

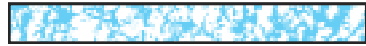
A GUIDE TO

GLAUCOMA



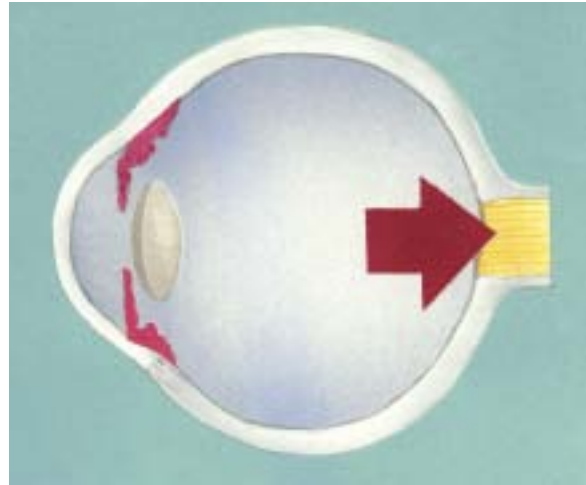
Presented to you by Glaucoma Center of Michigan

WHAT IS GLAUCOMA?



Glaucoma is a potentially blinding eye disease characterized by an abnormal buildup of fluid pressure within the eye. Under normal conditions the fluid produced within the eye leaves the eye through a drainage canal system. Eventually the fluid returns to the bloodstream.

When the production of the fluid is more than the drainage, the pressure within the eye increases. As the pressure increases, damage can occur to the optic nerve. Most patients develop glaucoma because of poor drainage of fluid through the drainage canal. The problem works like a plumbing problem when water backs up because of clogged pipes. This increased pressure in the eye results in nerve damage and irreversible loss of vision including potential blindness.



IS GLAUCOMA A COMMON VISUAL DISEASE?

Glaucoma is the leading preventable cause of blindness in the United States.

Currently about 2 million Americans are being treated for glaucoma. An equal number of people suffer from undiagnosed cases. In its early stages, this disease is without symptoms. It gradually and painlessly “sneaks up” and attacks over a period of time. If left undetected and untreated, glaucoma can leave its victims blind. **Once vision is lost to glaucoma, it cannot be restored.**

