

# Eye conditions

## Amblyopia (Lazy eye)

**Lazy eye**, or amblyopia, is the loss or lack of development of vision in one eye that is unrelated to any eye health problem and is not correctable with lenses. It can result from a failure to use both eyes together. Lazy eye is often associated with crossed-eyes or a large difference in the degree of nearsightedness or farsightedness between the two eyes. It usually develops before the age of 6, and it does not affect side vision.

Symptoms may include noticeably favoring one eye or a tendency to bump into objects on one side. Symptoms are not always obvious.

Treatment for lazy eye may include a combination of prescription lenses, prisms, vision therapy and eye patching. Vision therapy teaches the two eyes how to work together, which helps prevent lazy eye from reoccurring.

Early diagnosis increases the chance for a complete recovery. This is one reason why the American Optometric Association recommends that children have a comprehensive optometric examination by the age of 6 months and again at age 3. Lazy eye will not go away on its own. If not diagnosed until the pre-teen, teen or adult years, treatment takes longer and is often less effective.

## Astigmatism

Astigmatism is a vision condition that causes blurred vision due either to the irregular shape of the cornea, the clear front cover of the eye, or sometimes the curvature of the lens inside the eye. An irregular shaped cornea or lens prevents light from focusing properly on the retina, the light sensitive surface at the back of the eye. As a result, vision becomes blurred at any distance.

Astigmatism is a very common vision condition. Most people have some degree of astigmatism. Slight amounts of astigmatism usually don't affect vision and don't require treatment. However, larger amounts cause distorted or blurred vision, eye discomfort and headaches.

Astigmatism frequently occurs with other vision conditions like **nearsightedness (myopia)** and **farsightedness (hyperopia)**. Together these vision conditions are referred to as refractive errors because they affect how the eyes bend or "refract" light.

The specific cause of astigmatism is unknown. It can be hereditary and is usually present from birth. It can change as a child grows and may decrease or worsen over time.

A comprehensive optometric examination will include testing for astigmatism. Depending on the amount present, your optometrist can provide eyeglasses or contact lenses that correct the astigmatism by altering the way light enters your eyes.

Laser surgery is also a possible treatment option for some types of astigmatism. It changes the shape of the cornea by removing a small amount of eye tissue. This is done using a highly focused laser beam on the surface of the eye.

## Blepharitis

Blepharitis is an inflammation of the eyelids causing red, irritated, itchy eyelids and the formation of dandruff-like scales on eyelashes. It is a common eye disorder caused by either bacterial or a skin condition such as dandruff of the scalp or acne rosacea. It affects people of all ages. Although uncomfortable, blepharitis is not contagious and generally does not cause any permanent damage to eyesight.

Individuals with blepharitis may experience a gritty or burning sensation in their eyes, excessive tearing, itching, red and swollen eyelids, dry eyes, or crusting of the eyelids. For some people, blepharitis causes only minor irritation and itching. However, it can lead to more severe signs and symptoms such as blurring of vision, missing or misdirected eyelashes, and inflammation of other eye tissue, particularly the cornea.

In many cases, good eyelid hygiene and a regular cleaning routine can control blepharitis. This includes frequent scalp and face washing, using warm compresses to soak the eyelids, and doing eyelid scrubs. In cases where a bacterial infection is the cause, various antibiotics and other medications may be prescribed along with eyelid hygiene.

### **There are 2 types of blepharitis:**

**Anterior blepharitis** is commonly caused by bacteria (staphylococcal blepharitis) or dandruff of the scalp and eyebrows (seborrheic blepharitis). It may also occur due to a combination of factors, or less commonly may be the result of allergies or an infestation of the eyelashes.

**Posterior blepharitis** can be caused by irregular oil production by the glands of the eyelids (meibomian blepharitis) which creates a favorable environment for bacterial growth. It can also develop as a result of other skin conditions such as acne rosacea and scalp dandruff.

Blepharitis can be diagnosed through a comprehensive eye examination . Using the information obtained from testing, your optometrist can determine if you have blepharitis and advise you on treatment options.

Treatment depends on the specific type of blepharitis. The key to treating most types of blepharitis is keeping the lids clean and free of crusts.

- Warm compresses can be applied to loosen the crusts, followed by gentle scrubbing of the eyes with a mixture of water and baby shampoo or an over-the-counter lid cleansing product. In cases involving bacterial infection, an antibiotic may also be prescribed.
- If the glands in the eyelids are blocked, the eyelids may need to be massaged to clean out oil accumulated in the eyelid glands.
- Artificial tear solutions or lubricating ointments may be prescribed in some cases.
- Use of an anti-dandruff shampoo on the scalp can help.
- Limiting or stopping the use of eye makeup is often recommended, as its use will make lid hygiene more difficult.

If you wear contact lenses, you may have to temporarily discontinue wearing them during treatment.

Some cases of blepharitis may require more complex treatment plans. Blepharitis seldom disappears completely. Even with successful treatment, relapses may occur.

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An important part of controlling blepharitis involves treatment at home.

#### **Directions for a Warm Soak of the Eyelids:**

1. Wash your hands thoroughly.
2. Moisten a clean washcloth with warm water.
3. Close eyes and place washcloth on eyelids for about 5 minutes, reheating the washcloth as necessary.
4. Repeat several times daily.

#### **Directions for an Eyelid Scrub:**

1. Wash your hands thoroughly.

2. Mix warm water and a small amount of non-irritating (baby) shampoo or use a commercially prepared lid scrub solution recommended by your optometrist.
3. Using a clean cloth (a different one for each eye) rub the solution back and forth across the eyelashes and edge of the closed eyelid.
4. Rinse with clear water.
5. Repeat with the other eye.

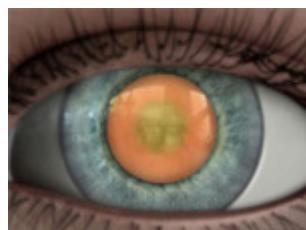
## Cataracts

A **cataract** is a cloudy or opaque area in the normally clear lens of the eye. Depending upon its size and location, it can interfere with normal vision. Most cataracts develop in people over age 55, but they occasionally occur in infants and young children. Usually cataracts develop in both eyes, but one may be worse than the other.

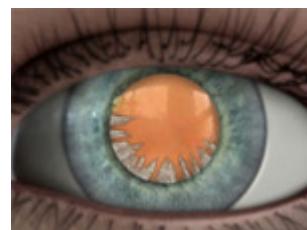
The lens is located inside the eye behind the iris, the colored part of the eye. The lens focuses light on the back of the eye, the retina. The lens is made of mostly proteins and water. Clouding of the lens occurs due to changes in the proteins and lens fibers.

The lens is composed of layers like an onion. The outermost is the capsule. The layer inside the capsule is the cortex, and the innermost layer is the nucleus. A cataract may develop in any of these areas and is described based on its location in the lens:

- A **nuclear cataract** is located in the center of the lens. The nucleus tends to darken changing from clear to yellow and sometimes brown.
- A **cortical cataract** affects the layer of the lens surrounding the nucleus. It is identified by its unique wedge or spoke appearance.
- A **posterior capsular cataract** is found in the back outer layer of the lens. This type often develops more rapidly.



Nuclear cataract



Cortical cataract

Normally, the lens focuses light on the retina, which sends the image through the optic nerve to the brain. However, if the lens is clouded by a cataract, light is scattered so the lens can no longer focus it properly, causing vision problems.

Cataracts generally form very slowly. Signs and symptoms of a cataract may include:

- Blurred or hazy vision
- Reduced intensity of colors
- Increased sensitivity to glare from lights, particularly when driving at night
- Increased difficulty seeing at night
- Change in the eye's refractive error

In age-related cataracts, changes in vision can be very gradual. Some people may not initially recognize the visual changes. However, as cataracts worsen vision symptoms tend to increase in severity.

Other factors can contribute to cataract development including:

- **Diabetes mellitus**—Persons with diabetes are at higher risk for cataracts.
- **Drugs**—certain medications have been found to be associated with the development of a cataract. These include:
  - **Corticosteroids**
  - **Chlorpromazine and other phenothiazine related medications**
- **Ultraviolet radiation** Studies have shown that there is an increased chance of cataract formation with unprotected exposure to ultraviolet (UV) radiation.
- **Smoking** - An association between smoking and increased nuclear opacities has been reported.
- **Alcohol** - Several studies have shown increased cataract formation in patients with higher alcohol consumption compared with people who have lower or no alcohol consumption.
- **Nutritional Deficiency** Although the results are inconclusive, studies have suggested an association between cataract formation and low levels of antioxidants (e.g. vitamin C, vitamin E, carotenoids). Further studies may show that antioxidants have a significant effect on decreasing cataract development.

Rarely, cataracts can be present at birth or develop shortly after. They may be inherited or develop due to an infection, i.e. rubella, in the mother during pregnancy. A cataract may also develop following an injury to the eye or surgery for another eye problem, such as glaucoma.

While there are no clinically proven approaches to preventing cataracts, simple preventive strategies include reducing exposure to sunlight through UV blocking lenses, decreasing or discontinuing smoking and increasing antioxidant vitamin intake through consumption of leafy green vegetables and nutritional supplements.

Additional testing may be needed to determine the extent of impairment to vision caused by a cataract and to evaluate whether other eye diseases may limit vision following cataract surgery.

Using the information obtained from these tests, your optometrist can determine if you have cataracts and advise you on options for treatment.

The treatment of cataracts is based on the level of visual impairment they cause.

If a cataract affects vision only minimally, or not at all, no treatment may be needed. Patients may be advised to monitor for increased visual symptoms and follow a regular check-up schedule.

In some cases, a change in eyeglass prescription may provide temporary improvement in visual acuity. Increasing the amount of light used when reading may be beneficial. The use of anti-glare coatings on clear lenses can help reduce glare for night driving.

When a cataract progresses to the point that it affects a person's ability to do normal everyday tasks, surgery may be needed. Cataract surgery involves removing the lens of the eye and replacing it with an artificial lens. The artificial lens requires no care and can significantly improve vision. New artificial lens options include those that simulate the natural focusing ability of a young healthy lens.

