Glaucoma UK

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Glaucoma
A Guide

This free booklet is brought to you by **Glaucoma UK** (formerly the International Glaucoma Association). Contact Glaucoma UK for further information or advice:

Glaucoma helpline: 01233 64 81 70
Monday-Friday 9.30am-5.00pm
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Glaucoma UK

Glaucoma UK is a registered charity that is here for everyone living with glaucoma throughout the UK.

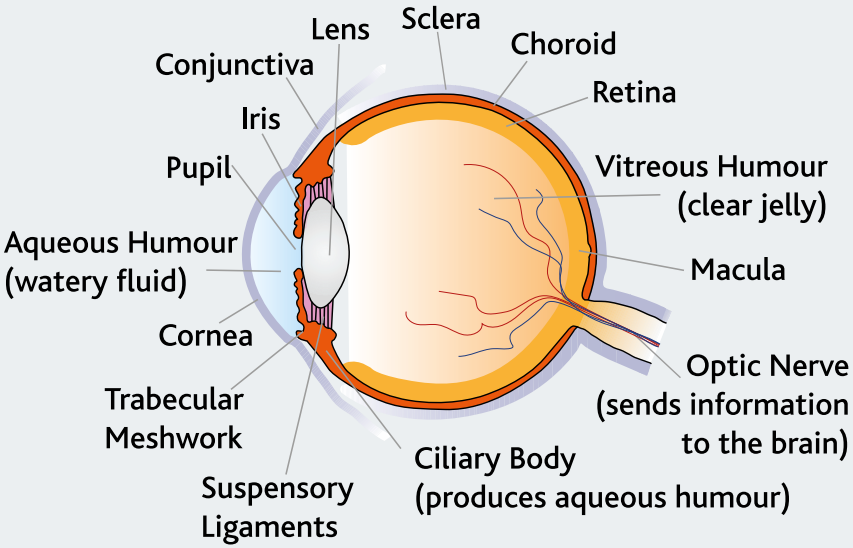
- We raise awareness of glaucoma so that it is detected and treated early.
- We campaign for effective services for everyone affected by glaucoma.
- We provide advice and support to help people live well with glaucoma.
- We fund vital glaucoma research.

Contents

01 Structure of the eye

Figure 1

Cross section through the eye showing the major structures, Health Press Unlimited (Oxford)



The eye is shaped like a ball. The tough white outer coat is called the sclera and its surface is covered by a thin skin called the conjunctiva. At the front of the eye, the outer coat is clear and is called the cornea; the cornea is

covered by the tear film. Behind the cornea is the iris – the coloured part of the eye – with the pupil forming a hole in its centre. The lens of the eye is suspended behind the pupil (if the lens becomes cloudy, it is called 'cataract'

The space between the cornea and the lens is filled with a clear fluid, called aqueous humour; this fluid maintains the pressure in the eye (the intraocular pressure). The pressure in the eye is determined by the balance between the fluid production and its drainage out of the eye.

The cornea and the lens, focus an image of what is being seen onto the back of the eye. The back of the eye is lined by a light sensitive layer, called the retina.

The central area of the retina is known as the macula. The macula is responsible for detailed vision, such as that needed for reading and recognising people. Further away from this central, detailed-vision area is the part of the retina which provides our peripheral vision, such as that needed for walking around and using stairs.

The image on the retina is converted into electrical impulses by series of nerve cells. These impulses pass along nerve fibres in the optic nerve to the back of the brain, where the final image is processed.

02 What is glaucoma?

Glaucoma is the name given to a group of eye conditions in which nerve fibres in the optic nerve are damaged where they leave the eye. This results in parts of the vision being lost. Glaucoma commonly affects both eyes, although one may be more affected than the other. Most often, the off-centre (peripheral) vision is lost first.

Typically, this goes unnoticed because the central vision, for reading and recognising faces, remains good. Also, one eye can make up for vision loss in the other eye, unless both eyes have lost vision in the same area. For this reason, much damage often has been done before a person with glaucoma realises there is a problem with his/her sight. The loss of the peripheral vision can make people with glaucoma more likely to fall and may affect eligibility to drive.

