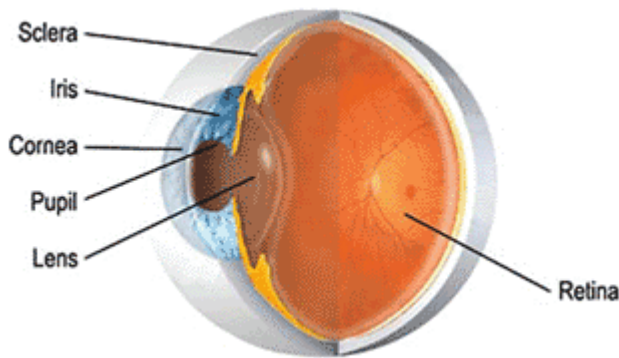


## Laser Eye Surgery



*Laser surgery alters the outer layer of the eye, specifically the **cornea**. The outer eye is composed of three parts: the cornea, the clear part that covers the pupil and iris; the **sclera**, the white part of the eye; and the **limbus**, the outer area of the cornea where it attaches to the sclera.*

Light is refracted in two stages, first by the cornea, second by the lens. The light should focus clearly on the **retina** (the optic nerve receptor) for good vision.

Four kinds of refractive error can cause vision problems.

- **Myopia**, or **near-sightedness** occurs when the eye is elongated (oval shaped) from front to back. This causes light rays to focus in front of the retina. So while the eye can focus on close objects, distant objects are blurry.
- **Hyperopia**, or **far-sightedness** happens when the eye is oval shaped from top to bottom. This causes light rays to focus behind the retina. As a result the eye can focus on distant objects, but close objects are blurry.
- **Astigmatism** means the cornea itself is misshaped and is oval like a football rather than spherical like a basketball. It causes more than one focal point within the eye, distorting vision both close-up and at a distance.
- **Presbyopia** occurs with aging as the eye's ability to focus diminishes because the lens becomes less elastic. Close objects are focused behind the retina; this explains why people need bifocals or reading glasses when they get older. This condition affects almost everyone after the age of 50 – presbyopia cannot be corrected by laser surgery.

### Is Laser Eye Surgery the Solution?

Lots of press has been given to laser eye surgery in recent years. And no wonder! People who wear glasses or contacts know how liberating it would be to live without them. Anyone who wears glasses understands the frustration of fumbling for glasses just to see a bedside alarm clock.

But before running to the closest laser clinic, people must know the risks and the benefits of laser eye surgery. They must remember laser eye surgery is not reversible.

Someone considering laser eye surgery should consult with a physician, and be as frank as possible about medical history and what he or she hopes to gain from having surgery. A doctor needs complete information to give good advice about suitable medical procedures.

## **Types of procedures**

The excimer laser, the basic laser used for eye surgery, emits high-energy ultraviolet light. The laser is precise, causing minimal damage to surrounding tissue. Two methods of corrective laser eye surgery have garnered the most attention: LASIK and PRK.

LASIK (laser in-situ keratomileusis) is used to treat near-sightedness, far-sightedness, and astigmatism. LASIK is the latest procedure to find wide use in laser eye surgery, as it seems to be more effective and has fewer complications than PRK. In this procedure a surgeon cuts a flap in the stroma (the cornea's middle layer) and then uses a laser to remove some of the tissue under the flap, reshaping the cornea. The flap is replaced and the cornea is allowed to heal naturally. The whole procedure takes less than a few minutes per eye.

PRK (photorefractive keratectomy) can also be used to treat near-sightedness, far-sightedness, and astigmatism. In this procedure a surgeon uses a laser to reshape the cornea by removing tissue from the surface of the cornea. As with LASIK, this procedure takes only a few minutes per eye.

Radial keratotomy (RK), is used less and less often, and corrects mild to moderate nearsightedness. In this procedure the surgeon makes incisions in a radial (spoke-like) pattern in a patient's cornea, causing it to flatten, thus reducing nearsightedness. This procedure typically takes less than half an hour.

## **Other emerging treatments**

New methods are currently under review. LASEK (laser epithelial keratomileusis), for instance, is similar to LASIK; however, a surgeon cuts the flap in the epithelium (the cornea's outer layer) instead of the stroma (the cornea's middle layer). Since the flap is closer to the outer layer of the cornea, if an infection occurs it would be easier to treat.

Corneal rings are emerging as another treatment for mild near-sightedness and mild astigmatism. In this procedure, the surgeon inserts a ring inside the cornea, causing it to flatten, and altering the way light refracts through the cornea. The procedure typically takes 15 minutes and, unlike laser methods, is reversible.

An implantable contact lens is an experimental device that fits behind the cornea. A surgeon places an artificial lens (something like a contact lens) behind the cornea, but in front of the eye's natural lens. This procedure typically takes 20 minutes and is completely reversible. Since this procedure uses a lens, it can correct near-sightedness, far-sightedness, and astigmatism.

**The benefits** realized by patients usually involve lifestyle changes, but they can be significant, and can be summed up in one word: freedom.