## Chalazion

A chalazion is a slowly developing lump that forms due to blockage and swelling of an oil gland in the eyelid. It is more common in adults than children and occurs most frequently in persons 30 to 50 years of age.

Initially, a chalazion may appear as a red, tender, swollen area of the eyelid. However, in a few days it changes to a painless, slow growing lump in the eyelid. A chalazion often starts out very small and is barely able to be seen, but it may grow to the size of a pea. Often times they may be confused with sties, which are also areas of swelling in the eyelid.

A sty is an infection of an oil gland in the eyelid. It produces a red, swollen, painful lump on the edge or inside surface of the eyelid. Sties usually occur closer to the surface of the eyelid than do chalazia.

A chalazion is generally not due to an infection, but results from a blockage of the oil gland itself. However, a chalazion may occur as an after-effect of a sty.

Common signs or symptoms of a chalazion include:

- Appearance of a painless bump or lump in the upper eyelid, or, less commonly, in the lower eyelid
- Tearing
- Blurred vision, if the chalazion is large enough to press against the eyeball

Most chalazia disappear without treatment in several weeks to a month. However, they often recur. Rarely, they may be an indication of an infection or skin cancer.

## **What causes a chalazion?**

A chalazion can develop when the oil produced by glands within the eyelids, called the meibomian glands, becomes thickened and is unable to flow out of the gland. The oil builds up inside the gland and forms a lump in the eyelid. Eventually the gland may break open and release the oil into the surrounding tissue causing an inflammation of the eyelid.

Risk factors for the development of a chalazion include:

- Chronic blepharitis, an inflammation of the eyelids and eye lashes
- Acne rosacea
- Seborrhea
- Tuberculosis
- Viral infection

## **How is a chalazion treated?**

Many chalazia require minimal medical treatment, resolving on their own in a few weeks to a month. To facilitate healing, warm compresses can be applied to the eyelid for 10 to 15 minutes 4 to 6 times a day for several days. The warm compresses may help soften the hardened oil that is blocking the ducts thereby promoting drainage and healing. Lightly messaging the external area of the eyelid for several minutes each day may also help to promote drainage.

A clean soft cloth dipped in warm water and wrung out can serve as an effective compress. Remoisten the cloth frequently to keep it wet and warm. Once the chalazion drains on its own, keep the area clean and keep your hands away from your eyes.

If the chalazion does not drain and heal within a month, contact your eye doctor. Don't attempt to squeeze or drain the chalazion yourself.

## Color Vision Deficiency

**Color vision deficiency** is the inability to distinguish certain shades of color or in more severe cases, see colors at all. The term "color blindness" is also used to describe this visual condition, but very few people are completely color blind.

Most people with color vision deficiency can see colors, but they have difficulty differentiating between:

- particular shades of reds and greens (most common) or
- blues and yellows (less common).

People who are totally color blind, a condition called **achromatopsia**, can only see things as black and white or in shades of gray.

The severity of color vision deficiency can range from mild to severe depending on the cause. It will affect both eyes if it is inherited and usually just one if the cause for the deficiency is injury or illness.

Color vision is possible due to photoreceptors in the retina of the eye known as **cones**. These cones have light sensitive pigments that enable us to recognize color. Found in the macula, the central portion of the retina, each cone is sensitive to either red, green or blue light, which the cones recognize based upon light wavelengths.

Normally, the pigments inside the cones register differing colors and send that information through the optic nerve to the brain enabling you to distinguish countless shades of color. But if the cones lack one or more light sensitive pigments, you will be unable to see one or more of the three primary colors thereby causing a deficiency in your color perception.

The most common form of color deficiency is red-green. This does not mean that people with this deficiency cannot see these colors at all; they simply have a harder time differentiating between

them. The difficulty they have in correctly identifying them depends on how dark or light the colors are.

Another form of color deficiency is blue-yellow. This is a rarer and more severe form of color vision loss than red-green since persons with blue-yellow deficiency frequently have red-green blindness too. In both cases, it is common for people with color vision deficiency to see neutral or gray areas where a particular color should appear.

## What causes color vision deficiency?

Color deficiency is usually an inherited condition, but disease and injury can also result in color recognition loss.

Usually, color deficiency is an inherited condition caused by a common X-linked recessive gene, which is passed from a mother to her son. But disease or injury damaging the optic nerve or retina can also result in loss of color recognition. Some specific diseases that can cause color deficits are:

- diabetes
- glaucoma
- macular degeneration
- Alzheimer's disease
- Parkinson's disease
- multiple sclerosis
- chronic alcoholism
- leukemia
- sickle cell anemia

Other causes for color vision deficiency include:

- **Medications** - certain medications such as drugs used to treat heart problems, high blood pressure, infections, nervous disorders and psychological problems can affect color vision.
- **Aging** - the ability to see colors can gradually lessen with age.
- **Chemical Exposure** - contact with certain chemicals such as fertilizers and styrene have been known to cause loss of color vision.

In the majority of cases, genetics is the predominate cause for color deficiency. About 8% of caucasian males are born with some degree of color deficiency. Women are typically just carriers of the color deficient gene, though approximately 0.5% of women have color vision deficiency. When the deficiency is hereditary, the severity generally remains constant throughout life. Inherited color vision deficiency does not lead to additional vision loss or blindness.

- **Pseudoisochromatic testing plates.** The patient is asked to look for numbers among the various colored dots, which help distinguish between red, green and blue color deficiencies. Individuals with normal color vision will see a number, while those with a deficiency do not see it. On some plates, a person with normal color vision may see one number, while a person with a deficiency sees a different number.



However, additional testing may be needed to determine the exact nature and degree of color deficiency.

It is possible for a person to have poor color vision and not know it. Quite often, people with red-green deficiency aren't even aware of their problem since they've learned to see the "right" color. For example, tree leaves are green, so they call the color they see green.

Also parents may not suspect the condition in their children until a situation causes confusion or misunderstanding. Early detection of color deficiency is vital since many learning materials rely heavily on color perception or color coding. That is one reason that the American Optometric Association recommends a comprehensive optometric examination before a child begins school.

## How is color vision deficiency treated?

There is no cure for inherited color deficiency. But if the cause is an illness or eye injury, treating these conditions may improve color vision.

Using special tinted eyeglasses or wearing a red tinted contact lens on one eye can increase some people's ability to differentiate between colors, though nothing can make you truly see the deficient color.

Most color deficient persons compensate for their inability to distinguish certain colors with color cues and details that are not consciously evident to people with normal color vision. There are ways to work around the inability to see certain colors by:

- **Organizing and labeling** clothing, furniture or other colored objects (with the help of friends or family) for ease of recognition.
- **Remembering the order of things** rather than their color can also increase the chances of correctly identifying colors. For example a traffic light has red on top, yellow in the middle and green on the bottom.

Though color vision deficiency can be a frustration and may limit participation in some occupations, in most cases it is not a serious threat to vision and can be adapted to your lifestyle with time, patience and practice

## Computer Vision Syndrome

**Computer Vision Syndrome** describes a group of eye and vision-related problems that result from prolonged computer use. Many individuals experience eye discomfort and vision problems when viewing a computer screen for extended periods. The level of discomfort appears to increase with the amount of computer use.

The most common symptoms associated with Computer Vision Syndrome (CVS) are

- eyestrain
- headaches
- blurred vision
- dry eyes
- neck and shoulder pain

These symptoms may be caused by:

- poor lighting
- glare on the computer screen
- improper viewing distances
- poor seating posture
- uncorrected vision problems

- a combination of these factors

The extent to which individuals experience visual symptoms often depends on the level of their visual abilities and the amount of time spent looking at the computer screen. Uncorrected vision problems like farsightedness and astigmatism , inadequate eye focusing or eye coordination abilities, and aging changes of the eyes, such as presbyopia, can all contribute to the development of visual symptoms when using a computer.

Many of the visual symptoms experienced by computer users are only temporary and will decline after stopping computer work. However, some individuals may experience continued reduced visual abilities, such as blurred distance vision, even after stopping work at a computer. If nothing is done to address the cause of the problem, the symptoms will continue to recur and perhaps worsen with future computer use.

Prevention or reduction of the vision problems associated with Computer Vision Syndrome involves taking steps to control lighting and glare on the computer screen, establishing proper working distances and posture for computer viewing, and assuring that even minor vision problems are properly corrected.

## **What causes Computer Vision Syndrome?**

Viewing a computer screen often makes the eyes work harder. As a result, the unique characteristics and high visual demands of computer viewing make many individuals susceptible to the development of vision-related symptoms.

Uncorrected vision problems can increase the severity of Computer Vision Syndrome symptoms. Viewing a computer screen is different than reading a printed page. Often the letters on the computer screen are not as precise or sharply defined, the level of contrast of the letters to the background is reduced, and the presence of glare and reflections on the screen may make viewing difficult.

Viewing distances and angles used for computer work are also often different from those commonly used for other reading or writing tasks. As a result, the eye focusing and eye movement requirements for computer viewing can place additional demands on the visual system.

In addition, the presence of even minor vision problems can often significantly affect comfort and performance at a computer. Uncorrected or under corrected vision problems can be major contributing factors to computer-related eyestrain.

Even people who have an eyeglass or contact lens prescription may find it's not suitable for the specific viewing distances of their computer screen. Some people tilt their heads at odd angles because their glasses aren't designed for looking at a computer. Or they bend toward the screen in

order to see it clearly. Their postures can result in muscle spasms or pain in the neck, shoulder or back.

In most cases, symptoms of CVS occur because the visual demands of the task exceed the visual abilities of the individual to comfortably perform them. At greatest risk for developing CVS are those persons who spend two or more continuous hours at a computer every day.

## **How is Computer Vision Syndrome treated?**

Solutions to computer-related vision problems are varied. However, CVS can usually be alleviated by obtaining regular eye care and making changes in how you view the computer screen.

In some cases, individuals who do not require the use of eyeglasses for other daily activities may benefit from glasses prescribed specifically for computer use. In addition, persons already wearing glasses may find their current prescription does not provide optimal vision for viewing a computer.

