

Refractive Errors & Correction

“Super Vision”

Lasik is currently the most sophisticated procedure for correction of refractive errors.

Lasik is an acronym for **Laser Assisted In situ Keratomileusis**.

In Lasik, Excimer laser is used for correction of refractive errors.

The word "Excimer" is a contraction of "excited" and "dimer". Dimer merely refers to the combination of atoms of argon and fluorine gases, to form an unstable molecule which breaks down to emit photons of ultra-violet light which are used in the Excimer laser.

The excimer laser is a "cool" laser, which does not generate heat in the cornea. The laser photons destroy intermolecular bonds in the corneal tissue resulting in tissue removal by a process called Photoablative decomposition.

The absence of damage to the cells surrounding the ablated tissue renders this laser particularly suitable for delicate eye procedures.

Millions of people world wide have undergone lasik procedure for

correction of refractive errors with extremely satisfactory results.

The Treatment

Lasik is performed as an outpatient procedure with the use of topical anaesthetic drops and you will be awake during the entire procedure. The duration of the procedure is about 10 minutes for each eye.



Fig. (6.a) Lasik Workstation

For short sightedness (Myopia)

With myopia, the cornea is too steeply curved and too much focusing power is produced. This makes distant objects blurry, because light is focused in front of the retina. Near objects remain clear.

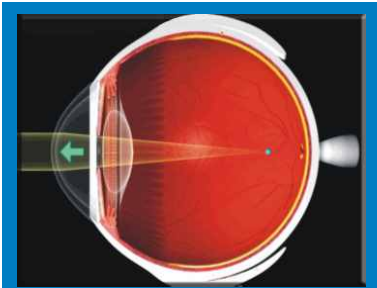


Fig. (6.b) Myopia

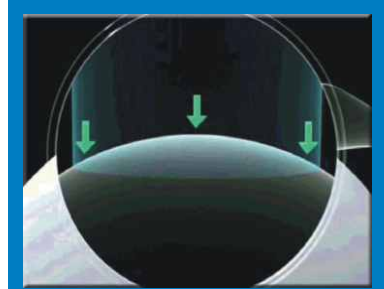


Fig. (6.c) Cornea Flattened in Myopic Lasik

When LASIK is performed for myopia, the laser gently flattens the cornea, which lessens the bending of incoming light, thereby allowing it to focus on the retina.

For Far sightedness (Hyperopia)

With hyperopia, the cornea does not bend incoming light enough, so light focuses behind the retina.

Hyperopia causes blurry vision for near objects. Hyperopia must be distinguished from presbyopia, which is clear vision at distance with a need for reading glasses for near.

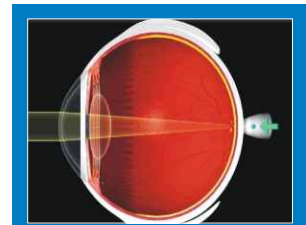


Fig. (6.d) Hyperopia

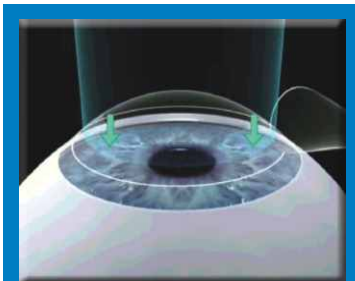


Fig. (6.e) Hyperopic Lasik

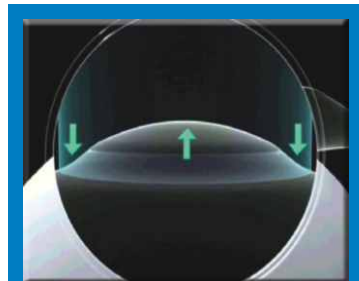


Fig. (6.f) Central Corneal Steepening in Hyperopic Lasik

When LASIK is performed for hyperopia, the corneal surface is gently steepened by the laser, resulting in more bending of incoming light and proper focusing on the retina.

For Cylindrical power (Astigmatism)

Astigmatism causes light entering the eye at different axes to be focused different amounts. For example, light entering vertically (from 12 o'clock to 6 o'clock) may be focused more than light entering horizontally (from 9 o'clock to 3 o'clock). In an eye without astigmatism, light is focused the same amount in each axis.

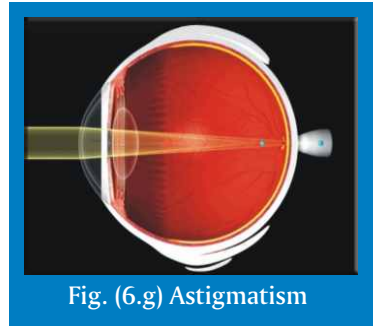


Fig. (6.g) Astigmatism

The net result of astigmatism is blurred vision. Often letters appear slanted or with "tails" coming off of them. Sometimes the affected eye sees double.

When LASIK is performed for astigmatism, the cornea is reshaped by the laser to allow proper focusing, regardless of the axis. In practical terms, astigmatism is treated similar to nearsightedness and farsightedness, but with different amounts of treatment to each axis.

The Procedure

I Step: An incision is made in the cornea . This corneal flap is made using an instrument called a Microkeratome which lifts a thin surface layer of the cornea away from underlying layers . The middle layer of

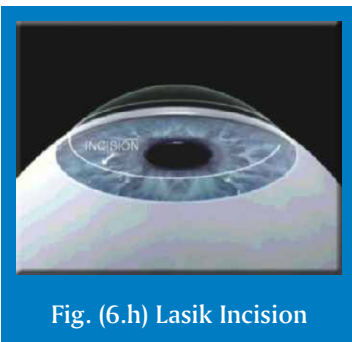


Fig. (6.h) Lasik Incision



Fig. (6.i) Lasik Flap

the cornea is thereby exposed for the laser treatment.

