first 24-hour period as you may find the smoke irritating to your eyes.
- Please refrain from operating a vehicle for approximately three days after your surgery, longer if you are still experiencing blurred vision.
- Please refrain from activities in smoky, dusty environments for approximately one week.
- Please be aware that TV viewing, reading and excessive computer use during the first few days may cause strain on the eyes – please use in moderation.

Summary-

Every patient is a unique individual and as such can expect to have a unique healing process. You, as the patient, must be realistic about your surgical outcome, expectations and healing time with this procedure.

Patients will experience a dramatic impact in their lives after surgery, allowing them to live a life free from the dependence on glasses and/or contacts. However, it should be noted that all patients will eventually require the need for reading glasses as part of the eyes natural aging process.

Dr. Costello and his staff strive to deliver the best quality care by way of the highest standards of surgical procedures, using the latest technology while combining the most comfortable of environments.

Description of PRK & LASIK

Photorefractive Keratectomy (PRK)

No needles or scalpels are used during this procedure but your eyes are anesthetized with eye drops. Dr. Costello removes the top epithelium layer using a polishing method in order to expose the cornea. The laser is then applied to the surface to gently reshape the curvature of your eye. The epithelium layer will grow back within three to five days healing time. The whole surgical process will take approximately 15 minutes to complete.

Laser In-Situ Keratomileusis (LASIK)

The surgeon uses a machine called a microkeratone to create an incision, which forms a flap. The flap is gently lifted up and back, exposing the cornea. The laser is then applied to the surface to reshape the curvature of your eye. The entire process will take approximately 20 minutes to complete.

The Patient Process

Prior to your pre-operative evaluation day-

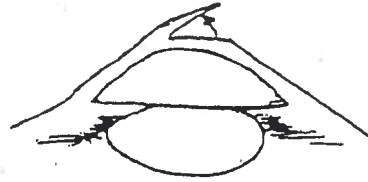
- Please remove your soft contact lenses **three days** prior to your pre-operative evaluation/ diagnostic date.
- Please remove your hard/ gas permeable contact lenses a minimum of **three weeks** prior to your pre-operative evaluation/ diagnostic date.

Prior to your surgery day-

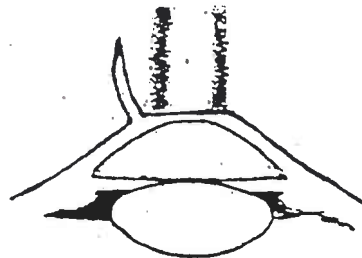
- Please pre-arrange alternate transportation for after your surgery.
- There are no restrictions on eating or taking medications before or on your surgery day. However, please advise us of any medications you may be taking.
- Please remove your soft contact lenses **three days** prior to your surgery date.
- Please remove your hard/ gas permeable contact lenses a minimum of **three weeks** prior to your surgery date.
- Please review the attached copy of the consent form as this is to be signed on the day of surgery.
- You will not be driving one to three days after LASIK and three to seven days after PRK.
- Please remove all facial makeup one to two days prior to surgery.

How does LASIK work and what are the outcomes?

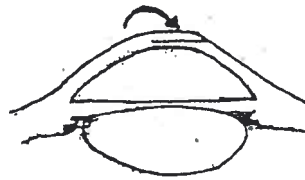
LASIK utilizes a two step method for vision correction. The first is the creation of a flap of corneal tissue. This protective layer helps in the quick recovery associated with this procedure.



The flap is created using an instrument called microkeratome. This instrument is automated to increase the level of precision of the flap. Once created, the flap is lifted and the laser is utilized.



LASIK uses the excimer laser to correct myopia or myopia with astigmatism by flattening the front of the cornea. The laser removes small layers of the cornea in an automated program designed to flatten the cornea by the amount needed to correct the refractive error of the patient. It works with the use of a powerful beam of ultraviolet light controlled by the doctor. This light does not enter the eye so that other structures (iris, lens, retina) remain unaffected.



It is important to note that while their vision without correction (i.e., glasses) improved, some patients still needed a prescription (i.e., glasses or contacts) after LASIK. Additionally, LASIK does not stop the need for reading glasses as we get older. In fact if a myope who utilized his myopia for reading has that myopia corrected with LASIK, he or she may then need reading glasses after the procedure.

WHEN IS PRK OR LASIK APPROPRIATE?

Excimer laser refractive surgery is appropriate for patients with myopia, hyperopia and/or astigmatism who wish to have less dependence on the use of glasses or contact lenses and who are willing to assume the risks associated with the procedure. One must be 18 years of age and have had no significant changes in his/her glasses or contact lens prescription for the previous 24 months in order to be eligible for the procedure.