- Eyeglasses or contact lenses prescribed for general use may not be adequate for computer work. Lenses prescribed to meet the unique visual demands of computer viewing may be needed. Special lens designs, lens powers or lens tints or coatings may help to maximize visual abilities and comfort.
- Some computer users experience problems with eye focusing or eye coordination that can't be adequately corrected with eyeglasses or contact lenses. A program of vision therapy may be needed to treat these specific problems. Vision therapy, also called visual training, is a structured program of visual activities prescribed to improve visual abilities. It trains the eyes and brain to work together more effectively. These eye exercises help remediate deficiencies in eye movement, eye focusing and eye teaming and reinforce the eye-brain connection. Treatment may include office-based as well as home training procedures.

## **Viewing the Computer**



Proper body positioning for computer use.

Some important factors in preventing or reducing the symptoms of CVS have to do with the computer and how it is used. This includes lighting conditions, chair comfort, location of reference materials, position of the monitor, and the use of rest breaks.

- **Location of computer screen** - Most people find it more comfortable to view a computer when the eyes are looking downward. Optimally, the computer screen should be 15 to 20 degrees below eye level (about 4 or 5 inches) as measured from the center of the screen and 20 to 28 inches from the eyes.
- **Reference materials** - These materials should be located above the keyboard and below the monitor. If this is not possible, a document holder can be used beside the monitor. The goal is to position the documents so you do not need to move your head to look from the document to the screen.
- **Lighting** - Position the computer screen to avoid glare, particularly from overhead lighting or windows. Use blinds or drapes on windows and replace the light bulbs in desk lamps with bulbs of lower wattage.
- **Anti-glare screens** - If there is no way to minimize glare from light sources, consider using a screen glare filter. These filters decrease the amount of light reflected from the screen.
- **Seating position** - Chairs should be comfortably padded and conform to the body. Chair height should be adjusted so your feet rest flat on the floor. If your chair has arms, they should be adjusted to provide arm support while you are typing. Your wrists shouldn't rest on the keyboard when typing.
- **Rest breaks** - To prevent eyestrain, try to rest your eyes when using the computer for long periods. Rest your eyes for 15 minutes after two hours of continuous computer use. Also, for

every 20 minutes of computer viewing, look into the distance for 20 seconds to allow your eyes a chance to refocus.

- **Blinking** - To minimize your chances of developing dry eye when using a computer, make an effort to blink frequently. Blinking keeps the front surface of your eye moist.

Regular eye examinations and proper viewing habits can help to prevent or reduce the development of the symptoms associated with Computer Vision Syndrome.

## Conjunctivitis

Conjunctivitis is an inflammation or infection of the conjunctiva, the thin transparent layer of tissue that lines the inner surface of the eyelid and covers the white part of the eye. Conjunctivitis, often called “pink eye,” is a common eye disease, especially in children. It may affect one or both eyes. Some forms of conjunctivitis can be highly contagious and easily spread in schools and at home. While conjunctivitis is usually a minor eye infection, sometimes it can develop into a more serious problem.

Conjunctivitis may be caused by a viral or bacterial infection. It can also occur due to an allergic reaction to irritants in the air like pollen and smoke, chlorine in swimming pools, and ingredients in cosmetics or other products that come in contact with the eyes. Sexually transmitted diseases like Chlamydia and gonorrhea are less common causes of conjunctivitis.

People with conjunctivitis may experience the following symptoms:

- A gritty feeling in one or both eyes
- Itching or burning sensation in one or both eyes
- Excessive tearing
- Discharge coming from one or both eyes
- Swollen eyelids
- Pink discoloration to the whites of one or both eyes
- Increased sensitivity to light

## What causes conjunctivitis?

The cause of conjunctivitis varies depending on the offending agent. There are three main categories of conjunctivitis: allergic, infectious and chemical:

## Allergic Conjunctivitis

- **Allergic Conjunctivitis** occurs more commonly among people who already have seasonal allergies. At some point they come into contact with a substance that triggers an allergic reaction in their eyes.
- **Giant Papillary Conjunctivitis** is a type of allergic conjunctivitis caused by the chronic presence of a foreign body in the eye. This condition occurs predominantly with people who wear hard or rigid contact lenses, wear soft contact lenses that are not replaced frequently, have an exposed suture on the surface of the eye, or have a glass eye.

## Infectious Conjunctivitis

- **Bacterial Conjunctivitis** is an infection most often caused by staphylococcal or streptococcal bacteria from your own skin or respiratory system. Infection can also occur by transmittal from insects, physical contact with other people, poor hygiene (touching the eye with unclean hands), or by use of contaminated eye makeup and facial lotions.
- **Viral Conjunctivitis** is most commonly caused by contagious viruses associated with the common cold. The primary means of contracting this is through exposure to coughing or sneezing by persons with upper respiratory tract infections. It can also occur as the virus spreads along the body's own mucous membranes connecting lungs, throat, nose, tear ducts, and conjunctiva.
- **Ophthalmia Neonatorum** is a severe form of bacterial conjunctivitis that occurs in newborn babies. This is a serious condition that could lead to permanent eye damage unless it is treated immediately. Ophthalmia neonatorum occurs when an infant is exposed to Chlamydia or gonorrhea while passing through the birth canal.

## Chemical Conjunctivitis

Chemical Conjunctivitis can be caused by irritants like air pollution, chlorine in swimming pools, and exposure to noxious chemicals.

## How is conjunctivitis treated?

Treatment of conjunctivitis is directed at three main goals:

1. To increase patient comfort.
2. To reduce or lessen the course of the infection or inflammation.
3. To prevent the spread of the infection in contagious forms of conjunctivitis.

The appropriate treatment for conjunctivitis depends on its cause:

- **Allergic conjunctivitis**—The first step should be to remove or avoid the irritant, if possible. Cool compresses and artificial tears sometimes relieve discomfort in mild cases. In more severe cases, non-steroidal anti-inflammatory medications and antihistamines may be prescribed. Cases of persistent allergic conjunctivitis may also require topical steroid eye drops.
- **Bacterial conjunctivitis**—This type of conjunctivitis is usually treated with antibiotic eye drops or ointments. Improvement can occur after three or four days of treatment, but the entire course of antibiotics needs to be used to prevent recurrence.
- **Viral Conjunctivitis**—There are no available drops or ointments to eradicate the virus for this type of conjunctivitis. Antibiotics will not cure a viral infection. Like a common cold, the virus just has to run its course, which may take up to two or three weeks in some cases. The symptoms can often be relieved with cool compresses and artificial tear solutions. For the worst cases, topical steroid drops may be prescribed to reduce the discomfort from inflammation, but do not shorten the course of the infection. Some doctors may perform an ophthalmic iodine eye wash in the office in hopes of shortening the course of the infection. This newer treatment has not been well studied yet; therefore no conclusive evidence of the success exists.
- **Chemical Conjunctivitis**—Treatment for chemical conjunctivitis requires careful flushing of the eyes with saline and may require topical steroids. The more acute chemical injuries are medical emergencies, particularly alkali burns, which can lead to severe scarring, intraocular damage or even loss of the eye.

## Contact Lens Wearers

Contact lens wearers may need to discontinue wearing their lenses while the condition is active. Your doctor can advise you on the need for temporary restrictions on contact lens wear.

If the conjunctivitis developed due to wearing contact lenses, your eye doctor may recommend that you switch to a different type of contact lens or disinfection solution. Your optometrist might need to alter your contact lens prescription to a type of lens that you replace more frequently to prevent the conjunctivitis from recurring.

## Self-care

Practicing good hygiene is the best way to control the spread of conjunctivitis. Once an infection has been diagnosed, follow these steps:

- Don't touch your eyes with your hands.

- Wash your hands thoroughly and frequently.
- Change your towel and washcloth daily, and don't share them with others.
- Discard eye cosmetics, particularly mascara.
- Don't use anyone else's eye cosmetics or personal eye-care items.
- Follow your eye doctor's instructions on proper contact lens care.

You can soothe the discomfort of viral or bacterial conjunctivitis by applying warm compresses to your affected eye or eyes. To make a compress, soak a clean cloth in warm water and wring it out before applying it gently to your closed eyelids.

For allergic conjunctivitis, avoid rubbing your eyes. Instead of warm compresses, use cool compresses to soothe your eyes. Over the counter eye drops are available. Antihistamine eye drops should help to alleviate the symptoms, and lubricating eye drops help to rinse the allergen off of the surface of the eye.

See your doctor of optometry when you experience conjunctivitis to help diagnose the cause and the proper course of action.

## Convergence Insufficiency

Convergence is the coordinated movement and focus of our two eyes inward. Close work requires us to focus both of our eyes inward on close objects, including books, papers, computer screens, etc. Convergence skills are learned and developed during our early years.

A problem with the coordinated movement of our eyes inward to look at close objects is called a convergence problem. A common convergence problem is Convergence Insufficiency.

When we are not able to converge our eyes easily and accurately, problems may develop, such as:

- Eye strain
- Headaches
- Double vision
- Difficulty reading and concentrating
- Avoidance of near work
- Poor sports performance
- Dizziness or motion sickness

### **Treatment of Convergence Problems**

Eye coordination problems like convergence insufficiency generally cannot be improved with eye glasses or surgery. A program of Vision Therapy may be needed to improve eye coordination abilities and reduce symptoms and discomfort when doing close work.

### **Resources for Convergence Insufficiency Diagnosis Available**

The 2008 Convergence Insufficiency Treatment Trial clearly supports the superiority of office-based vision therapy to home-based vision therapy alone for convergence insufficiency. As noted in the AOA's Clinical Practice Guideline (CPG) on Care of the Patient with Accommodative and Vergence Dysfunction, home-based vision therapy may be less effective than in-office therapy because no therapist is available to correct inappropriate procedures or to motivate the patient. The preferred clinical management therefore consists of in-office vision therapy supplemented with home therapy. Sample procedures include loose prism jumps, eccentric circles and life savers.

References:

<http://aoa.org/documents/CPG-18.pdf>

<http://aoa.org/documents/QRG-18.pdf>

For more information, visit the [AOA website](#).

### **Research on Convergence Insufficiency**

The National Eye Institute, a division of the National Institutes of Health for the U.S. Department of Health and Human Services, released a statement concerning the effectiveness of office-based vision therapy for treatment of Convergence Insufficiency. Dr. Mitchell Scheiman, FCOVD, has completed the 12-week study, known as the Convergence Insufficiency Treatment Trial (CITT), found that approximately 75 percent of those who received in-office therapy by a trained therapist plus at-home treatment reported fewer and less severe symptoms related to reading and other near work after the office-based vision therapy.

