

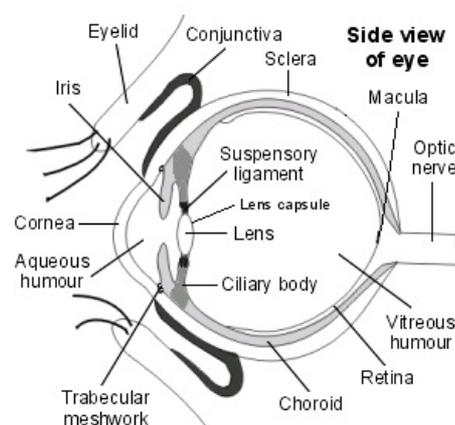
Chronic Open Angle Glaucoma

In chronic open angle glaucoma there is damage to the optic nerve at the back of your eye. It is usually caused by an increase in pressure within your eye. If it is not treated, glaucoma can lead to visual loss and even to blindness. Treatment can slow down glaucoma and help to prevent this. All adults aged over 35-40 should have a regular eye check which includes measurement of their eye pressure.

The eye and aqueous humour

When you look at an object, light from the object passes through the cornea of your eye, then the lens, and then it hits the retina at the back of your eye. The cornea and the lens both help to focus the light on to your retina. Nerve messages pass from the seeing cells (rods and cones) in your retina, down nerve fibres in your optic nerve to your brain. The messages are interpreted by your brain, which enables you to see.

Your pupil (the black area in the middle of the eye) helps to regulate the amount of light that gets into your eye. The muscles of your iris (which gives colour to your eye) control the size of your pupil. Iris muscles can cause your pupil to dilate (enlarge) or constrict (get smaller). When your pupil is dilated, more light can get into your eye; when it is constricted, less light can get in.



Your eye also needs to keep its shape so that it can work properly and so that light rays are focused accurately on to your retina. So, most of your eye is filled with a substance a bit like jelly, called the vitreous humour (humour meaning fluid). The front of your eye is filled with a clear fluid called aqueous humour, which is more watery. The part of your eye behind the lens, that is filled with vitreous humour, is called the posterior chamber. The part of your eye in front of the lens, that is filled with aqueous humour, is called the anterior chamber.

The aqueous humour is made continuously by the cells of the ciliary body. The aqueous humour fluid passes through your pupil to the front part of your eye, and then drains away through a sieve-like area called the trabecular meshwork. This is near the base of your iris. So, there is constant production and drainage of aqueous humour fluid. This keeps the fluid levels balanced.

What is glaucoma?

Glaucoma is an eye condition where the nerve at the back of your eye (the optic nerve) is damaged. This can lead to loss of vision. In most cases, the damage to the optic nerve is due to an increased pressure within the eye. There are different types of glaucoma.

- **Chronic open angle glaucoma** (also called chronic glaucoma or primary open angle glaucoma) is the most common type. This develops slowly so that any damage to the optic nerve and loss of sight is gradual. The term open angle refers to the angle between the iris and sclera which is normal, in contrast to:
- **Acute angle-closure glaucoma** where the angle is narrowed. This is uncommon. In this condition there is a sudden increase in the pressure within one eye. The eye quickly becomes painful and red. A separate leaflet called '*Acute Angle-closure Glaucoma*' gives more details.
- **Secondary glaucoma** is caused by various conditions which can cause a rise in eye pressure. For example, it may develop as a complication to some eye injuries.

- **Congenital glaucoma** is where glaucoma is present from birth.

The rest of this leaflet deals only with chronic open angle glaucoma.

What happens in chronic open angle glaucoma?

In chronic open angle glaucoma (just called glaucoma from now on) there is a partial blockage within the trabecular meshwork. This restricts the drainage of aqueous humour. The reason why the trabecular meshwork becomes blocked and does not drain well is not fully understood. The aqueous humour builds up if the drainage is faulty and this increases the pressure within your eye.

The increased pressure in your eye can damage the optic nerve (the main nerve of sight) and the nerve fibres running towards it from the retina. The retina contains the seeing cells at the back of the eye. The damaged parts of the nerve and retina lead to permanent patches of vision loss. In some cases this can eventually lead to total blindness.

Glaucoma can affect both of your eyes. However, it can often progress more quickly in one eye than in the other.

