

DEPARTMENT OF
OPHTHALMOLOGY

Laser Vision Correction



Short-sightedness, far-sightedness and astigmatism can affect your eyesight, giving blurred vision. But with laser vision correction, clear vision is now within your reach.

At TTSH LASIK Centre, you can get a complete picture of what laser vision correction can do for you. We are proud to offer a full range of LASIK procedures as well as other refractive surgeries to provide the best option customised to your visual and lifestyle requirements.

UNDERSTANDING VISION

Types of refractive errors

Myopia (Short-sightedness or Near-sightedness)

The myopic eye is longer than normal and distant images are focused in front of the retina instead of on it, causing a blurred image. Someone with myopia will see near objects clearly, but distant objects will be blur.

Hyperopia (Long-sightedness or Far-sightedness)

The hyperopic eye is shorter than normal and images are focused behind the retina, leading to a blurred image. Someone with hyperopia will see distant objects clearly but objects that are nearby will be blur.

Astigmatism

The astigmatic cornea is unevenly curved, resulting in blurred and multiple distorted images. This affects distant and near objects equally. Astigmatism may co-exist with myopia or hyperopia.

Presbyopia (Old-sightedness)

In presbyopia, the eye loses its ability to focus on near objects. It is caused by ageing and usually begins around 40 years of age. With time, presbyopia will progress and worsen, necessitating reading glasses. LASIK cannot prevent presbyopia, but some patients opt for monovision correction.

Correction of refractive errors

There are many ways to correct refractive errors:

- **Spectacles**

Spectacles are the most common and safest method, easy to maintain and versatile. However, they can be inconvenient and cosmetically unacceptable to some people. They restrict peripheral vision and can interfere with sports and outdoor activities.

- **Contact Lenses**

If fitted well and properly worn, contact lenses are safe and effective. They allow for more freedom during sports and other activities, and maximise peripheral vision. However, they can be troublesome to maintain, expensive, and carry a risk of infection.

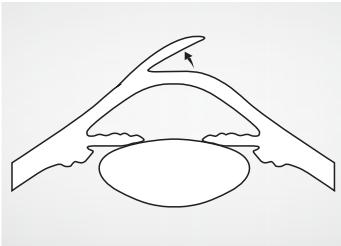
- **Refractive Surgery**

Refractive surgery changes the focusing power of the eye by altering the shape of the cornea, usually permanently. Laser vision correction is one form of refractive surgery, of which Laser Assisted In-Situ Keratomileusis (LASIK) is the most common form.

Types Of Laser Vision Correction

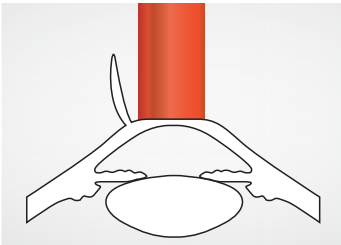
LASIK

LASIK basically involves 3 steps:



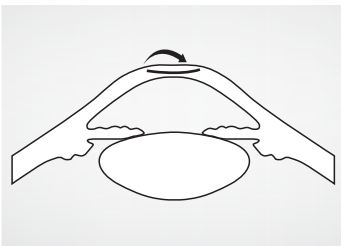
Step 1

Create the flap in the front of the cornea with the flap still attached on a hinge.



Step 2

The corneal flap is folded to the side, and the excimer laser is applied on the cornea to correct the refractive error.



Step 3

The corneal flap is then replaced to cover the area removed by the laser.

Methods to create the flap

1. Intralase (Bladeless)

The use of IntraLase laser or femtosecond laser is used to cut the flap. The advantage of using the laser to create the flap is that the diameter, thickness and hinge position can be customised. This is especially useful in patients with high degrees, thinner corneas or corneas with unusual shapes. There are also other advantages such as stronger flap stability and less risk of epithelial ingrowth.

2. Microkeratome (Blade)

In Microkeratome LASIK, the cornea flap is created by using a microscopic blade.

3. Epikeratome

In this method, a blunt microscopic blade is used to rub off the skin layer of the cornea (epithelium) in the form of a sheet. The skin layer is then folded back and laser is then applied to the cornea to correct the refractive error. After that, the skin layer is then replaced over the cornea. This technique is called Epi-LASIK.

Photo Refractive Keratectomy (PRK)

In PRK, the most superficial layer of the cornea, called the epithelium, is removed. The excimer laser is then used to reshape the surface of the cornea, changing its curvature and therefore correcting the refractive error.

As only the epithelium is removed and a flap is not created, PRK is useful for people with thin corneas and unable to have LASIK performed on them. PRK is also suitable for people who have occupations or sporting activities where a creation of a flap is unsuitable and also for people with mild to moderate dry eyes

Because the surface layer of the cornea is removed, there will be more discomfort, longer healing time and a higher risk of corneal haze and scarring compared to LASIK.