"This NEI-funded study compared the effectiveness of treatment options for convergence insufficiency," said Paul A. Sieving, M.D., Ph.D., director of the NEI. "The CITT will provide eye care professionals with the research they need to assist children with this condition."

"There are no visible signs of this condition; it can only be detected and diagnosed during a comprehensive eye examination," said principal investigator Mitchell Scheiman, O.D., FCOVD, of Pennsylvania College of Optometry at Salus University near Philadelphia, PA. "However, as this study shows, once diagnosed, CI can be successfully treated with office-based vision therapy by a trained therapist along with at-home reinforcement."

## Corneal Abrasion

A cut or scrape of the front of the eye. The cornea is the clear covering of the eye. Corneal abrasions can be very painful. They may be treated with antibiotic eye drops in order to prevent infection. Occasionally an eye must be patched to allow the cornea to heal, however, it is more common to place a contact lens on the eye in which the patient can sleep overnight while wearing. The contact lens is removed at a follow-up appointment once the cornea is healed. Depending on

the severity and depth of the corneal abrasion, vision may be permanently reduced.

## Diabetic Retinopathy

Diabetic retinopathy is a condition occurring in persons with diabetes, which causes progressive damage to the retina, the light sensitive lining at the back of the eye. It is a serious sight-threatening complication of diabetes.

Diabetes is a disease that interferes with the body's ability to use and store sugar, which can cause many health problems. Too much sugar in the blood can cause damage throughout the body, including the eyes. Over time, diabetes affects the circulatory system of the retina.

Diabetic retinopathy is the result of damage to the tiny blood vessels that nourish the retina. They leak blood and other fluids that cause swelling of retinal tissue and clouding of vision. The condition usually affects both eyes. The longer a person has diabetes, the more likely they will develop diabetic retinopathy. If left untreated, diabetic retinopathy can cause blindness.

Symptoms of diabetic retinopathy include:

- Seeing spots or floaters in your field of vision
- Blurred vision
- Having a dark or empty spot in the center of your vision
- Difficulty seeing well at night

In patients with diabetes, prolonged periods of high blood sugar can lead to the accumulation of fluid in the lens inside the eye that controls eye focusing. This changes the curvature of the lens and results in the development of symptoms of blurred vision. The blurring of distance vision as a result of lens swelling will subside once the blood sugar levels are brought under control. Better control of blood sugar levels in patients with diabetes also slows the onset and progression of diabetic retinopathy.

Often there are no visual symptoms in the early stages of diabetic retinopathy. That is why the American Optometric Association recommends that everyone with diabetes have a comprehensive dilated eye examination once a year. Early detection and treatment can limit the potential for significant vision loss from diabetic retinopathy.

Treatment of diabetic retinopathy varies depending on the extent of the disease. It may require laser surgery to seal leaking blood vessels or to discourage new leaky blood vessels from forming. Injections of medications into the eye may be needed to decrease inflammation or stop the formation of new blood vessels. In more advanced cases, a surgical procedure to remove and replace the gel-like fluid in the back of the eye, called the vitreous, may be needed. A retinal detachment, defined as a separation of the light-receiving lining in the back of the eye, resulting from diabetic retinopathy, may also require surgical repair.

If you are a diabetic, you can help prevent or slow the development of diabetic retinopathy by taking your prescribed medication, sticking to your diet, exercising regularly, controlling high blood pressure and avoiding alcohol and smoking.

Diabetic retinopathy is classified into two types:

1. **Non-proliferative diabetic retinopathy** (NPDR) is the early state of the disease in which symptoms will be mild or non-existent. In NPDR, the blood vessels in the retina are weakened causing tiny bulges called microaneurysms to protrude from their walls. The microaneurysms may leak fluid into the retina, which may lead to swelling of the macula.
2. **Proliferative diabetic retinopathy** (PDR) is the more advanced form of the disease. At this stage, circulation problems cause the retina to become oxygen deprived. As a result new fragile blood vessels can begin to grow in the retina and into the vitreous, the gel-like fluid that fills the back of the eye. The new blood vessel may leak blood into the vitreous, clouding vision. Other complications of PDR include detachment of the retina due to scar tissue formation and the development of glaucoma. Glaucoma is an eye disease defined as progressive damage to the optic nerve. In cases of proliferative diabetic retinopathy, the cause of this nerve damage is due to extremely high pressure in the eye. If left untreated, proliferative diabetic retinopathy can cause severe vision loss and even blindness.

Risk factors for diabetic retinopathy include:

- **Diabetes**—people with Type 1 or Type 2 diabetes are at risk for the development of diabetic retinopathy. The longer a person has diabetes, the more likely they are to develop diabetic retinopathy, particularly if the diabetes is poorly controlled.
- **Race**—Hispanic and African Americans are at greater risk for developing diabetic retinopathy.
- **Medical conditions**—persons with other medical conditions such as high blood pressure and high cholesterol are at greater risk.
- **Pregnancy**—pregnant women face a higher risk for developing diabetes and diabetic retinopathy. If gestational diabetes develops, the patient is at much higher risk of developing diabetes as they age.

## **How is diabetic retinopathy treated?**

Laser treatment (photocoagulation) is used to stop the leakage of blood and fluid into the retina. A laser beam of light can be used to create small burns in areas of the retina with abnormal blood vessels to try to seal the leaks.

Treatment for diabetic retinopathy depends on the stage of the disease and is directed at trying to slow or stop the progression of the disease.

In the early stages of Non-proliferative Diabetic Retinopathy, treatment other than regular monitoring may not be required. Following your doctor's advice for diet and exercise and keeping blood sugar levels well-controlled can help control the progression of the disease.

If the disease advances, leakage of fluid from blood vessels can lead to macular edema. Laser treatment (photocoagulation) is used to stop the leakage of blood and fluid into the retina. A laser beam of light can be used to create small burns in areas of the retina with abnormal blood vessels to try to seal the leaks.

When blood vessel growth is more widespread throughout the retina, as in proliferative diabetic retinopathy, a pattern of scattered laser burns is created across the retina. This causes abnormal blood vessels to shrink and disappear. With this procedure, some side vision may be lost in order to safeguard central vision.

Some bleeding into the vitreous gel may clear up on its own. However, if significant amounts of blood leak into the vitreous fluid in the eye, it will cloud vision and can prevent laser photocoagulation from being used. A surgical procedure called a vitrectomy may be used to remove the blood-filled vitreous and replace it with a clear fluid to maintain the normal shape and health of the eye.

Persons with diabetic retinopathy can suffer significant vision loss. Special low vision devices such as telescopic and microscopic lenses, hand and stand magnifiers, and video magnification systems can be prescribed to make the most of remaining vision.

## Diplopia (Double Vision)

Diplopia, or double vision, can result if our eyes do not both aim in the same place either at a distance or up close. The double images may be totally separate or overlap to some degree. Double vision can develop over time or appear suddenly.

### **Children and Double Vision**

A child may experience double vision, but may not be aware that this is not normal. Generally, children think that everyone sees the world as they do. Many parents have discovered that their child was seeing double and the child did not tell anyone because they thought it was normal.

It is quite common for children who are struggling with reading and other close work, especially in school, to experience seeing double after a relatively short amount of reading. These children will often avoid reading, or say that they don't like to read. In such cases, the children are usually experiencing difficulties with eye coordination and eyestrain at close distances.

### **Causes of Double Vision**

There are many causes of diplopia, ranging from serious medical conditions to very treatable visual difficulties. A COVD doctor is qualified to determine the cause as well as make any necessary referrals.

### **Treatment of Double Vision**

In almost all cases, seeing double should not be ignored. Do not wait for this visual problem to go away. If anyone you know sees double, contact a COVD doctor, who will determine the problem and develop a treatment regimen. Double vision that occurs suddenly needs to be evaluated immediately. Do not ignore this symptom.

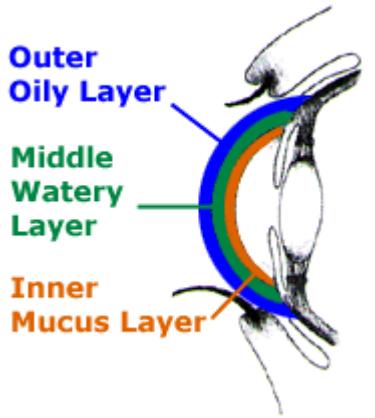
## Dry Eye

Dry eye is a condition in which there are insufficient tears to lubricate and nourish the eye. Tears are necessary for maintaining the health of the front surface of the eye and for providing clear vision. People with dry eyes either do not produce enough tears or have a poor quality of tears. Dry eye is a common and often chronic problem, particularly in older adults.

With each blink of the eyelids, tears are spread across the front surface of the eye, known as the cornea. Tears provide lubrication, reduce the risk of eye infection, wash away foreign matter in the eye, and keep the surface of the eyes smooth and clear. Excess tears in the eyes flow into small drainage ducts, in the inner corners of the eyelids, which drain in the back of the nose.

Dry eyes can result from an improper balance of tear production and drainage.

- **Inadequate amount of tears**—Tears are produced by several glands in and around the eyelids. Tear production tends to diminish with age, with various medical conditions, or as a side effect of certain medicines. Environmental conditions such as wind and dry climates can also affect tear volume by increasing tear evaporation. When the normal amount of tear production decreases or tears evaporate too quickly from the eyes, symptoms of dry eye can develop.
- **Poor quality of tears**—Tears are made up of three layers:



oil, water, and mucus. Each component serves a function in protecting and nourishing the front surface of the eye. A smooth oil layer helps to prevent evaporation of the water layer, while the mucin layer functions in spreading the tears evenly over the surface of the eye. If the tears evaporate too quickly or do not spread evenly over the cornea due to deficiencies with any of the three tear layers, dry eye symptoms can develop.

The most common form of dry eyes is due to an inadequate amount of the water layer of tears. This condition, called keratoconjunctivitis sicca (KCS), is also referred to as dry eye syndrome.