What's the difference between increased eye pressure and glaucoma?

Glaucoma means that part of the optic nerve is damaged, usually caused by increased eye pressure. Another term for eye pressure is intraocular pressure. However, about 1 in 5 people with glaucoma has eye pressures in the normal range. This is called normal pressure glaucoma. In this condition the optic nerve is damaged by relatively low eye pressures. Other factors, such as a poor blood supply, may make the optic nerve sensitive even to modest pressure.

In contrast, some people have an increased eye pressure with no ill effect to the optic nerve and no visual loss. Raised eye pressure without glaucoma is called ocular hypertension. However, as a rule, if your eye pressure is high, you have ocular hypertension and you have a much increased risk of developing glaucoma and visual loss.

If you are found to have high intraocular pressure, you should discuss with your doctor about your individual risk of developing glaucoma. The results from a large study have been published recently. They showed that if you do have ocular hypertension, the higher your individual risk of developing glaucoma, the more likely you are to benefit from having treatment to lower your eye pressure.

Who gets chronic open angle glaucoma?

Glaucoma is common. In the UK. About 1 in 50 people aged over 40 has glaucoma. This rises to about 1 in 10 people over the age of 75. It is unusual in people under the age of 35. It becomes more common with increasing age. Glaucoma can affect anyone, but it is more common if you:

- Have a family history of glaucoma.
- Have very short sight.
- Have diabetes.
- Are from African or Afro-Caribbean origin.

What are the symptoms of chronic open angle glaucoma?

There are usually no symptoms at first. There is no pain or redness in the eye. Most people with glaucoma do not notice problems until quite a bit of visual loss has occurred. This is because the first part of the vision to go is the outer (peripheral) field of vision. Central vision, used to focus on an object such as when we read, is spared until relatively late in the disease. Also, although glaucoma usually affects both eyes, it may not affect them equally. The better eye may fill in for a while if the other eye starts to lose patches of visual field.

Some elderly people with glaucoma put their gradually failing vision down to "just getting old". They might not have had their eyes checked for many years and may needlessly lose their sight. Untreated glaucoma is one of the world's leading causes of blindness. But, blindness can be prevented if glaucoma is diagnosed and treated early enough.

Who should be tested for glaucoma?

Everyone aged over 35 to 40 should have an eye check by an optometrist at least every five years. A check every 2 to 3 years is advised if you are aged over 50. Eye checks are particularly important if you are in any of the at-risk groups listed above. The eye check will detect early signs of glaucoma before any significant vision loss occurs. Most people with glaucoma have it detected at a routine eye check.

Certain people are entitled to free eye tests. For example, people aged over 40 with a first-degree relative (mother, father, brother, or sister) with glaucoma. If you have been found to have glaucoma, you should tell your close family members so that they can be tested.

What does an eye test for glaucoma involve?

The eye test usually involves examining your eyes in detail using a special light and magnifier called a slit lamp. In particular, the back of your eye where the optic nerve leaves your eye (known as the optic disc) will be examined. There are specific changes that can be seen in this area in someone with glaucoma. The optic disc takes on a typical appearance and is said to be cupped. A special photograph may be taken of your optic disc. This photograph can be used to refer back to in the future when your eyes are checked.

The pressure in your eyes (intraocular pressure) will also be measured. The thickness of your cornea may also be measured. This is because the thickness of your cornea can affect your intraocular pressure reading. A special lens may also be used to examine the drainage area (or trabecular meshwork area) of your eye. This examination is called gonioscopy. Your field of vision may also be tested. This is essentially how much you can see whilst you are looking forward. As mentioned above, in glaucoma, it is usually the periphery (outside) of your field of vision that is affected first.

What is the treatment for chronic open angle glaucoma?

The aim of treatment is to lower your eye pressure. If your eye pressure is lowered, further damage to the optic nerve is likely to be prevented or delayed. However, unfortunately, treatment cannot restore any sight that has already been lost. The eye pressure to aim for varies from case to case. It partly depends on how high your original pressure is. Your eye specialist will advise. Eye pressure can be lowered in various ways.

Eye drops

A variety of eye drops can lower eye pressure. They work either to:

- Reduce the amount of aqueous humour that you make (betablockers are the common drops used).
- Or, to increase the drainage of aqueous humour (eg, prostaglandin analogue drops).