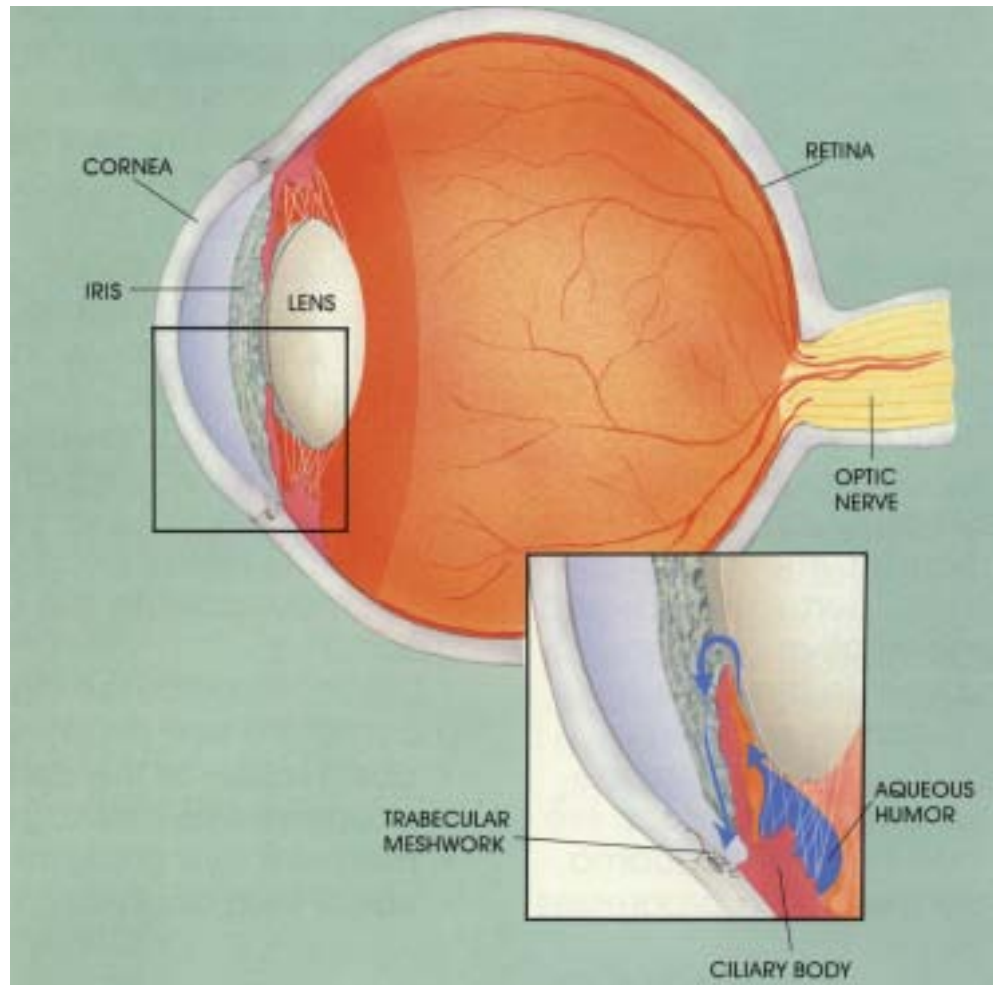


About one out of every 50 adults develops glaucoma; however, the risk of developing it dramatically increases after age 40. For certain high risk groups regular glaucoma checkups are very important:

- **patients over 60 years old**
- **African Americans** (8 times higher incidence)
- **diabetics**
- **family history of glaucoma**
- **previous trauma**
- **myopia** (nearsightedness)
- **hyperopia** (farsightedness)
- **hardening of the arteries**

We know what glaucoma is and does, but we still do not know what causes it despite extensive research.

HOW THE EYE WORKS



To understand how glaucoma develops, we must first understand the delicate and sophisticated mechanism of the eye.

The eye functions like a camera. In the front is the

cornea, a transparent tissue which protects and allows light to enter, much like a window. The colored part of the eye, the **iris**, is directly behind the cornea. It opens and closes like a camera shutter to control the

amount of light which enters the eye. Within the iris is the **pupil**, the small black-looking opening which continues to admit the correct amount of light. The **lens** then focuses that light on the **retina**, which, like film, records the light images. The retina sends visual messages to the brain via the optic nerve.

The front part of the eye, the **anterior and posterior chambers**, is filled with a fluid called **aqueous humor**. This fluid maintains normal pressure inside the eyeball, preventing it from collapsing—like a balloon filled with air. The fluid is constantly produced by the **ciliary body** and drains back to the bloodstream through the **trabecular meshwork**. Blockage or overproduction of the fluid elevates pressure (**intraocular pressure**) within the eyeball. Abnormally high pressure for an extended period of time in eyes with glaucoma creates damage to the optic nerve and loss of vision.

ARE THERE DIFFERENT TYPES OF GLAUCOMA?



There are five types of glaucoma:

- chronic (open angle)
- normal pressure
- acute (narrow or closed angle)
- secondary glaucoma
- congenital glaucoma

Ninety percent of all glaucoma cases are of the chronic open angle or normal pressure variety.

In this type, the drainage system functions incorrectly, resulting in a gradual pressure rise over time.

As this pressure increases, the optic nerve is damaged, and side (or peripheral) vision begins to deteriorate. **Ocular**

hypertension is a very common condition in which the pressure within the eye elevates, but the optic nerve and peripheral vision shows as normal. This condition progresses in some cases to open angle glaucoma.

A less common yet more alarming type is **narrow or acute angle closure glaucoma**. This version strikes suddenly and severely in the form of blurred vision, headaches, severe pain, nausea, or rainbows around

lights. With acute glaucoma there is a sudden increased pressure within the eye caused by a mechanical blockage of the drainage angle (trabecular meshwork). Unfortunately, permanent damage including blindness can potentially occur if immediate medical emergency treatment is not administered within hours of the appearance of these symptoms.

Secondary glaucoma can be caused by a number of factors like an eye injury, previous eye surgery, trauma, infection, inflammation, certain drugs, and other degenerative changes within the eye. In the case of injury for instance, scar tissue can block the natural passage of fluid out of the eye. Much like chronic open angle glaucoma, secondary glaucoma progresses over time.

Congenital glaucoma is found in infants and is very rare. The fluid drainage area is abnormal at birth and must be surgically treated as soon as possible to save the infant's vision. Since

infants have a more elastic eye than adults, the increased pressure will cause enlarged eyes, cloudy corneas, light sensitivity, and excessive tearing.

Glaucoma is frequently referred to as the "sneak thief of sight" because in its early stages it is symptomless. Later, headaches upon waking, difficulty with night vision, reoccurring redness in the eye(s) accompanied by blurred vision and or pain, frequent changes in eyeglass prescriptions, or noticeable loss of peripheral vision may indicate the onset of glaucoma.

