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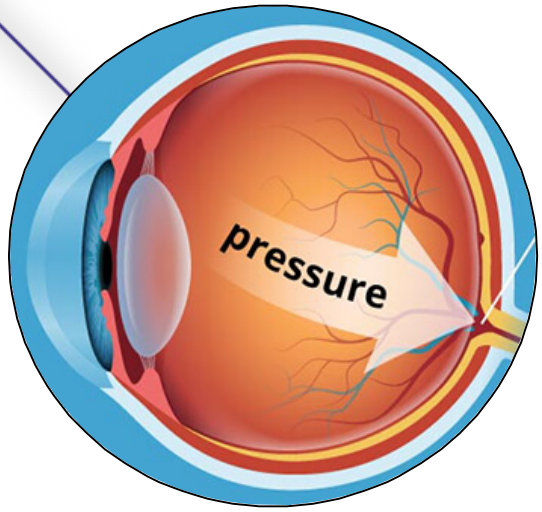
EYE CENTER

Understanding Glaucoma



because sight is precious

PANTHEO

EYE CENTER

Is an affiliated clinic and provides teaching facilities to

St George's University of London

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Medical School

What is glaucoma?

Glaucoma is a disease that damages the optic nerve of your eyes. It usually happens when fluid builds up in the front part of your eye increasing the intraocular pressure. This results to damage of the optic nerve and visual field loss. In most of the cases peripheral (side) vision is affected first, so the patient cannot notice the change. With time, the central (direct) vision will also begin to be lost.

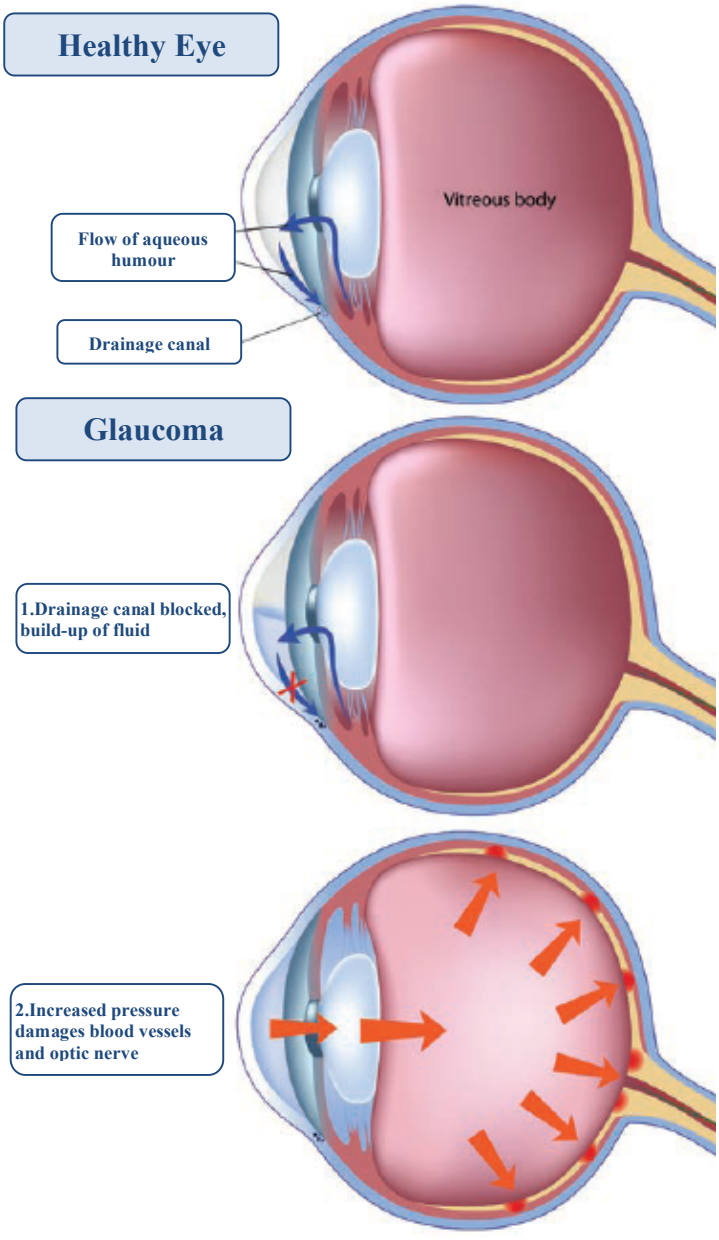
Glaucoma is a leading cause of blindness affecting 80 million people worldwide. Sight loss resulting from glaucoma cannot be reversed. However, early detection and careful, lifelong treatment with medication or surgery can maintain vision.