If left untreated, the damage continues ('progresses'), usually slowly over a period of years, eventually affecting the central, detailed vision. Although any vision which has been lost from glaucoma cannot be recovered, with early diagnosis, careful monitoring and regular use of the treatments, the vast majority of people with glaucoma retain useful sight for life.

Glaucoma affects about two in 100 people over the age of 40 in the UK, but glaucoma gets much more common as people get older, affecting one in 20 of those above the age of 80.

What causes glaucoma?

The damage to the optic nerve in glaucoma is usually associated with high pressure within the eye. A certain level of pressure is needed for the eye to keep its shape, but if the eye pressure is too high for the eye, it damages the optic nerve, leading to sight loss. Glaucoma can also develop when the eye pressure is within the normal range

(10mmHg - 21mmHg). This is known as normal (or low) tension glaucoma.

High eye pressure does not always cause glaucoma.

A common condition is 'ocular hypertension', where the eye pressure is above the normal range, but there is no detectable damage to the optic nerve or the vision.

This condition may be monitored without treatment or may be treated in the same way as glaucoma, depending on the specialist's view of the risk of developing glaucoma and the preference of the patient.

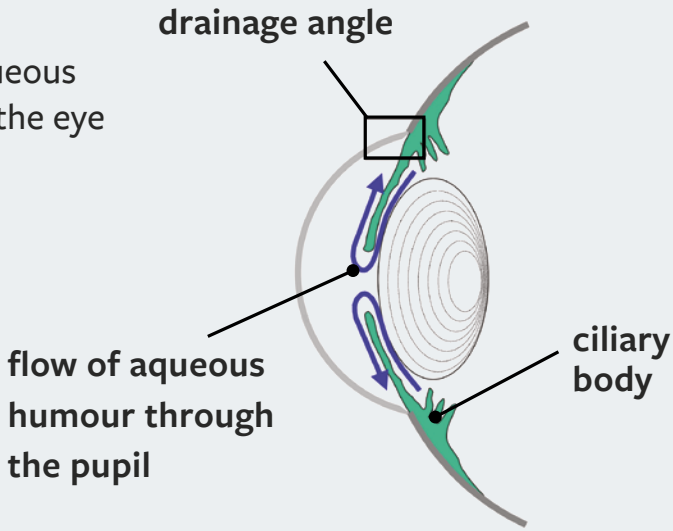
What creates pressure within the eye?

Eye pressure (intraocular pressure) is controlled by a watery fluid called aqueous humour, which fills the front part of the eye. This fluid is made in a ring of tissue behind the iris, called the ciliary body. It flows forward through the pupil and drains away through tiny channels, called the trabecular meshwork, in the angle between the cornea and iris (often called the 'drainage angle').

The trabecular meshwork is situated in the angle between the cornea (the clear window at the front of the eye) and the iris. In a normal eye there is a balance between the production and drainage of this fluid, but in some eyes this balance becomes disturbed and the pressure rises. If the pressure in the eye is high, this is usually because the flow of fluid out of the eye becomes restricted.

Figure 2

Flow of aqueous humour in the eye



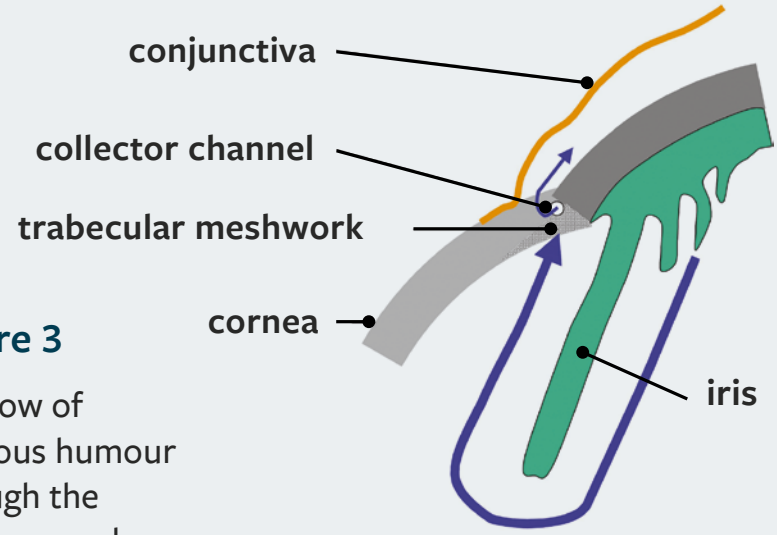


Figure 3

Outflow of aqueous humour through the drainage angle

03 What are the different types of glaucoma?

There are four main types of glaucoma:

