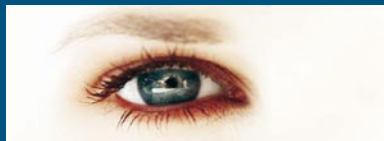


Laser



life-changing  
ophthalmic care®

# How Does Laser Eye Surgery Work?

All types of laser eye surgery work by re-shaping the front surface of the eye, the cornea. For laser candidates, laser eye surgery will in most cases remove almost all of the eye's distance focusing error and most people will have no need to wear glasses or contact lenses for clear distance vision. 95% of typical patients achieve 20/40 (6/12) or better vision.

The laser removes small amounts of tissue from the cornea in an extremely precise manner, to sculpt a new surface that enables your eye to form a clear image on the retina, much like a camera that has been perfectly focused.

The entire procedure is painless and very fast - less than 15 minutes, during which use of the laser beam lasts between 30 - 90 seconds per eye.

Whilst there are many confusing terms to describe laser eye surgery, there are only two ways that this is done:

## 1. **Surface treatment** – also known as PRK, Custom Surface, ASA or LASEK

- All describe a similar process, where the very top layer of the front surface of the eye (cornea) is removed and the laser reshapes the exposed layer immediately below. The top layer then grows back over the newly shaped surface.

## 2. **LASIK** – also known as Lamellar Surgery

- This technique has the advantage of not disturbing the very top layer of the cornea. Instead, a flap is created and lifted away to expose the layer immediately below, which is reshaped by the laser. The flap is then replaced on top of the reshaped surface.

## What is “Custom” or “Personalised” LASIK?

Traditionally non custom laser, LASIK or PRK, fires many hundreds of small spots which overlap by different amounts to create a new



surface to replicate the focusing pattern of the glasses or contact lenses. This system is called PLANOSCAN.

At Auckland Eye we have the advantage of providing traditional LASIK, and where best suited, also 'Custom' or our 'Personalised' LASIK known as 'Wavefront Guided' or 'ZYOPTIX'. Using this procedure laser spot positions are not determined by the glasses/contact lenses alone. Instead measurements are made of the whole focusing system by a machine called an ABERROMETER. Where appropriate, this personalised system has advantages. Our surgeons who are experienced with these methods will recommend the best type of treatment for you.

## What is PRK (Photo-refractive keratectomy)?

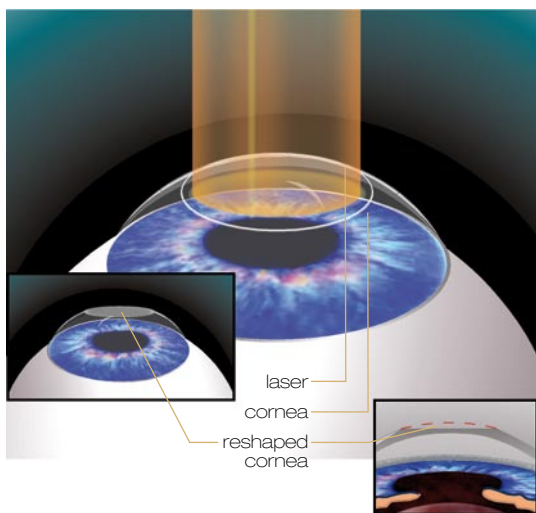
PRK is a surgical procedure that uses a cool ultraviolet light to shape the surface of the cornea. By removing minute amounts of corneal tissue the radius and the curvature is altered and hence the focal point of the eye. PRK was the first type of laser eye surgery introduced and allows for removal of tissue with great accuracy and with no significant damage to surrounding tissue. PRK is a good treatment to consider if you have:

- Low to Moderate Myopia
- A thin cornea
- Low astigmatism
- Previous laser eye/refractive surgery

### **Some disadvantages of surface treatment are:**

- Moderate discomfort for 2-4 days
- Relatively slow vision recovery, usually 2-4 weeks
- More variable visual outcomes due to skin healing variability
- Necessity for drops for 2-3 months

During PRK, no corneal flap is made making it suitable for people with thin corneas.



Photorefractive keratectomy (PRK)

## What is LASIK (Laser assisted in-situ keratomileusis)?

The more recently developed LASIK creates a flap, which is lifted to allow reshaping of the cornea just below the surface. Once the flap has been created the laser then uses a cool ultraviolet light to remove the corneal tissue by breaking the molecular bonds within the cells allowing exceptional accuracy and with no significant damage to surrounding tissue. LASIK has become the most commonly used method of laser eye surgery. It offers two principal advantages over PRK; it can treat a much wider range of refractive errors and postoperative recovery time is significantly faster. For the right candidate, LASIK provides a new perspective in vision correction.