High intraocular pressure

In a healthy eye, a clear fluid, called the aqueous humour is being produced and is essential for the eye to function. It circulates in the front part of the eye and flows out, in order to maintain healthy normal pressure. The outflow is done through a microscopic drain called the trabecular meshwork which is located in the drainage angle.

If the angle is blocked, or does not work properly, then the fluid builds up and the intraocular pressure is raised.

High pressure damages the sensitive optic nerve and results to vision loss.



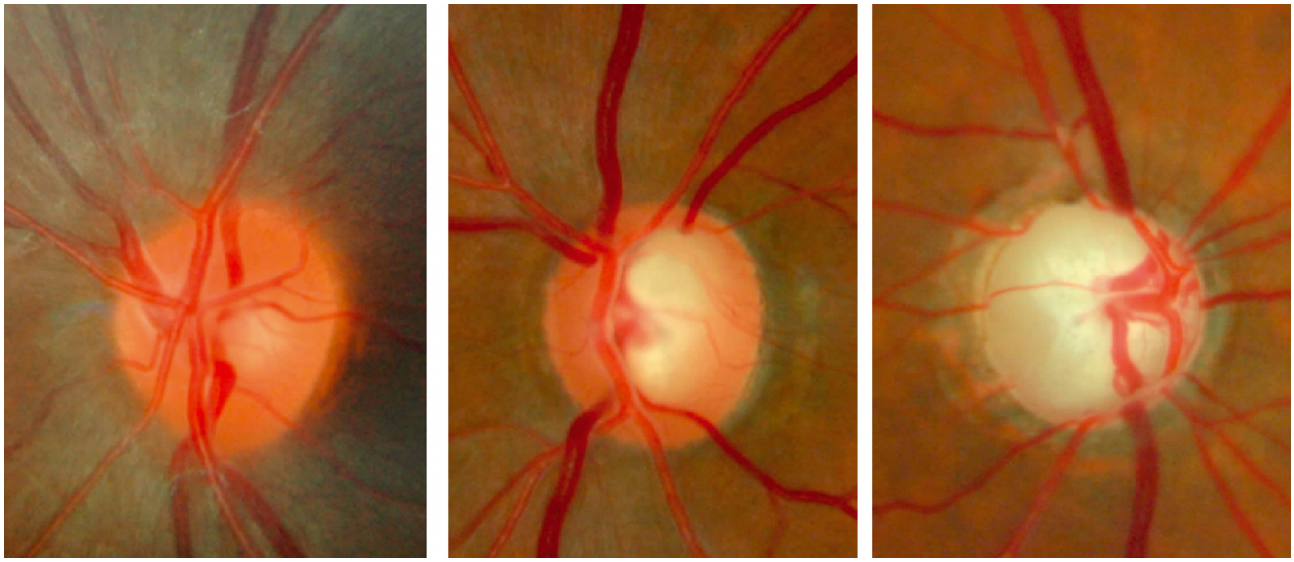
Optic nerve damage

You have millions of nerve fibers that run from your retina to the optic nerve. These fibers meet at the optic disc. As fluid pressure within your eye increases, it damages these sensitive nerve fibers and they begin to die.

As they die, the disc begins to hollow and develops a cupped or curved shape. This causes increase of the cup to disc ratio which is an important measurement to assess the health of your optic nerve. As glaucoma progresses, the cup-to-disc ratio increases. If the pressure remains too high for too long, the extra pressure can damage the optic nerve and result in vision loss.

The average cup-to-disc ratio of a healthy eye is 0.3–0.4. A cup-to-disc ratio of 0.7 or higher is considered an indication of glaucoma. Because early glaucoma typically affects one eye more than the other, a big difference between the cup-to-disc ratios of the two eyes, called asymmetry, is another sign of glaucoma.

During your examination, your doctor will be looking for indications of structural loss of retinal ganglion cells and their fibers in your optic nerve.



This picture shows a healthy optic nerve (left) undergoing the characteristic glaucomatous changes (center) resulting in advanced glaucomatous atrophy (right) and end stage disease.

