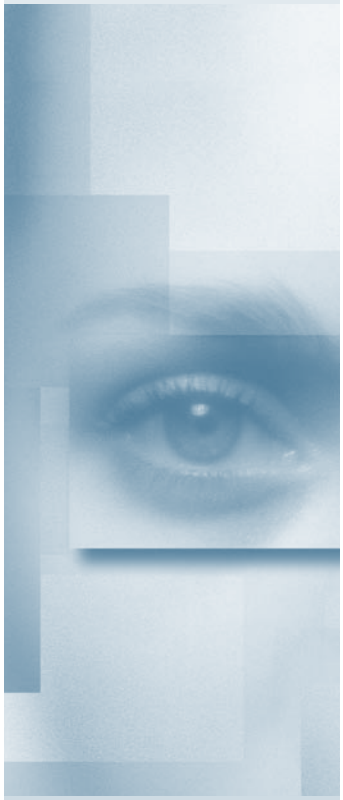
Canadian Ophthalmological Society / Société canadienne d'ophtalmologie

Laser Surgery of the Eye

A safe, precise technique



What is laser surgery?

Laser surgery can be used for many types of eye disease. A laser is a focused, intense beam of light. When focused through a microscope, a laser can be used to create tiny "explosions" in certain eye tissues, or to make small burns to seal tissues together. How the laser works depends on the kind of laser used and the type of eye tissue that needs to be treated.

Laser surgery of the eye has many advantages. There is low risk of infection, it is fairly painless, and it can be done without a hospital stay. Lasers use complex systems for producing and focusing the light beam, making them more precise than other kinds of surgery. **Ophthalmologists** introduced the use of lasers into the fields of medicine and surgery.

What disorders can be treated?

Tears or holes in the **retina** can lead to **retinal detachment**, a serious problem. Small tears and holes can often be repaired with **laser photocoagulation**, although not all of them can be treated. If the retina actually detaches, laser surgery will not repair it; an operation is needed.

There are two main types of **diabetic retinopathy**. In "proliferative" retinopathy, new abnormal blood vessels grow on the retina causing bleeding and scarring inside the eye. The laser is used to stop the growth of abnormal blood vessels and prevent

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bleeding. In “nonproliferative” retinopathy, small blood vessels in the retina leak fluid or tiny amounts of blood, blurring the vision. In this case, the laser is used to stop leakage from the blood vessels and prevent swelling of the **macula** and vision loss.

Macular degeneration can seriously affect central (or reading) vision. “Wet type” macular degeneration happens when abnormal blood vessels grow under the macula. Laser surgery destroys these abnormal blood vessels and prevents central vision from getting worse. Photodynamic therapy, or PDT, is a new treatment for “wet type” macular degeneration. A special dye is injected into the bloodstream and builds up in the abnormal blood vessels. Then, a low-energy laser is used to target the areas where the dye has built up. The laser destroys the abnormal blood vessels and leaves the normal tissue unharmed.

Unfortunately, “dry type” macular degeneration, which is caused by the gradual deterioration of the macula, cannot be treated with laser surgery.

Glaucoma affects 1 of every 100 Canadians over age 40. If it is not treated, the **optic nerve** may be damaged. Fortunately, vision loss can usually be prevented if glaucoma is detected and treated early. “Open-angle” glaucoma is the most common form of the disease. If medication does not control the pressure inside the eye, laser surgery may help to drain fluid from the eye and lower the pressure. If this doesn’t work, an operation may be needed. “Closed-angle” glaucoma is more rare and happens suddenly, often early in the morning. The ophthalmologist can use a laser to make a tiny opening in the iris to allow fluids to move around and lower the pressure in the eye.

Lasers are not used to remove **cataracts**, but they may be used after cataract surgery to improve vision. After cataract surgery, part of the **lens capsule** may get cloudy, making vision blurry. A laser that causes tiny explosions can be used to open the capsule and improve vision.

Lasers can also be used to improve vision by permanently changing the shape of the **cornea** (called "laser refractive surgery"). Lasers can correct nearsightedness, farsightedness, or **astigmatism**. Common laser surgeries include the following:

- Photorefractive keratectomy (PRK)
- Laser in situ keratomileusis (LASIK)
- Astigmatic keratectomy (AK).

Most people who have had these kinds of surgery can pass a standard driver's licence exam without glasses (in Canada this means 20/40 vision or better). About 1 in 10 people will need a second surgery 3 to 6 months later to get the results they want. After successful refractive laser surgery, middle-aged and older people will still need reading glasses for close vision. The surgery doesn't stop the natural aging process of the eye.

Laser refractive surgery is usually very successful, but there are some risks, just as there are pros and cons to glasses and contact lenses. Not everyone is a good candidate for laser refractive surgery. Discuss your visual and lifestyle needs with your ophthalmologist or eye care specialist so that you can decide the best way to correct your vision.

Glossary

Astigmatism: A condition in which the cornea is slightly irregular in shape, preventing the eye from focusing properly.

Cataract: A clouding of the lens. Seeing with cataracts is like looking through a dirty window.

Cornea: The front surface of the eye.

Diabetic retinopathy: Damage to the tiny blood vessels that feed the retina. This is caused by the changing levels of glucose in the blood.

Glaucoma: A serious and relatively common eye disease caused by increased pressure in the eye that damages the optic nerve. Side (peripheral) vision is affected first.

Iris: The coloured part of the eye.

Laser: An acronym that stands for light amplification by stimulated emission of radiation. A powerful electric current is passed through a tube containing gas (argon or krypton). This produces energy, and the laser emits a narrow, uniform beam of light.

Laser photocoagulation: A laser surgery treatment that makes small burns to seal tissues together.

Lens capsule: A membrane that surrounds the lens to protect it and hold it in place.

Macula: The part of the eye that processes the details in the central part of vision and allows us to see fine details, colours and to function in daylight.

Macular degeneration: Deterioration of the macula.

Ophthalmologist: A medically trained eye doctor and surgeon.

Optic nerve: The nerve that carries visual images to the brain.

Retina: Thin, light-sensitive tissue that covers the back of the eye and works like film in a camera to register the images we see.

Retinal detachment: An eye condition in which the retina pulls away or "detaches" from the back of the eye.

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