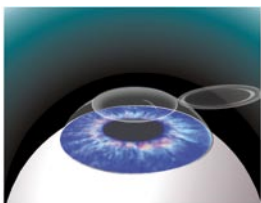
### Step 1:

The corneal flap is created exposing the inner layers of the cornea. This takes about 30 seconds.

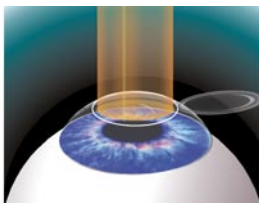


### Step 2:

The excimer laser is used to reshape the cornea. This takes between 30-90 seconds and is totally painless. For nearsightedness reshaping takes place in the central area to flatten the cornea, for farsightedness reshaping takes place on the edges to enhance its curve and with astigmatism reshaping target various locations to improve uniformity of the cornea's shape.



Step 1  
Flap is created and folded away from the central cornea



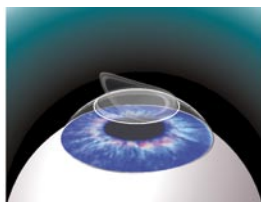
Step 2  
Excimer laser reshapes the cornea

### Step 3:

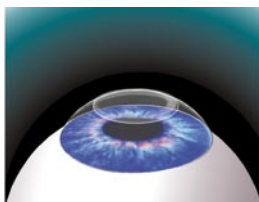
The corneal flap is replaced over the reshaped cornea so that there is little or no postoperative discomfort. Within three minutes the flap is securely attached and the procedure is over. There is no need for stitches as the flap bonds so quickly.

### Step 4:

Refractive surgery is complete.



Step 3  
Corneal flap is replaced



Step 4  
LASIK surgery is complete

## **LASIK has advantages over other procedures:**

- A relative lack of discomfort afterwards
- Improved healing - good vision is usually achieved almost immediately or at least by the very next day
- Eyedrops are usually discontinued after one week.

One disadvantage of LASIK treatment is that not everyone can have LASIK as it is dependent on the thickness and shape of the cornea.

## **More about Personalised LASIK**

At Auckland Eye as part of our 'personalised approach to patient care' we offer, and use, the latest Wavefront (custom) technology to deliver an individualised treatment plan for each patient. Wavefront technology offers a new level of diagnosis and treatment for people with nearsightedness, farsightedness and astigmatism.

## **The benefits are provided via three key components of the 'Wavefront System':**

- **The Wavefront Map** – reveals the way your entire optical system works, rather than just the corneal surface, allowing for a more precise and more detailed analysis of your vision.
- **Variable Spot Scanning** – allows for a larger treatment area, offering greater flexibility in developing a more personalised laser vision correction, especially with large pupil sizes, which can reduce quality of vision in low lighting.
- **The 3D Active Trak** – follows the tiny motions of your eye, repositioning the laser to ensure accuracy.

Our Wavefront System offers an individual treatment plan, designed especially for your eyes – hence the term 'custom'. It is the fingerprint of your eye, as no two are the same.



### **Benefits of Wavefront treatment:**

1. More likely to achieve clearer vision (20/20 or better)
2. Reduces likelihood of glare and halos at night
3. Ability to offer treatment to patients with larger pupils and thinner corneas
4. Removes less tissue thereby reducing the risk of complications.



### **How does the eye function?**

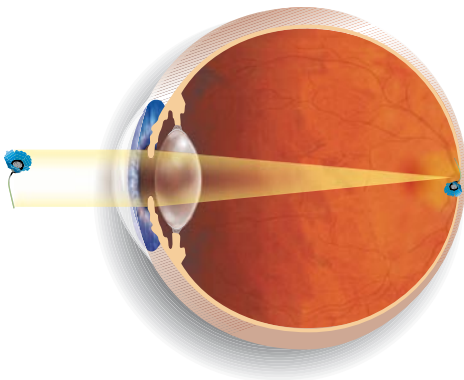
#### **Emmetropia (20/20 vision, perfect vision)**

This is how a perfect eye “works”. The light comes in through the cornea which focuses the light rays through the lens inside the eye and then onto the retina. The retina acts like the film in a camera and is responsible for the picture you see. The light hits the “macula”, a special area of the retina that is “built” to see fine detail (i.e. 20/20 vision). If the light hits the macula in perfect focus, you will see 20/20 or better on the doctor’s chart.