- **primary open angle glaucoma**
- **primary angle closure glaucoma**
- **secondary glaucoma**
- **developmental glaucoma**

Primary open angle glaucoma (POAG)

This is the most common form of glaucoma and is sometimes called 'chronic open angle glaucoma' or just 'open angle glaucoma'. It is a slow-developing (chronic) condition in which the optic nerve becomes damaged. If the eye pressure is high, this is because the drainage channels themselves are not good enough at draining fluid out of the eye. There is no visible obstruction blocking the flow: as the name of this type of glaucoma suggests, the

drainage angle remains ‘open’. The eye pressure rises very slowly and there is no pain to warn of a problem, even though the optic nerve is being damaged.

Primary angle closure glaucoma (PACG)

This sort of glaucoma is less common than POAG in Western countries. The tendency for this glaucoma to develop depends on the shape of the eye; it is more common in ‘long-sighted’ eyes and is more often found in people of Asian origin. Primary angle closure refers to blockage of the flow of fluid out of the eye by the iris – the ‘drainage angle’ is said to be ‘closed’.

Acute primary angle closure (sometimes called ‘acute glaucoma’) develops when the blockage is sudden and the pressure rises to a very high level quickly. This tends to be very painful. Symptoms include seeing halos around light sources, a red eye, cloudy vision and, sometimes, vomiting because of the severity of the pain. It must be treated immediately. In most cases, the vision recovers completely.

However, if treatment is delayed, there may be permanent damage to the eye and sight is irretrievably lost. When damage to the nerve has occurred, the term primary angle closure glaucoma is used.

Sometimes people experience a series of mild attacks of angle closure. These are called ‘sub-acute attacks’ and often occur in the evening. Vision may seem misty, with

coloured rings around white lights and there may be some discomfort and redness in the eye. If you have these symptoms, you should consult your optometrist without delay.

Chronic angle closure develops slowly, usually without symptoms; the iris gradually blocks the drainage angle. The pressure in the eye rises much more slowly than in acute angle closure. If damage to the nerve occurs, the term 'chronic primary angle closure glaucoma' is used.

Treatment is given to reduce the eye pressure to a level at which no further damage to the optic nerve occurs.

Secondary glaucomas

These kinds of glaucoma can either be open angle or closed angle in nature – there are various ways in which the drainage angle becomes blocked causing the eye pressure to rise. It has an identifiable cause, being 'secondary' to another condition. As well as treating the glaucoma, the other condition which has caused the glaucoma also may need to be addressed. The eye may then return to a normal state and not require further treatment, or it may have been damaged so that ongoing glaucoma treatment is required.

Developmental glaucoma

This is a rare condition where the eye has failed to form properly. It is present in about one in 10,000 babies and may be associated with other developmental

abnormalities of the eye. For full details of symptoms and treatments, see our booklet ‘Glaucoma in Babies and Children’.

04 Are some people at increased risk of developing glaucoma?

Yes, there are several risk factors which make the onset of glaucoma more likely and they tend to add to each other.

Age

POAG becomes much more common with increasing age. It is uncommon below the age of 40, but the number of people with the condition rises from about two in 100 people over the age of 40 to more than one in 20 for those over the age of 80.

Blood pressure

People with low blood pressure have a greater risk of worsening of glaucomatous sight loss. The eye doctor may want to review blood pressure treatment, if it is being taken, to ensure that it is not contributing to the low blood pressure.

Ethnicity

People of African-Caribbean origin have about a four times increased risk of POAG when compared with those of a European origin. The condition also tends to come on at an earlier age and be more severe. Regular clinic reviews is therefore vital if visual impairment is to be avoided. People of Asian origin are at an increased risk of developing primary angle closure glaucoma.