Insurance or Medicare does not usually cover refractive surgery and the patient is responsible for the cost of the procedure.

There are several conditions under which one should not proceed with refractive surgery. They include:

1. Eye inflammation or infection
2. Severely dry eyes
3. Excessive corneal scarring
4. Degenerative disease of the cornea
5. Uncontrolled diabetes
6. Use of drugs which may interfere with the healing process
7. Pregnancy

If you have or are approaching presbyopia (the need for reading glasses that is prevalent in persons over 40 years of age), PRK and LASIK will not prevent the occurrence of this age-related process and in some cases may hasten it.

THE OPERATION

Contact lenses must not be worn at least three days prior to the surgery (two to three weeks for hard or gas permeable lenses). Eye drops are given before treatment; this provides anesthesia. The patient is positioned under the operating microscope. The eyelids are gently held open with the lid speculum during the procedure. The patient is asked to look at a fixation light in the microscope throughout the procedure. The actual treatment duration is dependent on the type and amount of correction needed.

FOLLOWING SURGERY

PRK

A soft contact lens is placed on the cornea in order to protect the eye and to keep it comfortable while promoting surface healing. Over the next three to five days, until the contact lens is removed, eye drops will be used on a regular basis. Vision will be blurry during this period. Once the contact lens has been removed, different eye drops are prescribed for use over the next few months. Vision will gradually improve. Stable vision is usually achieved within one to three months.

LASIK

The flap is repositioned and holds itself in place through natural forces. Contact lenses are not used unless an epithelial defect occurs during surgery. Eye drops are applied on a regular basis and a shield covers the eye for the first several nights to prevent rubbing of the eye. Medicated drop regime after surgery is approximately one to two weeks. Lubrication drops may be used up to three months. Stable vision is usually achieved in two to four weeks.

SELECTING LASIK VERSUS PRK

LASIK offers several advantages over PRK. Since minimal epithelial healing needs to occur, there is less pain and discomfort and a small risk of post-operative haze development. The refraction is typically stable much sooner, and under or over corrections can usually be corrected by lifting the flap and repeating the excimer laser treatment.

However, there are risks associated with LASIK that are not present with PRK. The main risk is a faulty flap that may require further surgical correction. There is also a remote risk of retinal vascular occlusion (i.e. cutting off the blood supply to part of the eye) which would result in permanent retinal damage.

EXPECTED BENEFITS OF REFRACTIVE SURGERY (PRK AND LASIK)

In most cases, vision improves enough to allow a person to function without eyeglasses or contact lenses. Corrective lenses may still be required for activities such as driving and reading.

RISKS ASSOCIATED WITH REFRACTIVE SURGERY (PRK AND LASIK)

No surgical procedure is completely free of risk. It is not possible to list every complication that can occur, and there may be adverse reactions, which are unknown at this time. Since glasses or contacts are currently available and are generally safe, you need to thoroughly consider the risks against the potential benefits of having PRK or LASIK.

There are many risks associated with both PRK and LASIK, which can affect your vision, temporarily or permanently:

1. Under or Over Correction

The procedures may result in over or under correction of vision, which may require future enhancement procedures or the use of glasses or contact lenses for good vision. Significant over and under correction can generally be treated. Enhancement procedures may require a period of healing and there may be greater risk with that procedure. An assessment and consultation will be held at which time the benefits and risks of an enhancement surgery will be discussed.

Over correction is less tolerated in people over the age of 40 and in the event this happens, the use of glasses for reading or for distance vision may be required by some.

2. Halo Effect

Halo is an optical effect that is noticed in dim light. As the pupil enlarges, the untreated peripheral cornea produces a second faded image or a “star bursting effect” around lights. Some patients who have undergone refractive surgery notice this effect while driving at night and may require glasses at night. This condition usually diminishes with time but could be permanent. Halos occur less frequently with the present procedure, which uses a larger treatment zone.

3. Decentration

Significant decentration of the zone of treatment (the laser beam not centered on the pupil) can occur. Halo and blurry vision can result.

4. Increased Sensitivity

There may be increased sensitivity of the treated eye to light, glare and fluctuations in the sharpness of vision after the procedure. These conditions usually occur in the normal stabilization period from one to three months after the surgery, but they may also be permanent in some cases.

5. Optical Imbalance between Surgeries

In cases when refractive surgery is performed on only one eye at the same time, there may be some inconvenience in vision between two procedures. In the time between surgery on the first eye and the second eye, the two eyes may not work well together because of their temporary difference in refraction (spectacle correction). This imbalance is called anisometropia and generally causes inconvenience during the period between surgeries.