The way light is focused by the eye is a major factor in determining the quality of vision. Three factors are important:

1. The curvature of the cornea.
2. The power of the lens.
3. The length of the eye.

When these three elements are correctly balanced, light focuses on the retina giving clear vision. When not balanced correctly, as is the case for millions of people, a refractive (focusing) error occurs resulting in blurry vision for distance and/or near.



Normal eye

## What is 20/20 vision?

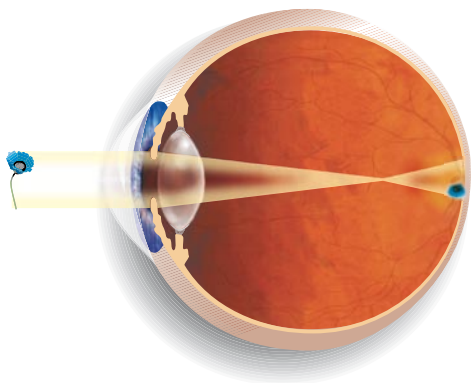
This is an arbitrary state of vision that is deemed as excellent or normal vision. In New Zealand we call this vision 6/6, vision being measured at a distance of six metres rather than 20 feet as in the United States. Vision is expressed as a fraction, and the closer the numbers the better the vision, i.e. 6/6 and 20/20 are equal to 1. Any different fraction represents better than or worse than normal excellent vision, for example, vision representing a fraction of less than 0.5, or 20/40, or 6/12, is deemed unsatisfactory for legal driving.



## What are the eye problems that laser surgery can fix? (For those who need glasses or contact lenses)

### Myopia (Nearsightedness)

Myopia affects one in four New Zealanders. Myopia occurs when the eye is larger than the “perfect eye.” Light rays are focused in front of the retina instead of directly on the retina (see picture). Distance vision is more blurred than near. Laser eye surgery can usually correct or significantly reduce myopia by flattening or removing tissue from the centre of the cornea.

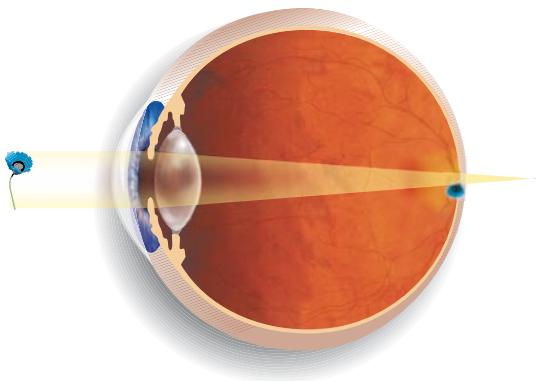


Myopia (nearsightedness)

### Hyperopia (Farsightedness)

Hyperopia results from eyes that are smaller than the “perfect eye,” causing light rays to fall past the retina (see picture). Near vision is sometimes more blurred than distance. Farsightedness is a distance vision problem and should not be confused with Presbyopia, which is the need for reading glasses after about 40 years of age (see below). Laser surgery can significantly improve hyperopia through the removal of tissue around the centre of the cornea. Frequently farsightedness may be undiagnosed when younger because the eye’s focusing system can overcome the problem. However, later in

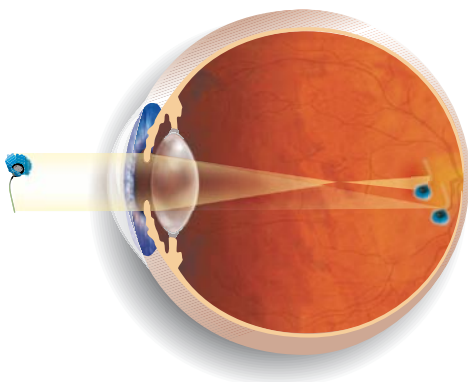
life the eye's focusing system loses its ability to overcome the error, and vision becomes blurry, first for near, then later for distance.



Hyperopia (farsightedness)

### Astigmatism

Astigmatism is caused by a difference in the curvatures of the cornea (or lens). While a perfect eye is round like a soccer ball, an eye with astigmatism is shaped more like a rugby ball. Light rays are focused at more than one point on the retina. This results in the retina's inability to clearly focus the image. Astigmatism is an additional cause of blurring which may occur on its own, or with near or farsightedness.