Free to swim, play basketball, or dance, without contacts or special glasses. Free to look through binoculars or a camera without first having to take off glasses. Free from paying for new glasses every couple of years.

However, some people might require glasses again, even after surgery. As people age, visual acuity often continues to deteriorate regardless of corrective surgery. Surgery corrects vision; it does not cure the underlying cause of visual deterioration.

**Recovery** is very patient specific. Some patients may be able to see clearly within 24 hours, while others may take several weeks to achieve visual acuity. Although a patient may be able to see clearly in the early stages of recovery, it is important to avoid any great jarring for many months. Physical sports like football, or other strains such as airbags, can cause post-surgical complications.

A patient should also commit to the follow-up regimen prescribed by the physician. Shortcuts should not be taken when it comes to vision.

The **risks** can range from minor to major. Minor risks may include sensitivity to light, as well as under or over-correction.

Major risks include permanent damage to the cornea due to error or infection. Health Canada notes: “Fortunately, complications are rare. However, it is important to realize that the changes made to your eyes during laser surgery are not reversible, and complications or risks increase significantly if you are not a suitable candidate for laser surgery.” ([http://www.hc-sc.gc.ca/hpb-dgps/therapeut/zfiles/english/publicat/iyh\\_lasereye\\_e.html](http://www.hc-sc.gc.ca/hpb-dgps/therapeut/zfiles/english/publicat/iyh_lasereye_e.html)).

Those considering eye surgery should choose their surgeon and procedure carefully.

Not everyone is an **ideal candidate** for laser eye surgery. The following points will help those considering a procedure determine whether they are ideal candidates:

- It is important that a person’s eyesight has been stable – the prescription has not changed – for more than two years.
- Some medical conditions, including auto-immune diseases such as lupus or HIV, can interfere with the process of healing. Diabetes can also inhibit healing.
- Drugs, such as steroids and certain acne prescriptions, can also inhibit healing.
- People who are pregnant or use an oral contraceptive may not be good candidates.
- A personal and/or family history of eye diseases can affect the outcome of laser eye surgery. Conditions such as herpes simplex, shingles in the eye area, glaucoma or dry eyes, should be brought to the attention of an eye care professional.
- People with large pupils under low light conditions – as determined by an ophthalmologist – may experience symptoms such as glare, halos, starbursts or ghost images after laser surgery. This may interfere with a person’s ability to drive at night
- In some cases, LASIK surgery can weaken the structure of the eyeball. This can increase the risk to a patient’s eyes if that person takes part in activities such as football, wrestling or boxing.
- Even when the surgery goes well, there is no guarantee that a patient won’t need glasses or contacts again at some point. As people grow older, their eyes continue to change.
- Stephen F. Brint, M.D., Dennis Kennedy, O.D., and Corinne Kuypers-Denlinger point out in their book *The Laser Vision Breakthrough*: “Second procedures are necessary for

10 to 20 percent of patients and are more common in patients with higher degrees of refractive errors.” (Page 159).

- Some people notice a change in their night vision after laser surgery, and people over 40 will probably still need glasses for reading fine print. Prospective patients should discuss their expectations with their eye care professional so that they won't be disappointed.

Source: Health Canada: © Minister of Public Works and Government Services Canada, (2001).

### **Other Considerations**

- Some jobs have specific vision requirements, and laser eye surgery might affect a person's prospects for employment in some fields. It is wise to investigate this before surgery.
- Medical advances are bound to continue. New reversible surgical procedures are already being investigated. It may be worth waiting until even more reliable surgeries are available. For instance, corneal rings, which are placed inside the edge of cornea causing it to take a new shape and correcting for near-sightedness, are currently being studied for approval. Likewise corrective lenses can be placed behind the cornea to correct any vision problems.

Source: Health Canada: © Minister of Public Works and Government Services Canada, (2001).

### **Benefits Coverage**

Some benefits carriers allow plan members to apply vision care coverage toward the cost of laser eye surgery. The maximum is specified by a member's plan, with typical coverage between \$100 and \$300 every two years.

As of November 1, 2001, Manulife will begin covering laser eye surgery under the vision benefit subject to the prescription glasses maximum (see the Q2 and Q3 *Administrative Updates* for more information).

Both employers and employees should know long-term evidence is not available to show laser eye surgery reduces the lifetime costs of vision care. Unless long-term cost benefits can be demonstrated, it is unlikely that benefits carriers will pay more than the typical vision care coverage for laser eye surgery.

In some circumstances it may be cost effective for an employer to pay for corrective eye surgery, such as factories where workers wear prescription safety glasses that need regular replacement.

### **The last word**

Laser eye surgery has helped thousands of Canadians to see clearly without glasses or contact lenses. In most cases, laser eye surgery is successful, but potential patients should remember, it is still surgery and carries inherent risk. Anyone considering a laser eye procedure should thoroughly discuss risks and benefits with their eye care professional before they decide to have the surgery.