6. Presbyopia and Reading Glasses

As a person grows older, the lens of the eye is less able to focus and near vision becomes more difficult. This normal aging process is called presbyopia, a condition that can be alleviated with reading glasses or bifocal lenses. If reading glasses are required at the time of the procedure, they will be required after treatment.

An advantage of being myopic (nearsighted) is that it generally takes longer to be affected by presbyopia. After laser surgery a patient over the age of 40 may require reading glasses.

7. Remote Risks

As with any eye surgery, there is a remote possibility of severe infection, loss of the corneal flap, corneal perforation, retinal detachment, hemorrhage, venous and arterial blockage, cataract formation, drug reaction, or other rare complications that could cause eye problems. They may range in seriousness, even to the extent of complete loss of vision of the eye, which may be restored with a partial or complete corneal transplant.

8. Regression

The visual acuity that is gained from refractive surgery could regress and vision may go partially or completely back to the level it was prior to the procedure. Such regression is more common in patients who are very nearsighted (>8 diopters). In most cases, this regression can be retreated.

9. Raised Eye Pressure

Transient elevation of intraocular pressure may occur with steroid eye drop use following PRK. Monitoring eye pressure is a routine part of the follow-up care.

10. Delayed Recovery of Best-Corrected Visual Acuity (BCVA)

It may take several months for full recovery of BCVA to occur following refractive surgery. This is due to healing and/or haze of the cornea. During the recovery period, there may be pain or a foreign body sensation in the eye, particularly in the first 24 hours after surgery. Generally, with the passage of time, the BCVA gradually improves and returns to its original state. Treatment may be necessary if the best corrected vision is not fully restored.

Medication may be given in conjunction with the procedure therefore; the patient must not drive for at least one day following the procedure and not resume driving until certain that vision is adequate.

Temporary glasses or contact lenses may be required for either distance or reading during the healing process and more than one pair of glasses may be needed.

11. Fragility on Eye Impact

After refractive surgery, the eye may be more fragile to trauma from impact for up to three months.

12. Eyelid Droop

There is a natural tendency of the eyelids to droop with age and eye surgery may hasten this process.

RISKS SPECIFIC TO PRK

1. Delayed Epithelial Healing and Infection

The surface epithelium is removed just prior to the laser surgery. This layer of the cornea usually heals within three to four days, but there may be a delay in the process. This delay is associated with more pain and increased risk of infection.

2. Microscopic Corneal Surface Irregularities

PRK can cause microscopic corneal surface irregularities and slight vision loss of best-corrected vision. One to two percent of patients may permanently lose up to two lines of vision on the eye chart.

3. Excessive Corneal Haze

Corneal haze occurs as part of the normal healing process over PRK. The haze peaks at six to ten weeks and then gradually subsides over several months. In most cases it has little or no effect on the final vision and can be only seen with a microscope. However, there have been reported cases of excessive haze, which ultimately required the patient to be retreated. Re-treatment for haze has been successful, but on rare occasions this has caused some permanent decreased vision.

RISKS SPECIFIC TO LASIK

1. Faulty or Improperly Created Flap

The flap created by the microkeratome maybe too thin, too thick, uneven or short. In this event, the laser part of the treatment may be postponed until the cornea has a chance to heal sufficiently to create the flap again. There is a risk of the “hinge” of the flap being completely cut (free flap), requiring the surgeon to reposition the detached flap of the cornea.

2. Flap May Move or Wrinkle Post-Operatively

Rubbing the eye may cause the flap to move or wrinkle after surgery. This may result in some permanent reduction in best-correction vision. Irregular healing of the flap could also result in a distorted cornea, which may result in vision that is less acute than prior to treatment.

3. Debris Under the Epithelium (or flap)

A small amount of debris under the flap does not affect your vision. If necessary, the flap can be lifted and debris removed.

4. Infection Under the Flap

This is very rare. Medications can generally treat this complication. However, scarring may occur and vision may be permanently affected.

5. “Sands of the Sahara” or Diffuse Lamellar Keratitis

A certain transient form of inflammation reaction between the flap and the corneal bed has been called “Sands of Sahara” or DLK. The exact cause of this complication has not been identified in medical journals. It is typically observed in the first week following surgery. DLK can result in a prolonged healing process, can be without symptoms, or can manifest itself with blurred vision and tearing from several days up to several months. DLK can be treated with topical steroids and, in rare cases, surgical intervention. DLK can result in a slight reduction in best-corrected vision.

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- Contents of this document were obtained from several resources about PRK and LASIK.