Astigmatism



## Presbyopia

A normal part of the aging process is a gradual weakening of the eye's near-focusing ability. This is caused by changes in the lens and the muscles which move it. Presbyopia makes reading and other close visual work increasingly difficult with the consequent need for reading glasses or bifocals. This occurs in all individuals, meaning that when the distance vision is fully corrected in both eyes everyone will require glasses for near vision by around the age of 45-50. There are some ways to overcome this:

**Being nearsighted:** People with nearsightedness will almost always have clear vision at a point close to them without the need for glasses. As they get older, they just take their glasses off for near and wear them for distance. Some people find this a satisfactory solution to presbyopia.

**Monovision:** This is where one eye is nearsighted, and the other has no distance focusing error. Some people have this state naturally, but it can be attained with contact lenses, and with laser surgery in suitable candidates. Ideally patients will try the contact lens correction as a "trial" before proceeding with laser surgery. Typically this will require a period of "adaptation" which usually takes 2-6 weeks.

## Solutions for eye focusing problems

- **Glasses** are a proven safe method of accurately correcting vision, although they have some disadvantages.
- **Contact lenses** provide more normal vision, but with a small risk of complications such as infection. If you simply want to avoid glasses, and have not tried contact lenses recently, then you could see your optometrist to arrange a trial of contact lenses in the latest designs and materials.

- **Laser Eye Surgery** now offers a relatively safe and effective method of vision correction for people over the age of 20 who have a stable focusing error.



## Reasons for choosing laser surgery

- The inability to tolerate contact lenses
- The desire to have more normal vision without dependence on glasses especially in emergency situations
- An occupation requiring good unaided vision e.g. (pilot/aircrew/police)
- Glasses/contact lenses don't match your image
- Glasses/contact lenses interfere with your working/sporting life
- To save money – over the years the cost of lenses, solutions and glasses amounts to thousands of dollars
- To avoid the negative consequences of long term contact lens wear.



## Am I suitable for laser surgery?

Certain general health or eye health conditions may make PRK or LASIK inadvisable:

- Under the age of 20, where the eyes may not yet have stabilised
- Pregnancy or breast feeding
- Connective tissue disorders such as rheumatoid arthritis that may increase the risk of complications after surgery.
- Systemic medications likely to affect wound healing such as corticosteroids or antimetabolites
- Keratoconus or other active corneal disease

## Common questions on laser surgery

### How long does the surgery take?

The LASIK procedure typically takes only 15 minutes per eye. The actual time that the laser is applied is only 30-90 seconds per eye. In preparation for your LASIK surgery day, you will need to have someone drive you to the practice that day as well as wait for you and drive you home. You and your driver should plan to spend approximately an hour to an hour and a half at Auckland Eye from start to finish.

### Does laser surgery hurt?

**No**, the laser procedure itself does not hurt. Anaesthetic drops are used to numb the eye and a sedative tablet is offered to help you relax. Slight pressure may be felt during the procedure. For three or four hours after surgery, most patients' eyes will feel scratchy and uncomfortable. As the cornea heals, it may feel like you have something in your eye. With LASIK this lasts less than a day, but with surface treatment there is usually discomfort for approximately 2 to 3 days. Your surgeon will give you medicated drops and lubricants to ease the discomfort and help the cornea heal.

## Can you guarantee me perfect vision with PRK or LASIK?

**No**, we cannot absolutely guarantee perfect results from the surgery because each eye responds slightly differently. However, experience from previously treated patients allows us to estimate the probability of your achieving perfect vision.

With low amounts of myopia and astigmatism 95% of patients will achieve perfect or near perfect vision. With moderate amounts of myopia 85% of people will achieve perfect or near perfect vision. People with higher amounts of myopia and astigmatism also have a very good probability of achieving good vision but with a significant chance that glasses or contact lenses will be needed at times. Further (enhancement) surgery may be necessary to achieve a full correction.

## Is laser surgery completely safe?

**Yes**, surgery is completely safe, but as with any surgery laser eye surgery has potential risks that you must be aware of. Final visual results cannot be guaranteed. Though complications can arise they are rare and will be discussed with you your surgeon well before committing to surgery.

## How long will the correction last?

Results have shown that after completion of the healing process the results gained will be permanent. There are rare cases where blurring of vision may recur. In most cases this happens after many years and is a result of progression of the process of myopia, which can occur naturally in any person. This could be expected in around 1-2% of treated patients.

