
Eyes - laser eye surgery

Summary

- Laser eye surgery is a medical procedure that involves the use of a laser to reshape the surface of the eye. This is done to improve or correct short-sightedness, long-sightedness and astigmatism.
 - Some people who have laser vision correction will still need to wear glasses or contact lenses to achieve optimum vision.
 - It is an expensive procedure not covered by health insurance.
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Laser corneal sculpting is a medical procedure that involves the use of laser to reshape the surface of the eye. This is done to improve or correct myopia (short-sightedness), hypermetropia (long-sightedness) and astigmatism (uneven curvature of the eye's surface). The first laser sculpting procedures were performed over 30 years ago.

The cornea is the transparent tissue that covers the front of the eye. It helps to control focusing. During laser eye surgery, a computer-controlled excimer laser is used to remove microscopic amounts of tissue from the cornea. The aim is to restore normal eyesight, without the need for glasses or contact lenses.

In one of the operations using the excimer laser, the thin outer layer of the cornea (called the corneal epithelium) is removed and the underlying layers are reshaped. This procedure is known as photorefractive keratectomy (PRK).

In a more commonly used procedure, a thin flap of corneal tissue is created with another laser known as a femtosecond laser. The most widely used one is known as the IntraLase. This flap is then lifted out of the way. The excimer laser reshapes the underlying tissue and the flap is replaced to cover the newly recontoured surface. Alternatively, an instrument with a very fine blade called a microkeratome can be used to make the flap before the excimer laser reshapes the cornea. This procedure is known as laser-assisted in situ keratomileusis (LASIK).

Myopia (short-sightedness)

Estimates suggest that around 30 per cent of Australians have myopia (short-sightedness). A person with myopia has no trouble focusing on close objects, but objects in the distance are blurry and difficult to see.

Hypermetropia (long-sightedness) and presbyopia

Hypermetropia is more common than myopia but tends to cause vision problems more commonly in people over the ages of 40. A person with hypermetropia sees distant objects better than close objects. They depend on glasses for up-close tasks such as reading.

The most common variation of this is presbyopia, which usually starts when a person is in their 40s. Presbyopia is where people can see quite well in the distance, but need to hold reading material further and further away from their eyes to be able to see clearly. This can't usually be corrected with laser corneal sculpting, but laser procedures can be used to make one eye short-sighted to overcome a dependence on reading glasses. This procedure is known as monovision.

Reasons why laser eye surgery may be considered

The reasons why a person may consider laser corneal sculpting include:

- They can't wear contact lenses and would prefer not to wear glasses for cosmetic reasons.
- They want to engage in work or leisure activities that cannot be done while wearing glasses or contact lenses.
- They don't want the inconvenience of contact lens wear and the care required.

Medical issues to consider

People thinking about laser eye surgery should consider that:

- You should be at least 20 years old before you consider laser eye surgery.
- The refractive error (prescription in glasses) should be stable.
- People with diabetes, uncontrolled rheumatic conditions, diseases of the immune system or a family history of keratoconus should be very careful in proceeding with laser eye surgery. An experienced refractive surgeon will be able to advise you appropriately.
- Laser eye surgery carries extra risks if performed on people with abnormally shaped or very thin corneas. These are easily assessed during preoperative testing in a refractive surgeon's office.

Laser eye surgery procedure

The excimer laser is a 'cool' type of laser. It doesn't burn tissue, but vaporises small amounts of the cornea every time a beam of the laser is pulsed onto the surface of the eye. The diameter of the laser beam and the number of pulses that are directed onto the cornea are carefully controlled using computer technology, so that the surface of the cornea is reshaped.

The procedure is performed using local anaesthetic eye drops and takes between five and 10 minutes per eye. However, the time taken for the reshaping of the cornea with the excimer laser is usually less than a minute.

Different sight problems require different treatments. For example:

- Myopia – the central apex or peak of the cornea must be flattened to reduce the degree of short-sightedness.
- Long-sightedness – the central apex of the cornea needs to be made steeper. This is done by applying the excimer laser to the edges of the cornea.
- Astigmatism – this occurs when the cornea is more curved in one direction than the other so the laser is applied in a more linear fashion to make the cornea more evenly curved.

If the procedure is successful, the cornea is able to focus light rays directly onto the retina at the back of the eye, rather than in front of or behind the retina.

Immediately after the laser eye operation

After the operation, you can expect:

- Minor discomfort
- To be able to see, though not perfectly clearly
- That you will need to be driven home, or catch a taxi.

Side effects and complications of laser eye surgery

Possible side effects and complications of laser eye surgery include:

- Over or under-correction – this may be due to over treatment or under treatment. You may need a second 'enhancement' procedure for optimal results.
- Dry eyes – you may need to use lubricating eye drops.
- Infection – this is extremely rare, but treatment with antibiotics may be necessary.
- Superficial scarring with PRK – this will require a further procedure to rectify.
- Excessive thinning of the cornea – this may lead to a bulging of the cornea similar to the condition of keratoconus. Vision deteriorates leading to the need for contact lenses or further surgery.
- Sensitive eyes – some people report increased sensitivity to glare, which can make driving dangerous.
- Blurred vision – 'halos' or rings of fuzzy light may result from the treatment. Interestingly, this is no longer thought to be associated with large pupils as it was in the early days of laser vision correction.
- Regression- that is, over time some of the previous refractive error (short-sightedness or long-sightedness) can return. An enhancement procedure may be necessary to keep the patient out of glasses.

Taking care of yourself at home

Be guided by your ophthalmologist, but general suggestions include:

- Use antibiotic and anti-inflammatory medication (in the form of drops) in the operated eye(s) for a period after surgery.
- Use plastic shields over the operated eye(s) for several nights after surgery to prevent damage caused by rubbing.
- Do not use pressure to rub the operated eye(s).

Long-term outlook for laser eye surgery

Some people who have laser eye surgery will still need to wear glasses or contact lenses to achieve optimum vision, although their natural eyesight should be much improved.

The long-term effects of laser corneal sculpting are believed to be minimal if the eyes are deemed to be well suited to the procedure.

Other forms of vision correction

Traditional methods of correcting myopia, hypermetropia and astigmatism include:

- Prescription glasses
- Contact lenses.

There are also alternative surgical procedures that do not require the use of an excimer laser. These include implantation of an intraocular lens and corneal incisions. Intraocular lenses can be phakic ones or like the ones used in patients who have cataract. Phakic lenses are a little like contact lenses but implanted on the inside of the eye so that they do not have to be removed.

Where to get help

- Your local doctor
- Ophthalmologist
- Recognised laser vision correction centre
- Optometrist

Things to remember

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This page has been produced in consultation with and approved by:

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