Methods of excimer laser ablation (the software)

1. Standard Ablation

Standard LASIK involves using a conventional laser software program to correct low to moderate myopia and moderate astigmatism. It is a good option for people with normal corneal thickness and curvatures.

2. Customised Ablation

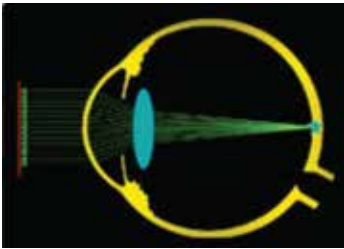
a) Tissue Saving

Tissue-saving LASIK is a form of LASIK in which the laser software is designed to remove less cornea tissue for a given degree of correction. It is ideal for high myopia and astigmatism and especially for people with thinner corneas so that full correction can be achieved and still retaining sufficient corneal tissue for structural strength and for future LASIK enhancement.

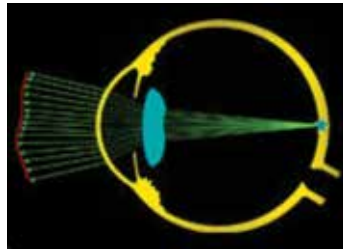
b) Aspheric

Unlike conventional LASIK, where the central part of the cornea is flattened, aspheric laser ablation is specially designed to retain the original curved shape of the cornea. This is an improvement over standard LASIK, and is intended to give sharper vision with less glare and haloes at night.

c) Wavefront



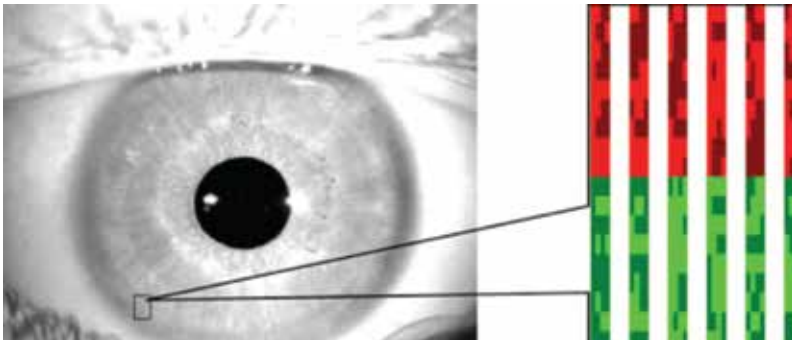
Perfect optical system.



Human eye - imperfect.

Wavefront LASIK customises the laser treatment to each eye's minute optical imperfections. In addition to correcting myopia and astigmatism, wavefront LASIK also simultaneously corrects these optical imperfections to produce better contrast sensitivity and reduces glare and haloes at night.

Iris-Recognition Advanced Control Eyetracker (ACE)

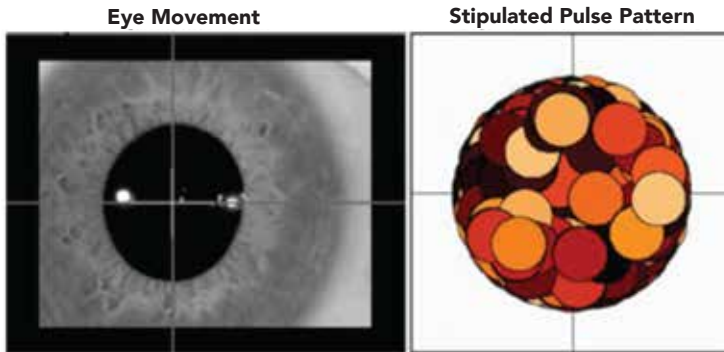


To achieve the best possible visual outcome after LASIK surgery, the laser pulses must be well centered and aligned with the eye during surgery.

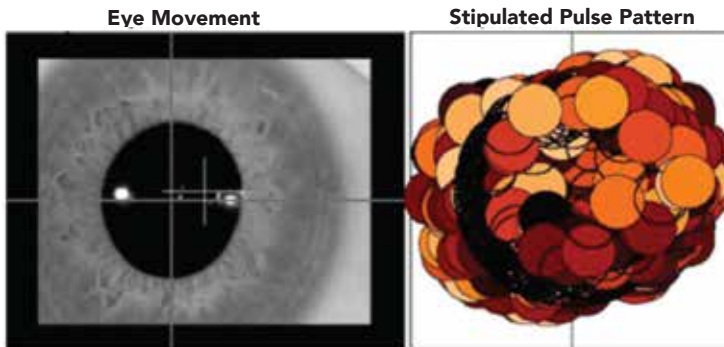
If your eye moves during the surgery, it will affect the location of where the laser pulse is applied. This can result in a less desirable vision outcome. However, our eyes often move during surgery which may affect the accuracy of the treatment.

Modern LASIK machine has an eye tracker that is able to track these eye movements to allow laser spots to be correctly placed on the cornea. This is especially important for correction of astigmatism in which the astigmatism axis must be well aligned for effective correction.