Your eye specialist will advise. Some drops work better in some people than in others. Some drops are not suitable for some people. For example, betablocker drops may not be suitable if you have asthma or heart disease. Also, the possible side-effects vary between the different types of drops. So, if the first does not work so well, or does not suit, another may work fine. In some cases, two different types of drops are needed to keep the eye pressure low. Preservative-free eye drops are available if you are allergic to preservatives added to the drops.

It is vital to use your drops exactly as instructed. If you are unsure whether you are using your drops correctly, ask for advice from your doctor or practice nurse. An eye specialist will keep a regular check on your eye pressures, optic nerves, and field of vision. How often you need to be followed up will depend on your particular situation. However, it is important to attend follow-up appointments.

Tablets

Tablets work by reducing the amount of aqueous humour that you make. However, side-effects can be troublesome and so tablets are not commonly used these days.

Laser treatments

If eye drops are not helping to lower your eye pressure enough, laser treatment may be suggested. A laser can burn the trabecular meshwork which improves the drainage of the aqueous humour. This treatment only takes a few minutes. A special contact lens is put on your eye to help the specialist focus the laser beam. You may feel a pricking sensation and notice some flashing lights but the procedure is usually well tolerated.

Another technique is to use a laser to destroy parts of the ciliary body. This reduces the amount of aqueous humour that is made. **Note:** sometimes eye drops are still needed after laser surgery.

Surgery

If other treatments are not effective, an operation called trabeculectomy is an option. This involves creating a channel from just inside the front of your eye to just under your conjunctiva. So, the aqueous humour can bypass the blocked trabecular meshwork. In effect, it is like forming a small safety-valve for the aqueous humour. Surgery may be advised if a trial of eye drops has failed to achieve target eye pressures, especially in younger people, or if you have very high eye pressures.

Like with all operations, there is a small risk of complications. Also, the operation may have to be repeated in some cases. This is usually because some scar tissue forms at the site of the channel and prevents it working to drain the aqueous humour.

Rarely, a different operation is used to insert a tiny drainage tube into your eye to drain the aqueous humour. This is usually only carried out if trabeculectomy has been tried a number of times and has been unsuccessful.

What is the prognosis (outlook)?

It is important to realise that most people treated for glaucoma will not go blind. However, in order to preserve your sight, it is very important that you follow the treatment plan outlined by your doctor. You should make sure that you follow the instructions and use your eye drops regularly.

Driving and glaucoma

Many people will be allowed to drive after glaucoma is diagnosed. Even if vision is reduced in one eye, you may still be allowed to drive if your vision is good enough in the other eye. However, you will need advice from your eye specialist. If you are a driver and have glaucoma causing loss of vision in both eyes, the law says that you must inform the Driver and Vehicle Licensing Agency (DVLA). The DVLA will usually contact your eye specialist and ask them for a report about your eye problems. The DVLA may also arrange an examination of your eyesight with an optometrist.

Further information and help

International Glaucoma Association

Woodcote House, 15 Highpoint Business Village, Henwood, Ashford, Kent TN24 8DH

Tel: 01233 64 81 70 Web: www.glaucoma-association.com

Royal National Institute of Blind People (RNIB)

105 Judd Street, London WC1H 9NE

Tel (helpline): 0303 123 9999 Tel (admin): 020 7388 1266 Web: www.rnib.org.uk

The UK's leading charity offering information, support and advice to people with sight loss.

Further reading & references

- [Guidelines for the management of open angle glaucoma and ocular hypertension, Royal College of Ophthalmologists \(2004\)](#); Scroll down the list to locate.
- [Glaucoma, NICE Clinical Guideline \(April 2009\)](#); Glaucoma: diagnosis and management of chronic open angle glaucoma and ocular hypertension
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- [European Glaucoma Society](#); Terminology and Guidelines for Glaucoma. 3rd edition. 2008.
- [Bell JA](#); Glaucoma, Primary Open Angle, *eMedicine*, Nov 2008
- [Kass MA, Gordon MO, Gao F, et al](#); Delaying treatment of ocular hypertension: the ocular hypertension treatment Arch Ophthalmol. 2010 Mar;128(3):276-87.

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