Family history

There is at least a four times increased risk of developing glaucoma if you have a close blood relative with the condition (father, mother, brother, sister, or child).

Eye examinations are funded by the NHS for such

people from the age of 40 years, but an earlier test is recommended, especially if you also fall into one of the other risk categories as well.

If you have glaucoma, don't forget to tell your relatives about the condition and the need for them to be tested. More information can be found in the IGA leaflet titled 'Glaucoma and your relatives'.

Short sight

People with short sight are at increased risk of developing glaucoma, and should ensure they are regularly tested for glaucoma.

Long sight

Long sighted people are known to be at increased risk of developing angle closure.

Diabetes

People with diabetes may be at increased risk of developing glaucoma, although it is not known whether there is a direct link between the two conditions. However, all people with diabetes should have regular routine eye examinations for diabetic eye diseases and glaucoma tests can usually be requested at the same time.

05 What should I do if I fall into one or more of the risk categories?

Glaucoma is usually painless and vision loss unnoticed until it is quite advanced. It is therefore important to have regular eye health checks with your optician which can pick up glaucoma at an early stage. There are three tests that are used to check for glaucoma and ocular hypertension. These tests are quick and painless.

They are:

1. Viewing your optic nerve using an ophthalmoscope (special torch) or microscope (slit lamp) and sometimes a photograph is taken of the optic disc (**ophthalmoscopy**).
2. Measuring the pressure in the eye (**tonometry**).
3. Testing your field of vision. This may not be required if your optic nerve appears healthy and your eye pressure is within the normal range (**perimetry**).

When you have an eye health check, it is a legal requirement that the optometrist examines the back of the eye.

This will include looking at your optic nerve. It is also recommended that everyone who is considered to be at risk of glaucoma (such as those people who are over the age of 40) has their eye pressure measured.

This is often done with an instrument that directs a puff of air at the front of your eye. If the results of either of these tests are inconclusive, your optometrist may also ask you to do a field of vision test to make sure everything is normal.

06 How is glaucoma treated?

Treating primary open angle glaucoma

The aim of treating POAG is to reduce the pressure within the eye to a level at which no further damage occurs to the optic nerve. Treatment is usually by means of eye drops.

These may reduce the amount of fluid being produced by the eye, increase the rate of drainage of fluid from the eye, or both.

There have been major advances in medical (eye drop) treatment in recent years, and the newer drops are far more effective and have fewer side effects than those which were previously available.

Laser treatment may be effective and is sometimes offered instead of, or in addition to, eye drops. If the eye drops do not provide a sufficient pressure lowering effect, surgical treatments are available.

Treating normal tension glaucoma (also called normal pressure glaucoma)

Some people develop glaucoma with a normal eye pressure (this is called normal tension or low tension

glaucoma). In these people, pressure-lowering drops are still the first choice of treatment, with a view to reducing the eye pressure to a level at which further damage to the optic nerve is prevented. However, the eye doctor may want to ensure that the blood pressure is not too low and may review blood pressure treatment, if it is being taken.

Treating primary angle closure glaucoma

Acute angle closure is initially treated with drops and an injection (into a vein) to lower the eye pressure. Once the pressure is lowered, a laser or surgical procedure is carried out in order to bypass the blockage in your eye's drainage system and prevent a recurrence of the problem.

The laser procedure is called 'iridotomy' (a small hole is made through the iris); the surgical procedure is called 'iridectomy' (a small part of the iris is removed).

Normally, the same procedure is also performed in the other eye, in order to prevent an attack of acute angle closure in that eye. These treatments are not painful and are usually done on a day patient basis, although a short stay in hospital may occasionally be required. If acute primary angle closure is diagnosed and treated without delay there may be an almost complete and permanent restoration of vision. However, any delay in addressing the problem may result in permanent damage to the eye.

Occasionally, the pressure may remain raised and ongoing treatment will be required, as for POAG.

Chronic primary angle closure is treated in a similar way to POAG, with drops to lower the pressure. In addition, laser treatment is often given to prevent further angle closure.