Glaucoma is detected through a complete eye examination:

- **observation of the optic nerve**
- **examine eye drainage areas**
- **measure eye pressure**
- **visual field analysis**
- **scanning laser ophthalmoscopy**
- **corneal pachymetry**

EVALUATIONS AND EXAMS

The examination and evaluation for glaucoma include the use of specially designed instruments.

Gonioscopy (A)

Observation of the drainage angle is performed by using a gonioscope, a specially mirrored and magnified lens that functions like a periscope. The lens magnifies and bends light to allow observation of the structures of the trabecular meshwork.



B

Tonometry (B)

Tonometry measures the pressure within the eye in millimeters of mercury. The cornea (front of the eye) is gently touched with a very sensitive instrument called an applanator.

Ophthalmoscope (C)

The evaluation of the optic nerve to locate characteristic nerve damage is performed with this instrument.

Visual Field Analyzer (D)

Visual field testing detects and measures the severity of the vision loss due to glaucoma. This instrument measures the loss of side or peripheral vision, which frequently occurs without the patient's knowledge.

Scanning Laser Ophthalmoscope

The most modern up-to-date technology to detect the earliest stages of glaucoma or to determine any subtle progression of existing glaucoma. This quick, accurate and detailed test offers a major advancement in glaucoma management.



A



D

Corneal Pachymetry

This test measures the thickness of the cornea. Checking the intraocular pressure by tonometry assumes a normal corneal thickness. If the cornea is too thick or too thin there is an adjustment made in the intraocular pressure based on the pachymetry reading.



C

TREATMENTS

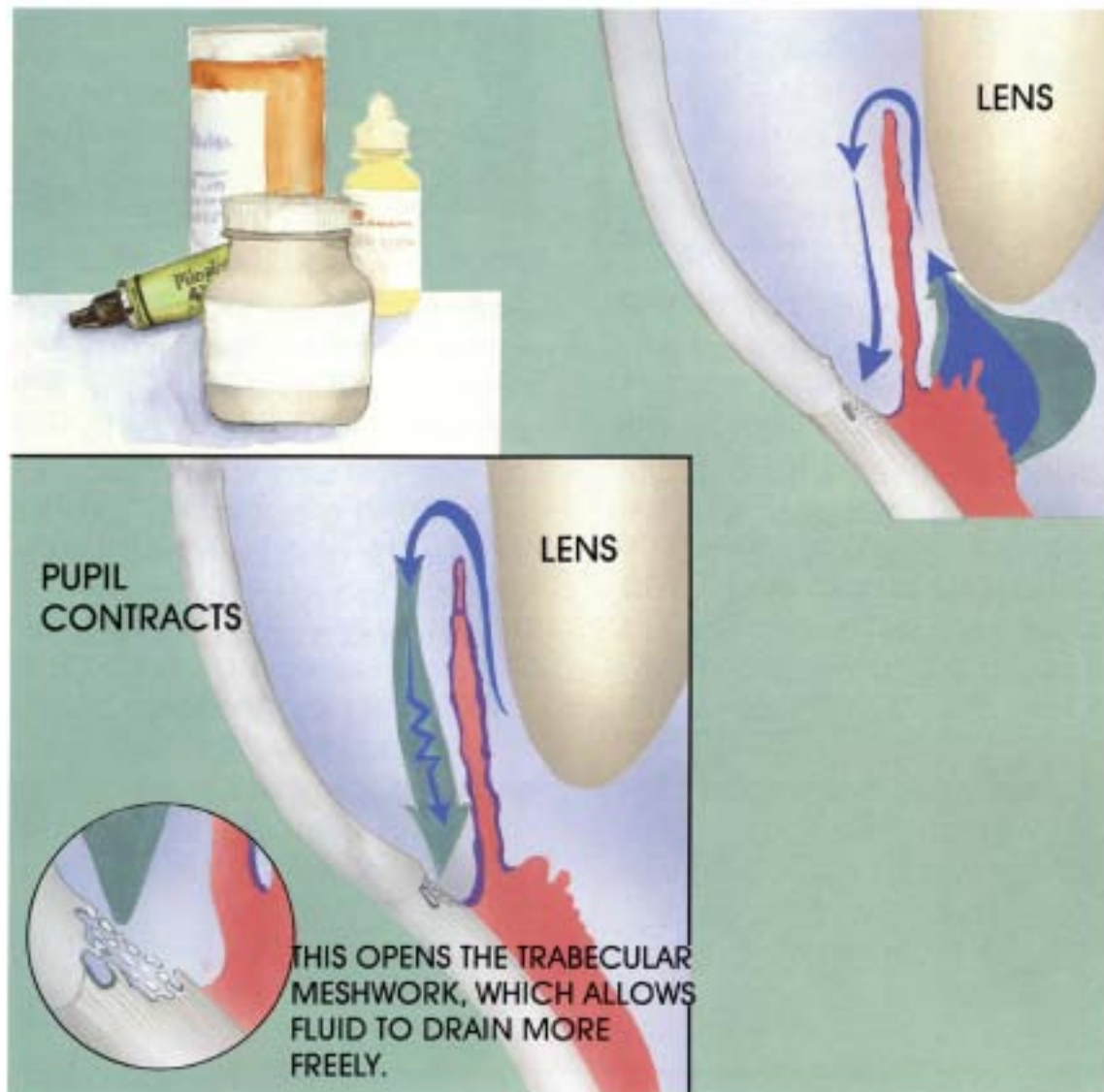
Treatment varies depending on the type of glaucoma. **Chronic open angle** and **secondary glaucoma** are usually