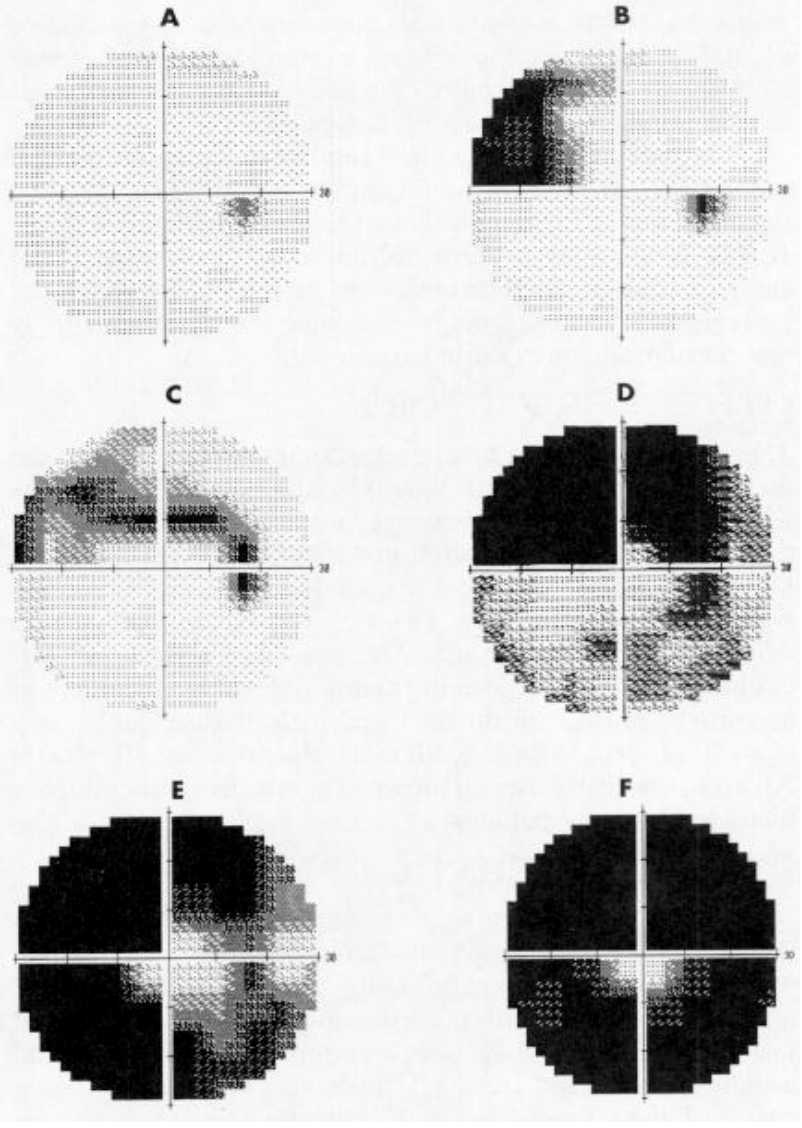
Visual field loss

Glaucoma is a disease that initially affects your peripheral (side) vision. Often, it is difficult to recognize the loss, because the deficits can be subtle and one eye can compensate for the other.

Visual field testing is performed for every patient to establish the diagnosis of glaucoma and for detecting possible progression.

As the disease progresses, more and more of the peripheral vision is lost until eventually, in very late and advanced disease, the central vision is also affected. Sometimes there are patients with glaucoma who have their central vision affected early in the course of the disease, which is another reason that formal visual field testing is so important.

Over time, visual field testing is performed many times, and while this may seem repetitive and unnecessary, recurrent visual field tests are a critical part of establishing baseline visual fields and monitoring glaucoma over time. This is actually your doctor's most useful measure of current condition and future risk and also helps determine whether your current treatment is sufficient.



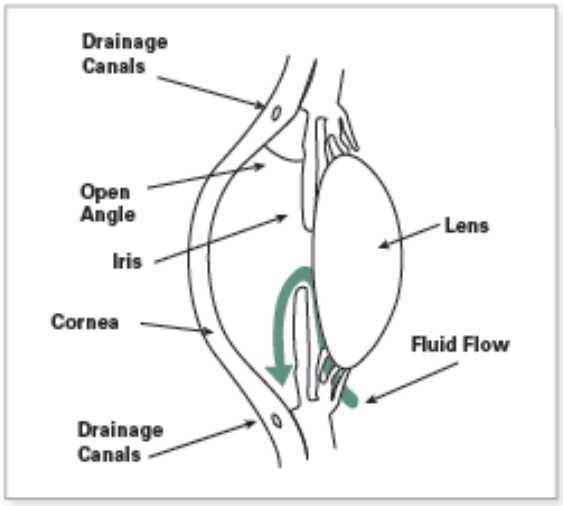
The picture demonstrates the progression of the visual field in a glaucomatous patient if left untreated. Peripheral vision is gradually lost resulting in tunnel vision. In end stage disease even tunnel vision is lost resulting to complete blindness.