## Can surgery be done on both eyes on the same day?

In over 99.5% of all cases we have performed at Auckland Eye, results of surgery on both eyes on the same day would be identical to results if separate day surgery had been chosen.



However, for high myopia, high astigmatism or farsightedness, we recommend an interval of at least one day between eyes. In some cases it is advisable to wait longer. This allows for the visual outcome in the first operated eye to stabilise before the second eye is operated on. Occasionally the surgeon may choose to adjust the amount of surgery based on the results of the first eye.



### When can I drive?

A patient is legal to drive with one eye 6/12 or better. Almost all patients will reach the legal standard for driving on the day after surgery.

Occasionally, imbalance between eyes, glare, or residual blurring may make a patient feel unconfident to drive. Once both eyes have had surgery, it is extremely rare for any patient to be either unconfident, or illegal to drive a car.

Night driving may be more difficult for a few weeks due to glare.



### When can I return to work?

Most patients will be completely pain free and have good vision on the day after surgery. As this requires a check with your surgeon, this should be a planned day off. Most patients will be completely able to return to work on the second day after surgery. Rarely, some patients (less than 5%) may need a longer time off work.

### How long will I be on medications?

For LASIK eyedrops are used for 1 week. Eyedrops are usually needed for 3-4 months following Surface Laser Treatment (PRK). This depends on the amount of attempted correction and on your individual healing response.

### Do I need to leave contact lenses out before surgery?

**Yes**, this is essential to achieve an accurate result. When contact lenses are left out of the



eye, changes to the shape of the cornea can commonly occur and this will result in a change in focus.

Soft lenses should be left out for seven days and hard (rigid gas permeable) lenses should be left out for one month per decade of use prior to the initial assessment.

### Can I wear contact lenses after PRK and LASIK?

With a good surgical result, most patients do not need to use contact lenses or glasses for distance vision after the operation. If a patient was able to wear contact lenses comfortably prior to surgery, they will usually be able to wear them again after surgery. Very rarely, because of the change in corneal shape following surgery there may be some people who are unable to wear contact lenses and who, if they need corrective lenses, will therefore need to wear glasses.

### Is there an upper age limit for PRK and LASIK?

**No**, as long as the eye and in particular, the cornea is healthy. After the age of 45 the eye's ability to do the extra focusing work needed to see for reading or close work gradually diminishes. Many people start to need reading glasses at this age and this requirement for reading glasses is not prevented by Laser Eye Surgery. This means that even if you have surgery, you will probably still need reading glasses from age 50.

**For more information on laser treatment please contact our friendly specialist team.**

# Auckland Eye

## life-changing ophthalmic care

New Zealand's largest and most highly specialised Eye Centre offers:

- internationally trained laser specialists and state-of-the-art laser surgery for refractive errors
- the best quality care as each ophthalmologist has specialist training in specific eye diseases and surgery techniques
- appointments are available at Auckland Eye in Remuera and also at our Apollo clinic in Albany (see website for details)
- modern day-stay facilities for cataract and outpatient ophthalmic surgery

Auckland Eye is dedicated to providing the highest quality service in a caring environment. It is the only private sector eye centre that has **Quality Health New Zealand** accreditation (QHNZ), for quality of patient care.

Auckland Eye is an affiliated provider to **Southern Cross Healthcare** and a partner of **Activa Health Limited**.

Auckland Eye offers a **no obligation free** laser assessment. Interest free finance is also available for approved applicants. To make an appointment, or if you have any questions about laser surgery, please contact one of our friendly specialist team.



affiliated provider



Southern Cross  
Healthcare



QUALITY HEALTH  
NEW ZEALAND  
TE TAURATA HAUORA

# Auckland Eye Surgeons



**Dr Stephen Best**

F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Howick



**Dr Sue Ormonde**

MD, F.R.C.Ophth.

F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Albany



**Dr Dean Corbett**

B.Sc., F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Albany
- Red Beach



**Dr David Pendergrast**

F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Henderson
- Papakura
- Pukekohe



**Dr Archie McGeorge**

F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Albany
- Takapuna
- Red Beach



**Dr Alison Pereira**

F.R.C. Ophth.

Appointments available at:

- Remuera
- Albany



**Dr Justin Mora**

F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Papakura
- Pukekohe
- Blockhouse Bay



**Assoc. Prof. Philip Polkinghorne**

F.R.A.N.Z.C.O.

Appointments available at:

- Remuera
- Papatoetoe
- Whangarei



**Dr Yvonne Ng**

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Appointments available at:

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