treated with a combination of one or more eye drops or ointment. The drops are instilled between one and four times a

day. **Using eye drops is frequently a lifetime commitment.** If eye drops inadequately control the pressure, glaucoma pills or a laser may be necessary. If all else fails, glaucoma surgery in the operating room can be performed. **Angle closure glaucoma** requires a laser treatment (laser iridectomy). **Congenital glaucoma** requires immediate surgery in the operating room.

Lasers have been used since the late 1970's in the treatment of glaucoma. The laser performs in a number of different ways to decrease pressure in the eye: it can perforate, stretch, or remove a portion of tissue in the eye that is causing the pressure to increase.

Laser treatment has proved to be very successful, safe, and effective in most types of glaucoma. Many times it prevents the need for conventional surgery and may even reduce the patient's need to continue other glaucoma



LASER & SURGICAL TREATMENT

medications. Although laser surgery helps prevent further eye damage by relieving the built-up pressure, **it cannot restore vision that has already been lost.**

Glaucoma patients receive many benefits from laser treatment. The treatment is usually done on an outpatient basis in the doctor's office. This means that the patient is able to return home and resume normal activities following completion of the treatment (usually about 15 minutes). In addition, laser treatment requires no incision or after-laser patching. Only anesthetic drops are needed prior to the treatment.

Three types of laser surgery are used in the control and treatment of glaucoma. Generally, they are performed with an argon or YAG laser.

- A **laser trabeculoplasty** in chronic open angle or secondary glaucoma is performed by stretching a portion of the trabecular meshwork, thus enabling fluid to drain more freely from the eye.

- A **laser iridotomy** is performed for patients with narrow angles or angle closure by opening a pathway for fluid to flow through the iris. This is done by focusing the laser beam on the iris and making a tiny hole in the iris to create new drainage paths.




- A **laser iridoplasty** is performed for patients who have components of both chronic open angle and narrow angle glaucoma. The laser is applied to the peripheral iris to "pull" it away from the trabecular meshwork (drainage canal).

More recently, special lasers have been utilized to treat otherwise unresponsive types of glaucoma. The purpose of these

laser treatments is to destroy the ciliary body, the fluid producing tissue within the eye.

In spite of the many improvements in treatment for patients with glaucoma, some patients still require surgical intervention. There are many different types of procedures classified as glaucoma filtration procedures. In all these procedures, the trabecular meshwork is removed to create a new drainage mechanism for the fluid to drain within the eye. They are frequently performed under local anesthesia on an outpatient basis. Following the surgery, patients are discharged from the hospital and return to the physician's office the next day.





Glaucoma Center of Michigan is the first ophthalmic practice in Michigan dedicated exclusively to the diagnosis, management, and treatment of all types of glaucoma.

Our physicians are **fellowship trained** in glaucoma with a wide range of experience in managing all types of this difficult disease. They are further supported by an experienced, knowledgeable staff who provide patients with a comfortable, courteous, and

caring atmosphere.

As we continue our efforts to battle this “sneak thief of sight,” we recognize that well informed patients and regular eye exams are two of the best methods to fight glaucoma. For these reasons we have created this booklet and hope you have found it to be clear, concise, and informative. As always, we encourage you to ask any questions or have us explain any portion that you do not understand.



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