In some eyes, replacing the lens in the eye is beneficial. If the lens is cloudy, this is called 'cataract surgery'; if the lens is clear, this is called 'clear lens extraction'.

Are there any other types of treatment?

Other treatments, such as tablets, laser therapy and surgery are available, either in place of, or in addition to, eye drops.

Laser trabeculoplasty
Laser spots are applied to the trabecular meshwork to stimulate the flow of fluid out of the eye. The treatment is painless.

Trabeculectomy
This is the most common operation. In a trabeculectomy, the surgeon makes a flap valve over a small hole in the outer wall of the eye. This creates a new passage for the fluid to leave the eye, under the white skin of the eye, forming a small bump or blister under the upper lid, called a trabeculectomy 'bleb'.

For futher information on other laser and surgical procedures, please contact the IGA for these leaflets.

07 Eye drops and glaucoma

Initial treatment is usually with eye drops. These are sufficient to keep the pressure in the target range in most people. There are several different types of eye drop for glaucoma and your eye doctor may need to change your treatment until the right drop, or combination of drops, is found. Once eye drops have been started, they usually need to be taken for life (there is no such thing as a 'course of treatment' for glaucoma).

How should I take my eye drops?

It is worth getting into a routine so that the drops are not forgotten. For instance you could keep the bottle or phial by your toothbrush, which will be a reminder when you brush your teeth. Rarely drops need to be stored in the fridge once they have been opened.

There are various ways to put drops in the eye and everyone will decide which is best for them. One of the simplest is to sit or stand in front of a mirror, pull down the lower lid with a finger of one hand, squeeze or tap the bottle according to instructions with the other hand, and let the drop fall into the pocket between the eye and the lid.

Another method is to tilt your head backwards whilst sitting, standing or lying down. If your drops are gel and not liquid, it may be easier to lie down in order to spread the gel along the inside of the lower lid.

After putting the drop in your eye, close your eye and gently press on the inside corner with a finger for one or two minutes. This will help to slow the rate at which drops drain out through the tear duct into your system, rather than staying in the eye where they are needed.

A small amount may, even then, drain through the tear duct and be swallowed. This is not harmful but may lead to unwanted side effects in susceptible people.

Figure 4

Putting drops in

Figure 5

Closing the tear duct

Tips:

If you take more than one type of drop, it is important to leave five minutes or more between each different drop to prevent the second one washing out the first.

If you take a drop more than once a day, spread the dose over the day e.g. if twice a day use the drop at the same time morning and evening ie12 hours apart.

If you have difficulty knowing if a drop has gone into the eye, keep your drops in the door of the 'fridge (not the freezer); you will then feel the coldness of the drop entering the eye. Be sure to check with the patient information leaflet (PIL) or pharmacist that your drops can be stored this way.

If you experience any problems with putting your eye drops in, there are compliance aids available to help you. For further information, see our booklet **Eye Drops and Dispensing Aids**, which gives information and advice on the different drops and their side effects, or ask the staff at your eye clinic.

Because damage to vision in glaucoma is permanent, it is important to prevent it getting worse. For this reason, it is essential to take your eye drops regularly if you want to preserve your vision.

08 Can I continue to drive with glaucoma?

Most people are still able to drive, provided that their visual field loss is not severe. However, if you have glaucoma in both eyes, you must, by law, inform the Driver and Vehicle Licensing Authority (DVLA) about your condition and undergo a special visual field test in order to check the extent of damage to your sight.

The requirements for driving with glaucoma have been changing in recent times, so please contact Glaucoma UK for the latest information.

More information can be found in our leaflet **Driving and Glaucoma**.

09 What if
my glaucoma cannot be fully controlled?

More than 90 per cent of people diagnosed with glaucoma today will retain useful vision (blindness is rare).

In certain cases, however, it may not be possible to control the glaucoma well enough to retain useful vision. This is often where the condition has been diagnosed at a late stage, treatments have been ineffective, or where the person with glaucoma has had difficulty taking the prescribed medications.

If your vision has deteriorated to an extent where you have difficulty carrying out normal daily tasks, much can be done to help you to use your remaining vision effectively. You should contact your ophthalmologist or optometrist to find out about low vision aids and whether you are eligible for registration as sight impaired or severe sight impaired.