People with dry eyes may experience symptoms of irritated, gritty, scratchy, or burning eyes, a feeling of something in their eyes, excess watering, and blurred vision. Advanced dry eyes may damage the front surface of the eye and impair vision.

Treatments for dry eyes aim to restore or maintain the normal amount of tears in the eye to minimize dryness and related discomfort and to maintain eye health.

## What causes dry eyes?

The development of dry eyes can have many causes. They include:

- **Age**—dry eye is a part of the natural aging process. The majority of people over age 65 experience some symptoms of dry eyes.

- **Gender**—women are more likely to develop dry eyes due to hormonal changes caused by pregnancy, the use of oral contraceptives, and menopause.
- **Medications**—certain medicines, including antihistamines, decongestants, blood pressure medications and antidepressants, can reduce the amount of tears produced in the eyes.
- **Medical conditions**—persons with rheumatoid arthritis, diabetes and thyroid problems are more likely to have symptoms of dry eyes. Also, problems with inflammation of the eyelids (blepharitis), inflammation of the surfaces of the eye, or the inward or outward turning of eyelids can cause dry eyes to develop.
- **Environmental conditions**—exposure to smoke, wind and dry climates can increase tear evaporation resulting in dry eye symptoms. Failure to blink regularly, such as when staring at a computer screen for long periods of time, can also contribute to drying of the eyes.
- **Other factors**—long term use of contact lenses can be a factor in the development of dry eyes. Refractive eye surgeries, such as LASIK, can cause decreased tear production and dry eyes.

## How are dry eyes treated?

Dry eyes can be a chronic condition, but your optometrist can prescribe treatment to keep your eyes healthy, more comfortable, and prevent your vision from being affected. The primary approaches used to manage and treat dry eyes include adding tears, conserving tears, increasing tear production, and treating the inflammation of the eyelids or eye surface that contributes to the dry eyes.

- **Adding tears**—Mild cases of dry eyes can often be managed using over-the-counter artificial tear solutions. These can be used as often as needed to supplement natural tear production. Preservative-free artificial tear solutions are recommended because they contain fewer additives that could further irritate the eyes. However, some people may have persistent dry eyes that don't respond to artificial tears alone. Additional steps need to be taken to treat their dry eyes.
- **Conserving tears**—An additional approach to reducing the symptoms of dry eyes is to keep natural tears in the eyes longer. This can be done by blocking the tear ducts through which the tears normally drain. The tear ducts can be blocked with tiny silicone or gel-like plugs that can be removed, if needed. A surgical procedure to permanently close tear ducts can also be used. In either case, the goal is to keep the available tears in the eye longer to reduce problems related to dry eyes.
- **Increasing tear production**—Prescription eye drops that help to increase production of tears can be recommended by your optometrist, as well as omega-3 fatty acid nutritional supplements.

- **Treatment of the contributing eyelid or ocular surface inflammation**—Prescription eye drops or ointments, warm compresses and lid massage, or eyelid cleaners may be recommended to help decrease inflammation around the surface of the eyes.

## Self Care

Steps you can take to reduce symptoms of dry eyes include:

- Remembering to blink regularly when reading or staring at a computer screen for long periods of time.
- Increasing the level of humidity in the air at work and at home.
- Wearing sunglasses outdoors, particularly those with wrap around frame design, to reduce exposure to drying winds and sun.
- Using nutritional supplements containing essential fatty acids may help decrease dry eye symptoms in some people. Ask your optometrist if the use of dietary supplements could be of help for your dry eye problems.

Avoiding becoming dehydrated by drinking plenty of water (8 to 10 glasses) each day.

## Hyperopia (Farsightedness)

Farsightedness, or **hyperopia**, as it is medically termed, is a vision condition in which distant objects are usually seen clearly, but close ones do not come into proper focus. Farsightedness occurs if your eyeball is too short or the cornea has too little curvature, so light entering your eye is not focused correctly.

Common signs of farsightedness include difficulty in concentrating and maintaining a clear focus on near objects, eye strain, fatigue and/or headaches after close work, aching or burning eyes, irritability or nervousness after sustained concentration.

Common vision screenings, often done in schools, are generally ineffective in detecting farsightedness. A comprehensive optometric examination will include testing for farsightedness.

In mild cases of farsightedness, your eyes may be able to compensate without corrective lenses. In other cases, your optometrist can prescribe eyeglasses or contact lenses to optically correct farsightedness by altering the way the light enters your eyes.

## **Spots and Floaters**

**Spots (often called floaters)** are small, semi-transparent or cloudy specks or particles within the vitreous, which is the clear, jelly-like fluid that fills the inside of your eyes. They appear as specks of various shapes and sizes, threadlike strands or cobwebs. Because they are within your eyes, they move as your eyes move and seem to dart away when you try to look at them directly.

Spots are often caused by small flecks of protein or other matter trapped during the formation of your eyes before birth. They can also result from deterioration of the vitreous fluid, due to aging; or from certain eye diseases or injuries.

Most spots are not harmful and rarely limit vision. But, spots can be indications of more serious problems, and you should see your optometrist for a comprehensive examination when you notice sudden changes or see increases in them.

By looking in your eyes with special instruments, your optometrist can examine the health of your eyes and determine if what you are seeing is harmless or the symptom of a more serious problem that requires treatment.

## **Glaucoma**

Glaucoma is a group of eye disorders leading to progressive damage to the optic nerve, and is characterized by loss of nerve tissue resulting in loss of vision. The optic nerve is a bundle of about one million individual nerve fibers and transmits the visual signals from the eye to the brain. The most common form of glaucoma, primary open-angle glaucoma, is associated with an increase in the fluid pressure inside the eye. This increase in pressure may cause progressive damage to the optic nerve and loss of nerve fibers. Vision loss may result. Advanced glaucoma may even cause blindness. Not everyone with high eye pressure will develop glaucoma, and many people with normal eye pressure will develop glaucoma. When the pressure inside an eye is too high for that particular optic nerve, whatever that pressure measurement may be, glaucoma will develop.

Glaucoma is the second leading cause of blindness in the U.S. It most often occurs in people over age 40, although a congenital or infantile form of glaucoma exists. People with a family history of glaucoma, African Americans over the age of 40, and Hispanics over the age of 60 are at an increased risk of developing glaucoma. Other risk factors include thinner corneas, chronic eye inflammation, and using medications that increase the pressure in the eyes.

The most common form of glaucoma, primary open-angle glaucoma, develops slowly and usually without any symptoms. Many people do not become aware they have the condition until significant vision loss has occurred. It initially affects peripheral or side vision, but can advance to central vision loss. If left untreated, glaucoma can lead to significant loss of vision in both eyes, and may even lead to blindness.

A less common type of glaucoma, acute angle closure glaucoma, usually occurs abruptly due to a rapid increase of pressure in the eye. Its symptoms may include severe eye pain, nausea, redness in the eye, seeing colored rings around lights, and blurred vision. This condition is an ocular emergency, and medical attention should be sought immediately, as severe vision loss can occur quickly.

Glaucoma cannot currently be prevented, but if diagnosed and treated early it can usually be controlled. Medication or surgery can slow or prevent further vision loss. However, vision already lost to glaucoma cannot be restored. That is why the American Optometric Association recommends an annual dilated eye examination for people at risk for glaucoma as a preventive eye care measure. Depending on your specific condition, your doctor may recommend more frequent examinations.

## What causes glaucoma?

There are many types of glaucoma and many theories about the causes of glaucoma. The exact cause is unknown. Although the disease is usually associated with an increase in the fluid pressure inside the eye, other theories include lack of adequate blood supply to the nerve.

**Primary open-angle glaucoma**—This is the most common form of glaucoma. One theory is that glaucoma is thought to develop when the eye's drainage system becomes inefficient over time. This leads to an increased amount of fluid and a gradual buildup of pressure within the eye. Other theories of the cause of the optic nerve damage include poor perfusion, or blood flow, to the optic nerve. Damage to the optic nerve is slow and painless and a large portion of vision can be lost before vision problems are noticed. Other theories also exist.

**Angle-closure glaucoma**—This type of glaucoma, also called closed-angle glaucoma or narrow angle glaucoma, is a less common form of the disease. It is a medical emergency that can cause vision loss within a day of its onset.

It occurs when the drainage angle in the eye (formed by the cornea and the iris) closes or becomes blocked. Many people who develop this type of glaucoma have a very narrow drainage angle. With age, the lens in the eye becomes larger, pushing the iris forward and narrowing the space between the iris and the cornea. As this angle narrows, the aqueous fluid is blocked from exiting through the drainage system, resulting in a buildup of fluid and an increase in eye pressure.

Angle-closure glaucoma can be chronic (progressing gradually) or acute (appearing suddenly). The acute form occurs when the iris completely blocks the drainage of the aqueous fluid. In people with a narrow drainage angle, if their pupils become dilated, the angle may close and cause a sudden increase in eye pressure. Although an acute attack often affects only one eye, the other eye may be at risk of an attack as well.

**Secondary glaucoma**—This type of glaucoma occurs as a result of an injury or other eye disease. It may be caused by a variety of medical conditions, medications, physical injuries, and eye abnormalities. Infrequently, eye surgery can be associated with secondary glaucoma.

**Normal-tension glaucoma**—In this form of glaucoma, eye pressure remains within what is considered to be the “normal” range, but the optic nerve is damaged nevertheless. Why this happens is unknown.

It is possible that people with low-tension glaucoma may have an abnormally sensitive optic nerve or a reduced blood supply to the optic nerve caused by a condition such as atherosclerosis, a hardening of the arteries. Under these circumstances even normal pressure on the optic nerve may be enough to cause damage.