Types of glaucoma

There are several types of glaucoma. The two main types are open-angle and angle-closure.

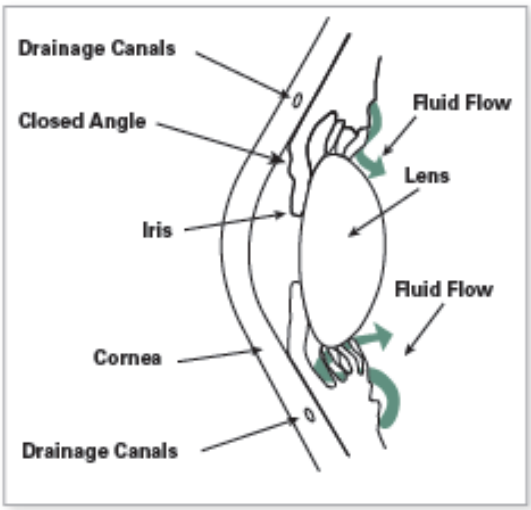
Open-Angle Glaucoma

This is the most common form, accounting for at least 90% of all glaucoma cases:
In these cases the drainage angle is open but not functioning properly, causing increased eye pressure, which leads to optic nerve damage, and possible vision loss.
There are no early warning signs of open-angle glaucoma. It develops slowly and sometimes without noticeable sight loss for many years. Most people who have open-angle glaucoma feel fine and do not notice a change in their vision.



Angle-Closure Glaucoma

In this type, the angle is closed in many or most areas. This rise in eye pressure may occur suddenly (an acute attack of angle closure) or gradually. If the intraocular pressure rises very quickly, it causes symptoms such as eye pain, blurry vision, redness, rainbow colored rings (or haloes) around lights, and nausea and/or vomiting. An acute attack of angle-closure glaucoma can cause permanent vision damage and requires immediate medical attention. The gradual form of angle-closure (chronic angle-closure glaucoma) usually has no symptoms and may not be apparent in the earlier stages without an eye examination.
Treatment of angle-closure glaucoma, and eyes at risk for this disease, usually involves a laser procedure (laser peripheral iridotomy) to create a small opening in the outer edge of the iris.



Risk factors

- Family history: especially first degree relatives
- Older age (>60 years of age)
- Race: African, Asian, or Hispanic descent are at higher risk
- Myopia or hypermetropia
- Use of steroid medications: not only eye drops/ointments but also inhalers, nasal sprays, oral or intravenous
- Past eye injury or complicated surgery

Symptoms

In the most common form of glaucoma, the open angle glaucoma, build up of fluid pressure happens very slowly, so in most cases there are no uncomfortable or painful symptoms. So, a patient can have severe visual field loss without actually knowing it. By the time glaucoma causes decrease in vision, it is already too late.

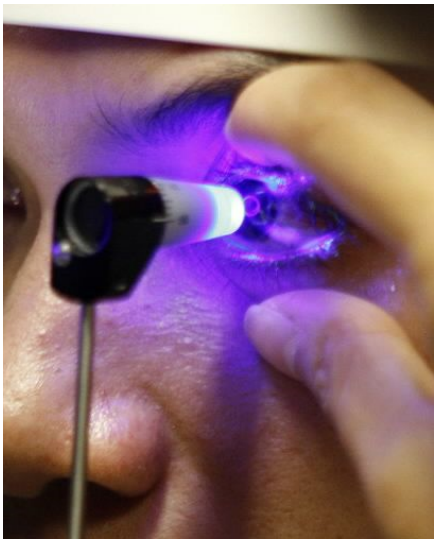
In less common types of glaucoma, such as angle closure glaucoma, symptoms can be more severe, such as blurry vision with halos or even loss of vision, eye pain or headache and nausea or vomiting.