Registration is the key to expert help and, in some cases, financial benefit.

10 Useful contact details

Driver and Vehicle Licensing Agency (DVLA)
Drivers Customer Services (DCS) Correspondence Team, DVLA, Swansea SA6 7JL

Car Licence Group One
0300 79 06 806

LGV and PVC Group Two
0300 79 06 807

glaucomaqueries@dvla.gov.uk

www.gov.uk/glaucoma-and-driving

11 Frequently asked questions

If I go on holiday, particularly to a warm climate, and there is no fridge, where should I keep the drops?
Keep your drops in a cool place out of the light. A cool wallet, available from the IGA, helps to keep the drops cool, for up to 45 hours.

Should I let the eye doctor know if I develop other medical conditions e.g. raised blood pressure or diabetes?
Yes. It may influence the treatment they prescribe you.

Can I do yoga exercises?
Yes, except for exercises involving the head being lower that the body for an appreciable time e.g. headstands. This tends to increase eye pressure.

Can I play wind instruments?
Playing a wind instrument such as a trumpet increases the eye pressure, but the effect will depend on how much, and how often, you play. It is best to ask your eye specialist if it would be suitable in your particular case.

12 Further help and information from Glaucoma UK

Glaucoma UK is here for anyone affected by glaucoma. For help and advice:

Call us

If you would like to find out more about any of the information contained in this booklet, or you would like to discuss any concerns you may have about glaucoma, you can call our helpline. Out of office hours there is an answer phone service where you can leave a message and you will be called back.

01233 64 81 70

Monday - Friday 9.30am - 5.00pm

Visit our website:

glaucoma.uk

for information and advice. You can also order a range of free booklets online and use the user forum to ask

questions and share experiences with other people living with glaucoma

Email us

helpline@glaucoma.uk

A full list of references and information sources used in the compilation of this leaflet is available on request by phone: **01233 64 81 70** or by email: **helpline@glaucoma.uk**

Glaucoma support groups

We have many support groups around the country run by hospital staff for the benefit of people with glaucoma. A list of these, along with contact details, can be found in our newsletter or on our website at **glaucoma.uk**

Buddies

If you are due to have surgery or laser treatment for your glaucoma, you may feel that you would benefit from speaking to someone else who has already had that experience. We have a list of people who are willing to do this. You may find that after your own experience that you decide that you too would like to become a buddy.

For further information on either of the above, please contact our helpline on **01233 64 81 70** or email **helpline@glaucoma.uk**

13 Other free advice booklets

that may be helpful

- Eye Drops and Dispensing Aids
- Secondary Glaucomas
- Dry Eye Syndrome - A Guide
- Driving and Glaucoma
- Glaucoma and Your Relatives
- Eye Clinic Referral
- Cool Wallet for Eye Drops
- Glaucoma in Babies and Children

All our information booklets are free and can be downloaded or ordered at **www.glaucoma.uk**

14 Remember

If you have glaucoma in both eyes you must inform the DVLA.

Prescribed drops should be used as recommended by your specialist, on a daily basis unless and until otherwise informed.

Tell your close relatives that you have glaucoma. They are at higher risk than average so should be tested regularly, and first degree relatives over the age of 40 are entitled to free eye tests.

Contact our glaucoma helpline if you have any questions. We are here to help.

About Glaucoma UK

- **We fund sight-saving research into the early detection and treatment of glaucoma**
- **We campaign to raise awareness of glaucoma so that no one loses their sight needlessly**
- **We provide support that helps people to live well with glaucoma**

Each year in the UK over 11,000 people are diagnosed with glaucoma. We are passionate about supporting them and are committed to providing our services free of charge to anyone who needs them. It is only through the generosity of our supporters that we can do this.

Help us save sight and fund research

- make a donation by calling **01233 64 81 64**
- donate online at **www.glaucoma.uk**
- become a member for £17.50 a year. Join online or call **01233 64 81 71**

Your support will make a difference to people with glaucoma today and will protect future generations from unnecessary glaucoma sight loss.

Glaucoma UK

The information in this leaflet was correct at the time of printing (printed 06/2020).

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