The ACE technology, in the Bausch and Lomb Technolas 217z machine, utilises an iris-recognition system to recognise the eye for tracking eye movements. Like our thumbprint, the iris pattern of the eye is unique to each eye, thus allowing precise matching of the laser pulses with the intended treatment position on the cornea. This therefore maximizes the accuracy and safety of the procedure.



With eyetracker.



Without eyetracker.



THE LASIK EXPERIENCE

Before the first consultation

Prior to your LASIK assessment, you are requested to stop contact lens wear.

The minimum recommended time to stop contact lens wear:

- Soft Contact Lenses
(1 week before assessment / surgery)
- Rigid Gas Permeable Lenses
(2 weeks before assessment / surgery)

This is to ensure the accuracy of the results obtained during your LASIK assessment.

Pre-operative LASIK assessment

During your LASIK assessment, a series of eye examinations will be performed.

These include the following:

- 1) Vision Assessment
(Visual Acuity test)
- 2) Eye Pressure Measurement
(Intraocular pressure)
- 3) Refraction
(Eye drops will be instilled to obtain a precise measurement of your eye power)

- 4) Cornea Thickness Measurement (Pachymetry)
- 5) Corneal Topography (Orbscan)
- 6) Wavefront Examination
- 7) Slitlamp Examination of your eyes

The whole process will take approximately 2 hours. After the tests, your surgeon will then decide whether you are suitable for LASIK and which type of LASIK is most appropriate for you.

On the day of surgery

- Arrange for someone to accompany you home, if possible.
- Do not plan to drive yourself home after the surgery.
- Do not wear makeup or fragrance.
- Bring warm clothing, as the surgery suite may be cold.
- Do wash your hair before the surgery as this should be avoided on the day after the surgery.



The surgical procedure

The operation will be performed under anaesthesia with numbing eye drops. An eyelid instrument will be used to gently open your eye to prevent it from blinking.

During the fashioning of the corneal flap, your vision will be momentarily dimmed. This takes only 20 seconds. You may feel a slight pressure sensation but there will be no pain.

Next, the Excimer laser will be applied to reshape the cornea, which takes approximately 30 to 60 seconds. You are required to look at a fixating light during the laser ablation and remain still. Again, there will be no pain.

After the surgery

After surgery, you will rest in the recovery lounge for half an hour. Your surgeon will review you before discharging you home with antibiotic eye drops and eye shields for wearing during sleep.

Follow-up after surgery

Your surgeon will review you the following day to check your vision and surgical outcome. Subsequently, follow-ups will be approximately at 1 week, 1 month and 3 months from the date of surgery. It is important to follow the post-operative advice and to use the eye drops as instructed. Medical certificate can be issued if you need one.

Who are suitable for Laser Vision Correction?

- You should be at least 18 years of age.
- Your eyesight should be stable for the past year, with no increase in degree.
- You should not have eye problems such as cataracts, glaucoma or keratoconus.

Who are NOT suitable for Laser Vision Correction?

- Pre-existing structural abnormality of the cornea (e.g. keratoconus)
- Very thin corneas
- Certain eye diseases (e.g. glaucoma)
- Active eye infection
- Are pregnant or breast feeding

What are some possible complications?

- Dry eye syndrome
- Fluctuating vision
- Halos and glares
- Some complications can be severe and sight-threatening
 - Keratoectasia
 - Post LASIK cornea infection
 - Flap complications, folds, cell ingrowth, tears and inflammation

Will there be recurrence of the corrected refractive error?

- Regression of the corrected refractive error is possible and may occur several months to years later.
- Patient may opt to have an enhancement of their treatment when it occurs, provided there is adequate cornea tissue.

Are there alternative refractive surgery if one is NOT suitable for lasik? Implantable Contact Lens (ICL)

Most refractive errors can be corrected by LASIK. However, LASIK is not able to correct very high degrees of myopia. In this situation, Phakic Intraocular Lens (IOL) can be considered.

Unlike LASIK, which modifies the shape of the cornea, Phakic IOL (pronounced "fay-kic") is an artificial lens that is surgically implanted into the eye while retaining the natural lens. The custom built Phakic IOL sits in front of the patient's natural lens and works like a contact lens within the eye.

- It has the advantage of correcting very high short-sightedness, and also long sightedness and astigmatism.
- It is highly effective and suitable for patients who want refractive surgery but are not suitable for LASIK or PRK.
- The disadvantages are
 - It is an operation within the eyeball.
 - Risk of raised eye pressure, cornea damage and may induce a cataract.

WHAT TO DO IN AN EMERGENCY?

Please call us at Tel: 8126 3632 during office hours.

Office hours:

- Monday – Friday: 8am – 5pm
- Saturday: 8am – 12noon

*Closed on Sundays and Public Holidays.

After office hours, you are advised to seek treatment at the Emergency Department (A&E), Basement 1, Tan Tock Seng Hospital.

Clinic Appointments and Eye Screening

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