



## North Shore Eye Centre

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# LASER SURGERY OF THE EYE

## What is laser?

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Laser surgery in ophthalmology can successfully treat many types of eye diseases. The word **laser** stands for “**L**ight **A**mplification by **S**timulated **E**mission of **R**adiation”. A laser is a concentrated beam of light, created when an electric current passes through a special material.

The name and colour of the laser depend on the type of the special material that is used:

- Argon gas – blue/green light
- Krypton gas – red or yellow light
- YAG (yttrium-aluminium-garnet) – invisible infrared light
- Argon/fluoride (excimer) – invisible ultraviolet light

## How does the laser work?

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There are two different ways that lasers are used to treat eye diseases.

### **THERMAL LASERS**

The light is converted to heat when it reaches the eye. The heat is used to:

- Seal blood vessels (veins and arteries) that are bleeding or leaking fluids.
- Destroy abnormal tissue such as a tumour
- Bond the retina to the back of the eye
- Open the eye’s filtration system for glaucoma treatment
- Create an opening in the iris for the treatment of narrow angle glaucoma

### **PHOTODISRUPTIVE LASERS**

The light cuts or sculpts the tissue, similar to a knife. The beam of light is used to :

- Cut thin membranes inside the eye that are blocking vision
- Change the shape of the eye’s surface.



## What are the advantages of using ophthalmic lasers?

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Laser surgery of the eye has several advantages:

- There is no risk of infection from the laser light.
- Laser surgery can be performed in an outpatient setting, without having to stay at the hospital overnight.
- The surgeon has great precision and control.

## Which eye diseases can be treated with laser surgery?

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### DISEASES OF THE RETINA

#### ***Retinal tears or holes***

The retina is the inner layer of the eye that senses light and helps you see. If the retina tears, it can separate from the back wall of the eye. This is called a detached retina, and it can cause you to lose sight.

Symptoms of retinal tears include:

- sudden flashes of light and “floaters” or specks in your vision.

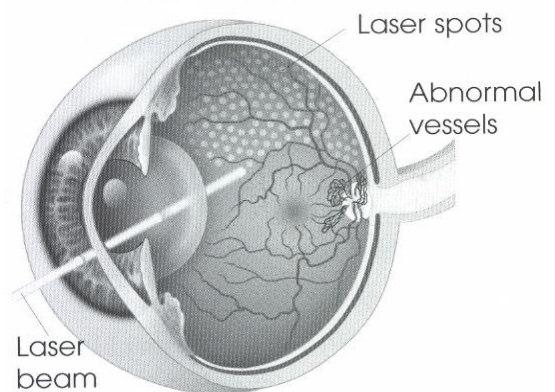
Most retinal tears can be easily treated with the argon or krypton laser, if they are found before the retina detaches. The laser helps bond the retina to the wall of the eye, preventing a retinal detachment.

#### ***Diabetic Retinopathy***

Eye disease from diabetes is a major cause of vision loss. Diabetes can cause blood vessels in the retina to grow abnormally. The vessels can leak fluid (macular oedema) or bleed inside the eye.

Laser surgery to treat diabetic retinopathy:

- seals leaking blood vessels to help reduce macular oedema, helping to prevent further vision loss; and
- slows or stops growth of abnormal blood vessels, decreasing the chance of bleeding in the eye.





## **Macular Degeneration**

The macula is the small, central area of the retina that allows us to see fine details clearly. Macular degeneration affects your central or reading vision.

Most people have “dry” macular degeneration, which cannot be helped with laser surgery. A few people (10%) have “wet” macular degeneration. Abnormal blood vessels cause bleeding and scarring of the macular. In certain cases, these people may be treated with the argon or krypton laser. The laser seals the blood vessels to prevent further damage.

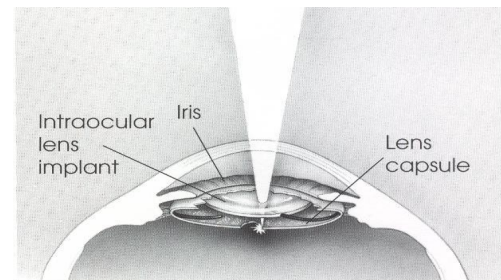
There are other retinal problems that can be treated with the laser, including:

- retinal vein occlusions
- histoplasmosis
- central serous retinopathy
- some tumours of the eye.

## **AFTER CATARACT SURGERY**

After a cataract has been removed, the capsule of the lens sometimes becomes cloudy. The neodymium-YAG laser can open up this cloudy membrane and restore the clear vision.

The laser is not used to remove cataracts.



*A laser can make an opening in a cloudy lens capsule to restore normal sight*

## **GLAUCOMA**

Glaucoma is a disease of the optic nerve, which is the main nerve from the eye and sends images from the eye to our brain and allows us to see. Glaucoma affects at least two out of every 100 older people.

Glaucoma damages the optic nerve, usually because the fluid pressure inside the eye is too high. Loss of vision from glaucoma can often be prevented if your ophthalmologist discovers the disease before much damage occurs to the optic nerve.

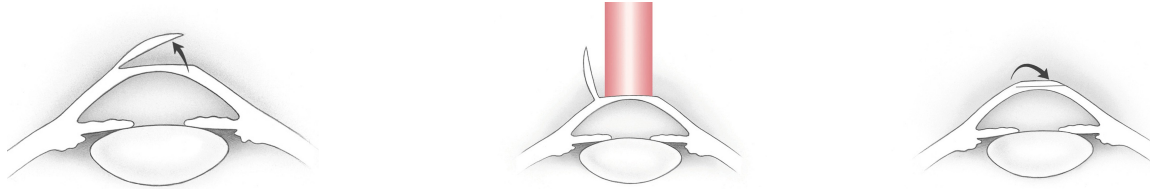
**Glaucoma must be detected early if the treatment is to be successful.**

Eye drops or pills are usually the way to treat glaucoma. If they do not control the pressure within the eye, laser surgery may be used to create a tiny opening, allowing the fluid to drain and release the pressure.



## REFRACTIVE SURGERY

In procedures called **photorefractive keratectomy** (PRK) and **laser in situ keratomileusis** (LASIK) the **excimer laser** is used to sculpt the cornea and reduce or eliminate the need for glasses or contact lenses.



*The Lasik procedure - create flap, lift and ablate lower layers of cornea with laser, then restore flap*

## Summary

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Laser surgery has been one of the great advances in treating eye diseases. The success of the laser depends on the type of eye disorder.

In most situations, laser surgery helps prevent further loss of sight, but will not provide great improvement in the vision. In a few situations, such as YAG laser or PRK, vision may be restored to normal.

Your ophthalmologist will discuss the risks and benefits that laser treatment can offer you.