Detecting glaucoma

In order to detect glaucoma, your doctor will need to perform the following tests:

Tonometry

During tonometry, eye drops are intalled to numb the eye and then a device called a tonometer will be used to measure the pressure. The average range for eye pressure is 12–22 mmHg. The level of eye pressure at which glaucoma develops is not the same for everyone and some people can get glaucoma even if their pressures are within the average range of 12–22 mm Hg.



Gonioscopy

Gonioscopy is a diagnostic exam that helps determine whether the angle formed by the iris and the cornea is open and wide or narrow and closed. During the exam, eye drops are used to numb the eye and a special hand-held contact lens is gently placed on the eye for a few moments.

Pachymetry

Pachymetry measures the thickness of the cornea—the clear window at the front of the eye. Corneal thickness has the potential to influence eye pressure readings. If a cornea is thicker than average, pressure readings with a tonometer may be higher. This gives your eye doctor additional information for your glaucoma diagnosis.

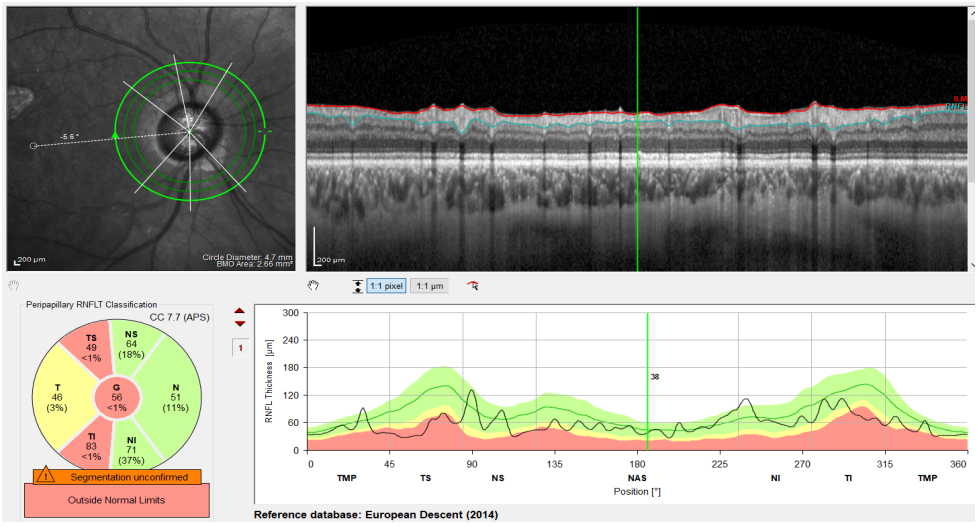
Ophthalmoscopy

This diagnostic procedure helps the doctor examine your optic nerve for glaucoma damage. Eye drops are used to dilate the pupil so that the doctor can see through your eye with a special lens in order to examine the shape and color of the optic nerve. An optic nerve that is cupped or not a healthy pink color is cause for concern.

Perimetry

Perimetry (or a visual field test) produces a map of your field of vision. This test will help your doctor to determine whether your peripheral vision has been affected by glaucoma.

OCT



This techonology uses a special laser that produces a three-dimensional high-resolution image of the optic nerve and it measures the thickness of the nerve fiber layer as well as the ganglion cell layer. By imaging your optic nerve over time during multiple visits to your eye doctor, these technologies can help detect progressive loss of optic nerve fibers.

Treatment of glaucoma

With early diagnosis and proper medication and treatment, glaucoma can be controlled. However, sight loss resulting from glaucoma cannot be restored. At the present time, there is no cure. Once detected, glaucoma usually requires ongoing, long-term care. Keeping your eye pressure under control is very important. You must follow your treatment plan carefully to help control your eye pressure. This will protect the optic nerve and prevent sight loss.
Many people think that glaucoma has been cured when high eye pressure is lowered to safe levels with medication or surgery. In fact, the glaucoma is only being controlled, not cured. Regular checkups are still needed even after medications or surgeries have controlled the eye pressure.

Target pressure

The eye specialist will decide which range of pressure is acceptable for each individual case, in order to maintain vision and avoid progression. The target pressure is decided according to the severity of glaucoma, age of patient, corneal thickness, etc.

Glaucoma Medications

Glaucoma is typically treated with the use of medications that either help the fluid drain better or decrease the amount of fluid made by the eye. In most cases, medication can safely control eye pressure for many years.

