



Laser Refractive Eye Surgery Guide

What is Laser Refractive Eye Surgery?

It's a broad term used to describe the use of lasers to correct eyesight defects such as short-sight (myopia) long-sight (hyperopia) and astigmatism (uneven focusing power) by changing the shape of the cornea. The cornea is a clear layer that covers the surface of the eye – its shape determines your focusing power.

The purpose of laser surgery is to reduce the need for you to wear glasses or contact lenses.

How does it work?

Energy from a laser is used to remove microscopic portions of tissue from the cornea, altering its shape. Short sightedness is treated by flattening the surface of the cornea and long sightedness by making the cornea more pointed.

What are its limitations?

One in three patients will still need to wear glasses for some purposes such as night driving even after treatment. Laser refractive surgery cannot correct age-related long sightedness as this is related to the lens and not the cornea.

What types of laser eye surgery are available?

Laser refractive surgery has been around for over 20 years and there are now a number of different techniques available (*see below*).

Fact sheets of each type of refractive surgery are available to download but here is a brief summary.

Photorefractive Keratectomy (PRK)

The surface cells of the cornea are removed and then a laser is applied directly to the surface. The laser removes microscopic portions of tissue from the cornea altering its shape. This takes 15 to 20 minutes to treat both eyes. It may be safer than being treated with LASIK if your cornea is relatively thin. It's good for treating short-sightedness. Your eyesight will be stable after approximately three months. Costs: Around £750 to £2,300 per eye.

LASIK (laser assisted in situ keratomileusis).

This technique was introduced in the 1990s and revolutionised laser eye surgery. More than 100,000 patients a year now have this procedure performed. It uses a cutting instrument called a microkeratome to cut a flap in the surface of the cornea. The flap is folded back so that the laser can be used to remove some of the cornea and then folded back into its original position. The operation on both eyes can be carried out in 15 minutes under local anaesthetic and recovery is within a few hours. Patients also suffer less pain after the operation than with PRK or LASEK (*see below*). LASIK can correct 95 per cent of refractive errors so it is suitable for correcting short sight, long sight and astigmatism, as well as damaged blood vessels.

Wavefront

A more sophisticated version of LASIK which uses sensors to map the contours of the eye before surgery. It is used to treat the 5 per cent of problems LASIK is not suitable for.



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LASEK (Laser assisted epithelial keratomileusis).

This involves chemically removing the top layer of the cornea to create a flap before a laser corrects vision problems. It is used when the cornea is too thin for LASIK treatment. It takes 15 to 20 minutes to perform. Recovery time is longer than for LASIK but it may be safer if your cornea is thin or you play sports where there is a risk of injury to the face. Costs around £750 to £2,300 per eye.

Is laser eye surgery suitable for everyone?

No – first of all you have to be over 21 in good health and not had your prescription changed within the last year. Only about 40 per cent of patients will be suitable for laser treatment. Your spectacle prescription must fall between -1 and -9 if you are short-sighted and +1 to +4 if you are long sighted.

Your ophthalmologist will assess your eye to see if it will benefit from treatment; certain medical conditions such as diabetes, rheumatoid arthritis or other auto immune disease may present problems. If you suffer from severe dry eye disease or have a conical cornea, laser eye surgery may not benefit you.

Who is allowed to operate?

Technically any surgeon can operate on the eye – there is no law preventing this. The Royal College of Ophthalmologists awards a qualification called the **Certificate of Competence** after a surgeon has demonstrated competence in assessing patients for treatment, diagnosing eye conditions, carrying out surgery and dealing with complications. Patients should be advised to check their surgeon holds this qualification and ask to see it before agreeing to surgery.

How much experience in laser refractive surgery should surgeons have?

Your surgeon should be performing at least 500 of these operations a year to be considered experienced and up to date with current developments.

What is the Royal College of Ophthalmologist's role in advising the public?

The College has no direct remit to control professional standards in the laser refractive industry, but has recently launched the Assessment of Competence (see above) for surgeons in this sector. This is the only independent assessment of how competent a laser eye refractive eye surgeon is.

How effective is laser eye surgery?

The National Institute of Clinical Excellence published information for the public about this in 2006 www.nice.org.uk/IPG164. It concluded:

PRK, LASEK and LASIK seemed to be equally effective for the correction of **short-sightedness** (including short-sightedness by astigmatism).

Data from procedures carried out on 2,000 short-sighted eyes with PRK showed that 69 per cent were close to the intended correction within 0.5 dioptres (a unit of measurement for the power of the eye) and 92 per cent were within 1.0 D.

- **LASEK treatment for myopia or astigmatism** showed that 75 per cent of eyes were with 0.5 D and 92 per cent were within 1.0D of the intended correction when they checked 3 to 6 months after treatment.



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- **LASIK treatment for myopia or astigmatism** showed that 77 per cent were within 0.5 D and 91 per cent were within 1.0 D of the treatment when checked 3 to 12 months later.

Remember though – there cannot be an absolute guarantee of a specific amount of improvement - it will all depend on how well your eyes heal.

What are the risks and side effects of treatment?

Safety has improved greatly over the last 10 years and treatments are now more accurately targeted. Surgeons are also able to better assess who is most suitable for treatment, The overall risk of something going wrong with laser surgery is less than five per cent, but it's always worth checking what the complication rate is for the individual clinic where you are being treated as some clinics can have much higher rates. Here are some of the possible complications.

- **Dry Eyes:** Some patients experience dryness in the eye for the first couple of months after surgery because the nerves at the front of the eye responsible for tear production and blinking have to re-grow. Drops may be needed for up to a year or longer term.
- **Night Vision Problems (including seeing halos and problems with glare when driving at night).** These are more common the higher the correction to the eye, but are rarely severe. NICE found the haze effect happened after PRK, LASEK and LASIK, but LASIK had the lowest risk of this happening at 0 to 2 per cent.
- **Infection:** Around 1 in 5,000 patients develop an infection. Eye drops can help prevent this.
- **Drooping eyelid:** This is usually temporary and stops within a few weeks.
- **Flap complications with LASIK:** These occur in between 0 and 4 per cent of cases but can usually be corrected with little or no loss of vision.
- **Sight loss due to Ectasia;** Ectasia is a serious complication following surgery and refers to thinning of the cornea; the centre bulges forward and causes poor vision. This can lead to sight loss. NICE said the risk of this happening with LASIK was 0.2 per cent, but it could be even lower if it was used more selectively.

Five crucial questions to ask an Ophthalmic surgeon

1. **Do you have the Certificate of Competence from the Royal College of Ophthalmologists?**
This is the only independent assessment of an ophthalmic surgeon's skills in this specialist area.
2. **How many procedures do you perform a year?** The more operations your surgeon performs on a regular basis the better his skills would be – he should be performing at least 500 a year.
3. **What is your success rate?** At least 75 per cent of cases should result in 20/20 vision.
4. **What is the complication rate for your clinic?** The average complication rate is 5 per cent nationally, but some clinics have much higher rates, sometimes as high as 40 per cent. All clinics should audit their procedures – you should expect these figures to be readily available. If they are not – ask yourself why.
5. **How much formal training do you have in laser eye surgery?** The absolute minimum you should be looking for is at least three months formal training in laser eye surgery.