## Risk factors

Certain factors can increase the risk for developing glaucoma. They include:

- **Age**—People over age 60 are at increased risk for the disease. For African Americans, however, the increase in risk begins after age 40. The risk of developing glaucoma increases slightly with each year of age.
- **Race**—African Americans are significantly more likely to get glaucoma than are Caucasians, and they are much more likely to suffer permanent vision loss as a result. People of Asian descent are at higher risk of angle-closure glaucoma and those of Japanese descent are more prone to low-tension glaucoma.
- **Family history of glaucoma**—Having a family history of glaucoma increases the risk of developing glaucoma.
- **Medical conditions**—Some studies indicate that diabetes may increase the risk of developing glaucoma, as do high blood pressure and heart disease.
- **Physical injuries to the eye**—Severe trauma, such as being hit in the eye, can result in immediate increased eye pressure and future increases in pressure due to internal damage. Injury can also dislocate the lens, closing the drainage angle, and increasing pressure.
- **Other eye-related risk factors**—Eye anatomy, namely corneal thickness and optic nerve appearance indicate risk for development of glaucoma. Conditions such as retinal detachment, eye tumors, and eye inflammations may also induce glaucoma. Some studies

suggest that high amounts of nearsightedness may also be a risk factor for the development of glaucoma.

- **Corticosteroid use**—Using corticosteroids for prolonged periods of time appears to put some people at risk of getting secondary glaucoma.
- 

## How is glaucoma diagnosed?

Glaucoma is diagnosed through a comprehensive eye examination. To establish a diagnosis of glaucoma, several factors must be present: Because glaucoma is a progressive disease, meaning it worsens over time, a change in the appearance of the optic nerve, a loss of nerve tissue, and a corresponding loss of vision confirm the diagnosis. Some optic nerves have a suspicious appearance, resembling nerves with glaucoma, but the patients may have no other risk factors or signs of glaucoma. These patients should be closely followed with routine comprehensive exams to monitor for change.

Testing includes:

- **Patient history** to determine any symptoms the patient is experiencing and the presence of any general health problems and family history that may be contributing to the problem.
- **Visual acuity measurements** to determine the extent to which vision may be affected.
- **Tonometry** to measure the pressure inside the eye to detect increased risk factors for glaucoma.
- **Pachymetry** to measure corneal thickness. People with thinner corneas are at an increased risk of developing glaucoma.
- **Visual field testing**, also called perimetry, to check if the field of vision has been affected by glaucoma. This test measures your side (peripheral) vision and central vision by either determining the dimmest amount of light that can be detected in various locations of vision, or by determining sensitivity to targets other than light, and comparing it to others of similar age.
- **Evaluation of the retina of the eye**, which may include photographs of the optic nerve, in order to monitor any changes that might occur over time.
- **Supplemental testing** may include gonioscopy, a procedure allowing views of the angle anatomy, the area in the eye where fluid drainage occurs. Serial tonometry may be performed. This is a procedure acquiring several pressure measurements over time, looking for changes in the eye pressure throughout the day. Other tests include using devices to measure nerve fiber thickness, and look for specific areas of the nerve fiber layer for loss of tissue.

## How is glaucoma treated?

The treatment of glaucoma is aimed at reducing intraocular pressure. The most common first line treatment of glaucoma is usually prescription eye drops that must be taken regularly. In some cases, systemic medications, laser treatment, or other surgery may be required. While there is no cure as yet for glaucoma, early diagnosis and continuing treatment can preserve eyesight.

- **Medications**—A number of medications are currently available to treat glaucoma. Typically medications are intended to reduce elevated intraocular pressure. One may be prescribed a single medication or a combination of medications. The type of medication may change if it is not providing enough pressure reduction or if the patient is experiencing side-effects from the drops.
- **Surgery** involves either laser treatment, making a drainage flap in the eye, inserting a drainage valve, or destroying the tissue that creates the fluid in the eye. All procedures aim to reduce the pressure inside the eye. Surgery may help lower pressure when medication is not sufficient, however it cannot reverse vision loss.
- **Laser surgery**—Laser trabeculoplasty helps fluid drain out of the eye. A high-energy laser beam is used to stimulate the trabecular meshwork to work more efficiently at fluid drainage. The results may be somewhat temporary, and the procedure may need to be repeated in the future.
- **Conventional surgery**—If eye drops and laser surgery aren't effective in controlling eye pressure, you may need a filtering procedure called a trabeculectomy. Filtering microsurgery involves creating a drainage flap, allowing fluid to percolate into and later drain into the vascular system.
- **Drainage implants**—Another type of surgery, called drainage valve implant surgery, may be an option for people with uncontrolled glaucoma, secondary glaucoma or for children with glaucoma. A small silicone tube is inserted in the eye to help drain aqueous fluid.

## Treatment for acute angle-closure glaucoma

Acute angle-closure glaucoma is a medical emergency. Several medications can be used to reduce eye pressure as quickly as possible. A laser procedure called laser peripheral iridotomy will also likely be performed. In this procedure, a laser beam creates a small hole in the iris to allow aqueous fluid to flow more freely into the front chamber of the eye where it then has access to the meshwork for drainage.

## Lifelong treatment

There is no cure for glaucoma. Patients with glaucoma need to continue treatment for the rest of their lives. Because the disease can progress or change silently, compliance with eye medications and eye examinations are essential, as treatment may need to be adjusted periodically.

By keeping eye pressure under control, continued damage to the optic nerve and continued loss of your visual field may slow or stop. The optometrist may focus on lowering the intraocular pressure to a level that is least likely to cause further optic nerve damage. This level is often referred to as the target pressure and will probably be a range rather than a single number. Target pressure differs for each person, depending on the extent of the damage and other factors. Target pressure may change over the course of a lifetime. Newer medications are always being developed to help in the fight against glaucoma.

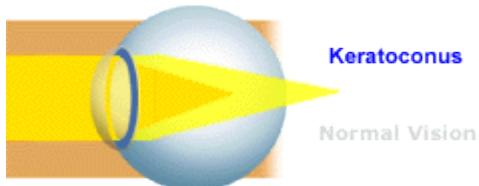
Early detection, prompt treatment and regular monitoring can help to control glaucoma and therefore reduce the chances of progression vision loss.

## Keratoconus

**Keratoconus** is a vision disorder that occurs when the normally round cornea (the front part of the eye) becomes thin and irregular (cone) shaped. This abnormal shape prevents the light entering the eye from being focused correctly on the retina and causes distortion of vision.

In its earliest stages, keratoconus causes slight blurring and distortion of vision and increased sensitivity to glare and light. These symptoms usually appear in the late teens or late 20s. Keratoconus may progress for 10-20 years and then slow in its progression. Each eye may be affected differently. As keratoconus progresses, the cornea bulges more and vision may become more distorted. In a small number of cases, the cornea will swell and cause a sudden and significant decrease in vision. The swelling occurs when the strain of the cornea's protruding cone-like shape causes a tiny crack to develop. The swelling may last for weeks or months as the crack heals and is gradually replaced by scar tissue. If this sudden swelling does occur, your doctor can prescribe eye drops for temporary relief, but there are no medicines that can prevent the disorder from progressing.

Eyeglasses or soft contact lenses may be used to correct



the mild nearsightedness and astigmatism that is caused by the early stages for keratoconus. As the disorder progresses and cornea continues to thin and change shape, rigid gas permeable contact lenses can be prescribed to correct vision adequately. In most cases, this is adequate. The contact lenses must be carefully fitted and frequent checkups and lens changes may be needed to achieve and maintain good vision.

In a few cases, a corneal transplant is necessary. However, even after a corneal transplant, eyeglasses or contact lenses are often still needed to correct vision.

## Learning Related Vision Problems

A learning-related visual problem directly affects how we learn, read, or sustain close work. Visual problems in any of the following areas can have a significant impact on learning:

- eye tracking skills - eyes following a line of print
- eye teaming skills - two eyes working together as a synchronized team
- binocular vision - simultaneously blending the images from both eyes into one image
- accommodation - eye focusing
- visual-motor integration - eye-hand coordination
- visual perception - visual memory, visual form perception, and visualization

As vision and learning are intimately connected, a vision problem can be easily mistaken for a learning problem. Youngsters with visual problems can be misdiagnosed as having Learning Disabilities, ADHD, or Dyslexia. There are various reasons for this misdiagnosis. For example, children who have learning-related visual problems cannot sustain their close work at school. They may be misdiagnosed as ADHD because children with ADHD also can't sustain attention on their work. Same behaviors, different diagnosis.

## Age-Related Macular Degeneration

### There are 2 forms of macular degeneration: Dry and Wet

With "dry" macular degeneration, the tissue of the macula gradually becomes thin and stops functioning properly. There is no cure for dry AMD, and any loss in central vision cannot be restored. However, doctors now believe there is a link between nutrition and the progression of dry AMD. Dietary changes favoring low-fat content and dark green leafy vegetables can slow vision loss. Nutritional supplements also may be beneficial.

Less common, "wet" macular degeneration results when fluids leak from newly formed blood vessels under the macula and blur central vision. Vision loss can be rapid and severe. If detected early, "wet" AMD can be treated with laser treatment, which is often called photocoagulation. A highly focused beam of light seals the leaking blood vessels that damage the macula. Photodynamic Therapy (PDT) uses a medication injected into the bloodstream, which is then activated with a laser shone into the eye. A new therapy available, where a medication is injected into the back of the eye, is showing favorable results. These are not permanent cures but are used to slow the rate of central vision loss.

Age-Related Macular Degeneration (AMD) is the leading cause of severe vision loss in adults over age 50. The Centers for Disease Control and Prevention estimate that 1.8 million people have AMD and another 7.3 million are at substantial risk for vision loss from AMD. Caucasians are at higher risk for developing AMD than other races. Women also develop AMD at an earlier age than men. This eye disease occurs when there are changes to the macula, a small portion of the retina that is located on the inside back layer of the eye. AMD is a loss of central vision that can occur in two forms: "dry" or atrophic and "wet" or exudative.

Most people with macular degeneration have the dry form, for which there is no known treatment. The less common wet form may respond to laser procedures, if diagnosed and treated early.

Some common symptoms are: a gradual loss of ability to see objects clearly, distorted vision, a gradual loss of color vision, and a dark or empty area appearing in the center of vision. If you experience any of these, contact your doctor of optometry immediately for a comprehensive examination. Central vision that is lost to macular degeneration cannot be restored. However, low vision devices, such as telescopic and microscopic lenses, can be prescribed to maximize existing vision.

Researchers have linked eye-friendly nutrients such as lutein/zeaxanthin, vitamin C, vitamin E, and zinc to reducing the risk of certain eye diseases, including macular degeneration. For more information on the importance of good nutrition and eye health, please see the diet and nutrition section.