Laser treatment

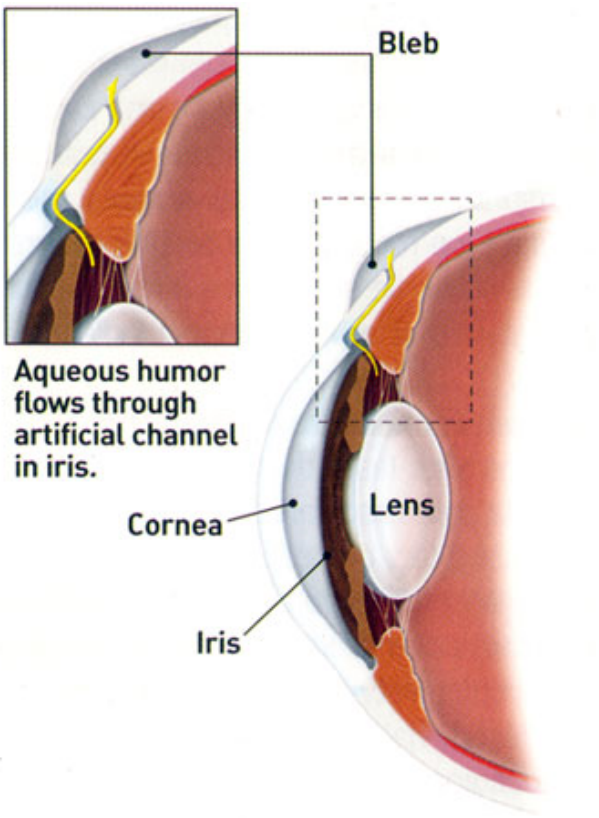
There are several types of laser surgery used to treat glaucoma. The type of laser surgery will depend on the form of glaucoma and how severe it is. Laser surgeries are performed in an outpatient setting in your doctor’s office or at the clinic.

Laser surgery is the main initial treatment method for angle-closure glaucoma, which results in widening of the angle for most patients. In cases of open-angle glaucoma, laser surgery can be used as an adjunct treatment with medications.

Incisional Surgery

Incisional surgery is usually considered when the maximum amount of medication is not controlling your eye pressure or when your glaucoma is progressing despite normal pressures.

What happens during surgery is that a new drainage is opened for the fluid to drain and the eye to maintain low pressures. The most common types of surgery is trabeculectomy, where the drainage channel is made from the patients own tissues, and tube surgery, where an artificial valve or tube is placed in the eye so that the fluid can drain.



What You Can Do to Manage Your Glaucoma

Know and Keep Track of Your Medications:
Make your medications part of your daily routine. Keep a record of each medication you are taking. Write down the name, the dosage, and the number of times it should be taken each day. You can use an alarm watch or a smartphone to remind you of when to take your medication.
Find out about possible side effects. But remember, if your side effects are severe, the medication may not be right for you. Talk to your doctor about any side effects.

It's important that you tell everyone on your healthcare team—including your family doctor and any other specialists—that you have glaucoma and what medications you are taking. This will help them in prescribing treatments that won't interfere with your glaucoma medications. Be especially careful about using any medication that contains steroid.

How to Use Eye Drops

Before using eyedrops, wash your hands. Sit down and tilt your head back, or lie down and look at the ceiling. Then follow these steps:

1) Make a pocket in your lower lid pulling down with your index finger.

2) Look up. Squeeze one drop into the pocket in your lower lid. Don't blink, wipe your eye, or touch the tip of the bottle to your eye or face.

3) Close your eye. Keep closed for 2-3 minutes without blinking and press the inside corner of the eye (to stop the drop from draining into your throat).

Stay Organized:

Schedule your next checkup before you leave the doctor's office, and put your appointment on your calendar.

Write down any questions you have about your eyes, vision, or medications before you see your doctor. During your checkup, bring this list of questions, and write down your doctor's answers.

Your Lifestyle Counts:

Keeping in good general health is just as important as taking care of your eyes. Eating healthy foods, getting enough exercise, not smoking, not ingesting too much caffeine, and staying at a healthy weight are important. Be sure to check with your doctor before you start any strenuous exercise program.

As a glaucoma patient, you have the chance to teach your friends and relatives about this disease. Many people are unaware of the importance of eye checkups and do not know that individuals with glaucoma may have no symptoms. You can help protect their eye health by encouraging them to have their eye pressure and optic nerves checked regularly.

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