II Step : The surgeon focuses the laser on the exposed middle layer of the cornea. A foot pedal is depressed to activate the laser. The laser treatment usually lasts anywhere from a few seconds up to a minute,



Fig. (6.j) Microkeratome



Fig. (6.k) Lasik Flap

depending on the amount of correction needed. While the laser is running, it makes a rapid ticking sound. Each tick represents an individual pulse of the laser. After the laser reshapes the cornea, a small amount of fluid is used to wash away microscopic debris. The flap is then folded back into place. In a few minutes, natural adhesive forces seal it in place without the need for sutures.

Are you a candidate for Excimer Laser Surgery?

In general, the ideal candidate for LASIK is over 18 years of age and has healthy corneas. Candidates should not have had a significant increase in their spectacle prescription within the last 12 months.

LASIK surgery may not be right for you. If you have the following conditions / situations which may preclude your eligibility for the LASIK procedure :

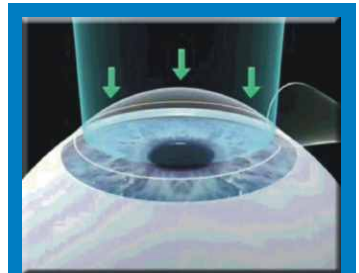
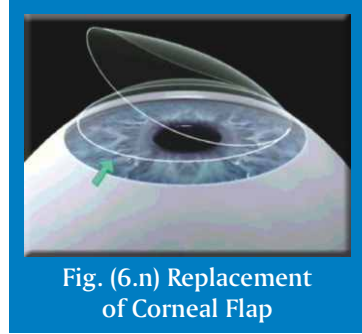


Fig. (6.l) Laser Ablation



Fig. (6.m) Laser Ablation

1. Pre-existant structural abnormality of the cornea, called keratoconus, which would be worsened by any forms of refractive surgery.
2. If you do not fall within an appropriate combination of the following parameters:
 - Power
 - Pachymetry (Central thickness of cornea)
 - Pupil size
3. Degenerative eye diseases such as:
 - Lupus
 - Glaucoma
 - Active diabetes
 - Rheumatoid arthritis
4. Active eye infection
5. Severe dry eye symptoms
6. Retinal Detachment
7. During pregnancy
8. Using glasses for reading only



Wavefront Lasik Surgery

Wavefront Lasik Surgery involves tailoring the excimer laser treatment to very small visual irregularities. These are called higher order aberrations that are specific to each person. Custom Wavefront Lasik technology takes information from corneal topography maps, and from an instrument called an aberrometer (also called a wavefront analyzer) and feeds it directly into the laser.

Wavefront Lasik Surgery will correct your prescription and will also correct the very small optical irregularities that are found not only on the cornea, but also the entire eye. These advances in technology mean that every patient can be treated as a special case. The new technology helps the patient achieve, what is called as super vision.

Realistic Expectations

The decision to have LASIK is an important one that ultimately, only you can make. It is important that you have realistic expectations and that your decision is based on facts, not hopes or misconceptions. The goal of refractive surgery is to reduce your dependence on spectacles or contact lenses. It does not always create perfect vision. It cannot correct a condition known as presbyopia which normally occurs around age 40 and may require the use of reading glasses. In fact, people over 40 years old who have had their myopia reduced with refractive surgery may find that they need reading glasses after the procedure. Your doctor will provide you with additional information that will allow you to make an informed decision. However the procedure called Conductive Keratoplasty takes care of presbyopia.

Points to be taken care after LASIK procedure :

- ◆ Upon returning home, rest or sleep for a few hours.
- ◆ The patient can return to his/her normal everyday activities the day after the operation.
- ◆ Avoid touching or rubbing the operated eye for 2 weeks.
- ◆ Avoid swimming for 2 weeks, light physical exercise is okay.
- ◆ Avoid exposure to strong light or over use for long periods (that includes the unoperated eye).
- ◆ Avoid activities which may cause trauma to the eyes.

Phakic IOL

In patient with very high myopia who cannot undergo LASIK, a new modality of IOL implantation has revolutionized refractive correction. A specially made intra ocular lens implanted with the appropriate power in front of the normal human lens thereby correcting the myopia. This retains the accommodation of the normal human lens enabling the patient to see distance and near clearly.

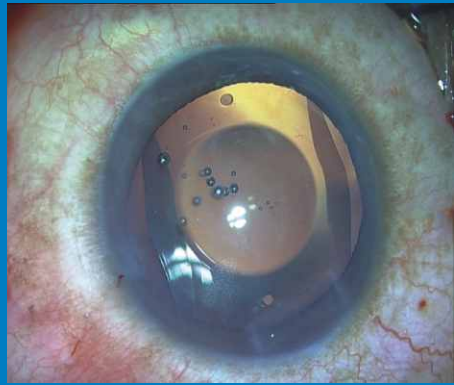


Fig. (6.o) Phakic IOL

Caveats :

- Refractive error is a very commonly encountered problem.
- Many ways of corrections are available, spectacles, contact lenses, LASIK, Phakic IOL.
- Treatment of choice for both myopia and hypermetropia for patients between 18 to 50 years is LASIK.
- A wavefront optimized LASIK will give better vision than normal eye.
- LASIK procedure takes only 10 mins.
- LASIK should not be done in children.