## Myopia (Nearsightedness)

Nearsightedness, or myopia, as it is medically termed, is a vision condition in which close objects are seen clearly, but objects farther away appear blurred. Nearsightedness occurs if the eyeball is too long or the cornea, the clear front cover of the eye, has too much curvature. As a result, the light entering the eye isn't focused correctly and distant objects look blurred.

Nearsightedness is a very common vision condition affecting nearly 30 percent of the U.S. population. Some research supports the theory that nearsightedness is hereditary. There is also growing evidence that it is influenced by the visual stress of too much close work.

Generally, nearsightedness first occurs in school-age children. Because the eye continues to grow during childhood, it typically progresses until about age 20. However, nearsightedness may also develop in adults due to visual stress or health conditions such as diabetes.

A common sign of nearsightedness is difficulty with the clarity of distant objects like a movie or TV screen or the chalkboard in school. A comprehensive optometric examination will include testing for nearsightedness. An optometrist can prescribe eyeglasses or contact lenses that correct nearsightedness by bending the visual images that enter the eyes, focusing the images correctly at

the back of the eye. Depending on the amount of nearsightedness, you may only need to wear glasses or contact lenses for certain activities, like watching a movie or driving a car. Or, if you are very nearsighted, they may need to be worn all the time.

Another option for treating nearsightedness is orthokeratology (ortho-k), also known as corneal refractive therapy. It is a non-surgical procedure that involves wearing a series of specially designed rigid contact lenses to gradually reshape the curvature of your cornea. The lenses place pressure on the cornea to flatten it. This changes how light entering the eye is focused.

Laser procedures are also a possible treatment for nearsightedness in adults. They involve reshaping the cornea by removing a small amount of eye tissue. This is accomplished by using a highly focused laser beam on the surface of the eye.

For people with higher levels of nearsightedness, other refractive surgery procedures are now available. These procedures involve implanting a small lens with the desired optical correction directly inside the eye, either just in front of the natural lens (phakic intraocular lens implant) or replacing the natural lens (clear lens extraction with intraocular lens implantation). These procedures are similar to one used for cataract surgery patients, who also have lenses implanted in their eyes (intraocular lens implants).

## What causes nearsightedness?

If one or both parents are nearsighted, there is an increased chance their children will be nearsighted.

The exact cause of nearsightedness is unknown, but two factors may be primarily responsible for its development:

- heredity
- visual stress

There is significant evidence that many people inherit nearsightedness, or at least the tendency to develop nearsightedness. If one or both parents are nearsighted, there is an increased chance their children will be nearsighted.

Even though the tendency to develop nearsightedness may be inherited, its actual development may be affected by how a person uses his or her eyes. Individuals who spend considerable time reading, working at a computer, or doing other intense close visual work may be more likely to develop nearsightedness.

Nearsightedness may also occur due to environmental factors or other health problems:

- Some people may experience blurred distance vision only at night. This “night myopia” may be due to the low level of light making it difficult for the eyes to focus properly or the increased pupil size during dark conditions, allowing more peripheral, unfocused light rays to enter the eye.
- People who do an excessive amount of near vision work may experience false or “pseudo” myopia. Their blurred distance vision is caused by over use of the eyes’ focusing mechanism. After long periods of near work, their eyes are unable to refocus to see clearly in the distance. The symptoms are usually temporary and clear distance vision may return after resting the eyes. However, over time constant visual stress may lead to a permanent reduction in distance vision.
- Symptoms of nearsightedness may also be a sign of variations in blood sugar levels in persons with diabetes or an early indication of a developing cataract.

An optometrist can evaluate vision and determine the cause of the vision problems.

## How is nearsightedness diagnosed?

Testing for nearsightedness may use several procedures in order to measure how the eyes focus light and to determine the power of any optical lenses needed to correct the reduced vision.

As part of the testing, letters on a **distance chart** are identified. This test measures **visual acuity**, which is written as a fraction such as 20/40. The top number of the fraction is the standard distance at which testing is performed, twenty feet. The bottom number is the smallest letter size read. A person with 20/40 visual acuity would have to get within 20 feet to identify a letter that could be seen clearly at forty feet in a “normal” eye. Normal distance visual acuity is 20/20, although many people have 20/15 (better) vision.

Using an instrument called a **phoropter**, an optometrist places a series of lenses in front of your eyes and measures how they focus light using a hand held lighted instrument called a **retinoscope**. The doctor may choose to use an automated instrument that automatically evaluates the focusing power of the eye. The power is then refined by patient’s responses to determine the lenses that allow the clearest vision.

This testing may be done without the use of eye drops to determine how the eyes respond under normal seeing conditions. In some cases, such as for patients who can’t respond verbally, or when some of the eye’s focusing power may be hidden, eye drops may be used. They temporarily keep the eyes from changing focus while testing is performed.

Using the information obtained from these tests, along with the results of other tests of eye focusing and eye teaming, your optometrist can determine if you have nearsightedness. He or she will also

determine the power of any lens correction needed to provide clear vision. Once testing is complete, your optometrist can discuss options for treatment.

## How is nearsightedness treated?

Persons with nearsightedness have several options available to regain clear distance vision. They include:

- eyeglasses
- contact lenses
- orthokeratology
- laser and other refractive surgery procedures
- vision therapy for persons with stress-related nearsightedness.

Eyeglasses are the primary choice of correction for persons with nearsightedness. Generally, a single vision lens is prescribed to provide clear vision at all distances. However, for patients over about age 40, or children and adults whose nearsightedness is due to the stress of near vision work, a bifocal or progressive addition lens may be needed. These multifocal lenses provide different powers or strengths throughout the lens to allow for clear vision in the distance and also clear vision up close.

Eyeglasses are frequently used to correct myopia.

A large selection of lens types and frame designs are now available for patients of all ages. Eye glasses are no longer just a medical device that provides needed vision correction, but can also be a fashion statement. They are available in a wide variety of sizes, shapes, colors and materials that not only correct for vision problems but also may enhance appearance.

For some individuals, contact lenses can offer better vision than eyeglasses. They may provide clearer vision and a wider field of view. However, since contact lenses are worn directly on the eyes, they require regular cleaning and care to safeguard eye health.

Orthokeratology (Ortho-K), also known as corneal refractive therapy, involves the fitting of a series of rigid contact lenses to reshape the cornea, the front outer surface of the eye. The contact lenses are worn daily for limited periods, such as overnight, and then removed. Persons with moderate amounts of nearsightedness may be able to temporarily obtain clear vision for most of their daily activities.

Nearsightedness can also be corrected by reshaping the cornea using a laser beam of light. Two commonly used procedures are photorefractive keratectomy (PRK) and laser in situ keratomileusis (LASIK).

In **PRK**, a laser is used to remove a thin layer of tissue from the surface of the cornea in order to change its shape and refocus light entering the eye. There is a limit to how much tissue can safely be removed and therefore the amount of nearsightedness that can be corrected.

**LASIK** does not remove tissue from the surface of the cornea, but from its inner layers. To do this, a section of the outer corneal surface is cut and folded back to expose the inner tissue. Then a laser is used to remove the precise amount of corneal tissue needed to reshape the eye, and then the flap of outer tissue is placed back in position to heal. The amount of nearsightedness that LASIK can correct is limited by the amount of corneal tissue that can be removed in a safe manner.

People who are highly nearsighted or whose corneas are too thin to allow the use of laser procedures now have another option. They may be able to have their nearsightedness surgically corrected by implanting small lenses in their eyes. These intraocular lenses look like small contact lenses and they provide the needed optical correction directly inside the eye.

**Vision therapy** is an option for people whose blurred distance vision is caused by a spasm of the muscles which control eye focusing. Various eye exercises can be used to improve poor eye focusing ability and regain clear distance vision.

People with nearsightedness have a variety of options to correct their vision problem. In consultation with your optometrist, you can select the treatment that best meets your visual and lifestyle needs.

## Nystagmus

Nystagmus is a vision condition in which the eyes make repetitive, uncontrolled movements, often resulting in reduced vision. These involuntary eye movements can occur from side to side, up and down, or in a circular pattern. As a result, both eyes are unable to hold steady on objects being viewed. Nystagmus may be accompanied by unusual head positions and head nodding in an attempt to compensate for the condition.

Nystagmus can be inherited and appear in early childhood or develop later in life due to an accident or illness. Generally, nystagmus is a symptom of some other underlying eye or medical problem. However, the exact cause is often unknown.

Persons with nystagmus may experience reduced visual acuity. They may also have problems with depth perception that can affect their balance and coordination. Nystagmus can be aggravated by fatigue and stress.

Most individuals with nystagmus can reduce the severity of their uncontrolled eye movements and improve vision by positioning their eyes to look to one side. This is called the "null point" where the least amount of nystagmus is evident. To accomplish this they may need to adopt a specific head posture to make the best use of their vision.

The forms of nystagmus include:

- **Congenital** - most often develops by 2 to 3 months of age. The eyes tend to move in a horizontal swinging fashion. It is often associated with other conditions such as albinism, congenital absence of the iris (the colored part of the eye), underdeveloped optic nerves, and congenital cataract.
- **Spasmus nutans** - usually occurs between 6 months and 3 years of age and resolves spontaneously between 2 and 8 years of age. Children with this form of nystagmus often display head nodding and a head tilt. Their eyes may move in any direction. This type of nystagmus usually does not require treatment.
- **Acquired** - develops later in childhood or adulthood. The cause is often unknown, but it may be due to central nervous system and metabolic disorders or alcohol and drug toxicity.
- Nystagmus can be further classified by the type of motion the eyes make:
  - **Pendular nystagmus** - the speed of movement of the eyes is the same in both directions.
  - **Jerk nystagmus** - the eyes move slowly in one direction and then quickly "jerk" back in the other direction.

## What causes nystagmus?

Nystagmus results from the instability or impairment of the system responsible for controlling eye movements. When nystagmus develops in early childhood, it can be caused by a problem with the visual pathway from the eye to the brain. Often the child has no other eye or medical problem. Acquired nystagmus, which occurs later in life, can be the symptom of another condition such as stroke, multiple sclerosis or a blow to the head.

Other causes of nystagmus include:

- Lack of development of normal eye movement control early in life
- Albinism
- Very high refractive error, e.g. nearsightedness (myopia) or astigmatism
- Congenital cataracts
- Inflammation of the inner ear
- Medications such as anti-epilepsy drugs

- Central nervous system diseases

## How is nystagmus diagnosed?

Nystagmus can be diagnosed through a comprehensive eye exam. Testing for nystagmus, with special emphasis on how the eyes move, may include:

- **Patient history** to determine any symptoms the patient is experiencing and the presence of any general health problems, medications taken, or environmental factors that may be contributing to the symptoms.
- **Visual acuity measurements** to assess the extent to which vision may be affected.
- **A refraction** to determine the appropriate lens power needed to compensate for any refractive error (nearsightedness, farsightedness, or astigmatism).
- **Testing how the eyes focus, move and work together.** In order to obtain a clear, single image of what is being viewed, the eyes must effectively change focus, move and work in unison. This testing will look for problems that affect the control of eye movements or make it difficult to use both eyes together.

Since nystagmus is often the result of other underlying health problems, your optometrist may refer you to your primary care physician or other medical specialist for further testing.

Using the information obtained from testing, your optometrist can determine if you have nystagmus and advise you on treatment options.

## How is nystagmus treated?

Nystagmus cannot be cured. While eyeglasses and contact lenses do not correct nystagmus, they can help to correct other vision problems such as nearsightedness, farsightedness or astigmatism.

Some types of nystagmus improve throughout childhood. In addition, vision may be enhanced with prisms and special glasses. The use of large-print books, magnifying devices and increased lighting can also be helpful.

Rarely, surgery is performed to alter the position of the muscles, which move the eyes. While it does not cure nystagmus, it may reduce the amount of head turn needed for best vision.

Treatment for other underlying eye or medical problems may help to improve or reduce nystagmus.

## Ocular Hypertension

**Ocular hypertension** is an increase in the pressure in your eyes that is above the range considered normal with no detectable changes in vision or damage to the structure of your eyes. The term is used to distinguish people with elevated pressure from those with glaucoma, a serious eye disease that causes damage to the optic nerve and vision loss.

Ocular hypertension can occur in people of all ages, but it occurs more frequently in African Americans, those over age 40 and those with family histories of ocular hypertension and/or glaucoma. It is also more common in those who are very nearsighted or who have diabetes.

Ocular hypertension has no noticeable signs or symptoms. Your doctor of optometry can check the pressure in your eyes with an instrument called a tonometer and can examine the inner structures of your eyes to assess your overall eye health.

Not all people with ocular hypertension will develop glaucoma. However, there is an increased risk of glaucoma among those with ocular hypertension, so regular comprehensive optometric examinations are essential to your overall eye health.

There is no cure for ocular hypertension, however, careful monitoring and treatment, when indicated, can decrease the risk of damage to your eyes.

## Presbyopia

**Presbyopia** is a vision condition in which the crystalline lens of your eye loses its flexibility, which makes it difficult for you to focus on close objects.

Presbyopia may seem to occur suddenly, but the actual loss of flexibility takes place over a number of years. Presbyopia usually becomes noticeable in the early to mid-40s. Presbyopia is a natural part of the aging process of the eye. It is not a disease, and it cannot be prevented.

Some signs of presbyopia include the tendency to hold reading materials at arm's length, blurred vision at normal reading distance and eye fatigue along with headaches when doing close work. A comprehensive optometric examination will include testing for presbyopia.

To help you compensate for presbyopia, your optometrist can prescribe reading glasses, bifocals, trifocals or contact lenses. Because presbyopia can complicate other common vision conditions like nearsightedness, farsightedness and astigmatism, your optometrist will determine the specific lenses to allow you to see clearly and comfortably. You may only need to wear your glasses for close work like reading, but you may find that wearing them all the time is more convenient and beneficial for your vision needs.

Because the effects of presbyopia continue to change the ability of the crystalline lens to focus properly, periodic changes in your eyewear may be necessary to maintain clear and comfortable vision.

## Retinal Detachment

Retinal detachment is a condition where the light sensitive back surface of the eye tears away from the inside of the eye. The retina is a thin coating of tissue on the inner walls of the eye, and is the tissue in the eye that contains photoreceptors and is responsible for vision.

Retinal detachments are most likely to occur in cases of trauma and when the vitreous gel (the gel that fills the inside of the eye) deteriorates or detaches.

Retinal detachments can be mild in severity, such as a small tear or holes, but can also progress to more serious detachments. If a tear, hole, or other injury allows fluid to get under the retina, the entire retina can peel away from the inner walls of the eye, causing irreversible blindness. This process is much like wallpaper which loosens and peels away from the wall.

Because of the serious nature of retinal detachments and the potential for irreversible blindness, diagnosis and treatment is required immediately. Typically the longer a retinal detachment goes untreated, the greater the loss of vision. In addition, the length of time the retina is detached is directly related to the amount of vision which can be restored with treatment.

There are specific warning signs which are related to retinal detachment. These are:

1. you see a sudden increase in the number of floaters in your vision.
2. you see flashes of light in your side vision which you cannot explain.
3. you notice a shadow, veil or curtain coming over or across your side vision (this could be in any direction).
4. you notice that lines which should look straight (such as a door frame or street curb) look bent or wavy.
5. you notice that your central vision is blurry, and it cannot be improved in any way (either by moving closer, moving farther away, cleaning your glasses, rubbing your eyes, etc.).

Most retinal detachments will require surgery within 24 hours, but small holes or tears without symptoms are usually followed closely by taking photos and monitoring with eye exams at regular intervals. With prompt diagnosis and treatment, the long term prognosis is good, but delayed treatment can often result in severe and permanent vision loss.

## **Retinitis Pigmentosa**

**Retinitis pigmentosa (RP)** is a group of inherited diseases that damage the light-sensitive rods and cones located in the retina, the back part of our eyes. Rods, which provide side (peripheral) and night vision are affected more than the cones that provide color and clear central vision.

Signs of RP usually appear during childhood or adolescence. The first sign is often night blindness followed by a slow loss of side vision. Over the years, the disease will cause further loss of side vision. As the disease develops, people with RP may often bump into chairs and other objects as side vision worsens and they only see in one direction - straight ahead. They see as if they are in a tunnel (thus the term tunnel vision).

Fortunately, most cases of retinitis pigmentosa take a long time to develop and vision loss is gradual. It may take many years for loss of vision to be severe.

Currently, there is no cure for RP, but there is research that indicates that vitamin A and lutein may slow the rate at which the disease progresses. Your doctor of optometry can give you more specific information on nutritional supplements that may help you.

Also, there are many new low vision aids, including telescopic and magnifying lenses, night vision scopes as well as other adaptive devices, that are available that help people maximize the vision that they have remaining. An optometrist, experienced in low vision rehabilitation, can provide these devices as well as advice about other training and assistance to help people remain independent and productive.

Because it is an inherited disease, research into genetics may one day provide prevention or cure for those who have RP.

## **Retinoblastoma**

Every parent dreads to hear the word "cancer," but cancer has a high prevalence in the United States. Early detection of cancer can greatly reduce the severity of the illness and increase life expectancy.

Optometrists diagnose, refer, and manage cancers that involve the eye area. The most common cancer involving the eye in young children is retinoblastoma. In the United States, this fast-growing cancer occurs in 1 in every 20,000 children, making it the tenth most common pediatric cancer.

There are 2 forms of retinoblastoma—hereditary and sporadic. Although sporadic retinoblastoma occurs more frequently, families with a history of hereditary retinoblastoma should be assessed.

Adapted from Hoppe E, Frankel R. Optometrists as key providers in the prevention and early detection of malignancies. *Optometry* (2006) 77, 397-404

## Subconjunctival Hemorrhage

A subconjunctival hemorrhage is the accumulation of blood underneath the conjunctiva, the clear membrane covering the white part of the eye. The hemorrhage usually looks as though it is a bright red spot on the white of the eye. The hemorrhage can range from very small to quite large. They are spontaneous in nature, and often happen without a patient even knowing. It is usually only noticed by the patient after someone else points it out.

### What causes them?

A subconjunctival hemorrhage stems from a broken blood vessel beneath the thin, clear layers of the “whites” of the eye. It is common for the broken vessel to be caused from exertion or straining-- often times from lifting heavy objects, coughing, vomiting, or constipation. If a person has recently taken any medication containing aspirin, or are taking blood thinners, a hemorrhage is more likely to occur.

We recommend a patient mention the subconjunctival hemorrhage to their primary care provider. They may recommend blood testing if they are concerned about any conditions affecting blood, blood clotting, etc.

It is more common that there is no certain medical cause. A subconjunctival hemorrhage will resolve in 7-10 days. Occasionally a mild discomfort can be felt due to the increase in fluid within the layers of the tissues that can be relieved with the use of artificial tears.

If you suspect you have a subconjunctival hemorrhage please call our office and schedule an appointment. We want to make sure there are no other concerns regarding your eye health.

## Anterior Uveitis

**Anterior uveitis** is an inflammation of the middle layer of the eye, which includes the iris (colored part of the eye) and adjacent tissue, known as the ciliary body. If untreated, it can cause permanent

damage and loss of vision from the development of glaucoma, cataract or retinal edema. It usually responds well to treatment; however, there may be a tendency for the condition to recur. Treatment usually includes prescription eye drops, which dilate the pupils, in combination with anti-inflammatory drugs. Treatment usually takes several days, or up to several weeks, in some cases.

Anterior uveitis can occur as a result of trauma to the eye, such as a blow or foreign body penetrating the eye. It can also be a complication of other eye disease, or it may be associated with general health problems such as rheumatoid arthritis, rubella and mumps. In most cases, there is no obvious underlying cause.

Signs/symptoms may include a red, sore and inflamed eye, blurring of vision, sensitivity to light and a small pupil. Because the symptoms of anterior uveitis are similar to those of other eye diseases, your optometrist will carefully examine the inside of your eye, under bright light and high magnification, to determine the presence and severity of the condition. Your optometrist may also perform or arrange for other diagnostic tests to help pinpoint the cause.