X-Plain
Retinal Tear and Detachment
Reference Summary

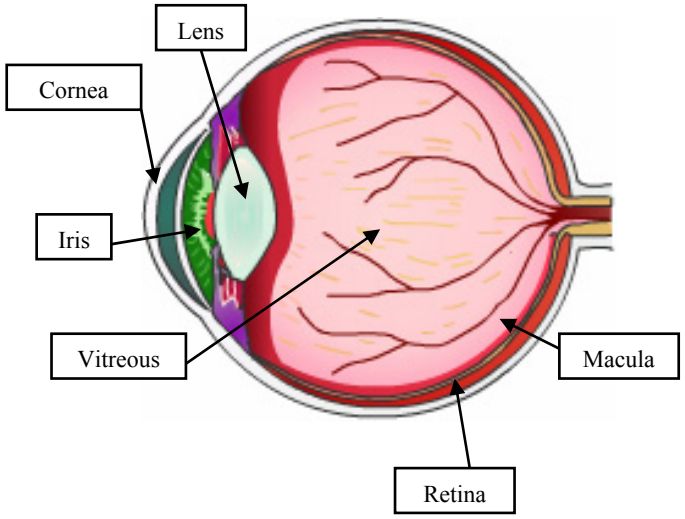
Introduction

The retina is the layer of tissue in the back of the eye that is responsible for vision. It is attached to the choroid tissue, which supplies the retina with blood. Retinal detachment is a disease where the retina separates from the choroid after a retinal tear develops.

Retinal detachment is a serious eye condition. If it is not treated, it can lead to blindness. Each year, 30,000 people in the United States are diagnosed with retinal detachment.

There are clear warning signs that a person is developing a retinal tear or detachment. When diagnosed early, most retinal problems are treatable. With treatment, retinal problems usually do not affect vision very much.

This reference summary explains what retinal tears and detachments are. It discusses their symptoms, causes, diagnosis and treatment options.



Anatomy

It is important to recognize the parts of the eye before learning about retinal tears and detachments. This section reviews the anatomy of the eye.

Light hits the cornea of the eye first. The cornea is the transparent covering on the front of the eye.

Next, light travels to the back part of the eye through the pupil. The pupil is the opening in the center of the iris, the colored part of the eye.

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The iris controls the amount of light that enters the eye by changing the size of the pupil.

As light passes through the pupil, it enters a clear lens that focuses the light onto the back of the eye. The lens acts like the lens of a camera.

After passing through the lens, focused light continues through a clear gel called "vitreous." The light moves towards the back of the eye where the retina is located.

The retina changes light into electric signals. The signals are sent through the optic nerve to the brain. The brain translates the signals into the images we see.

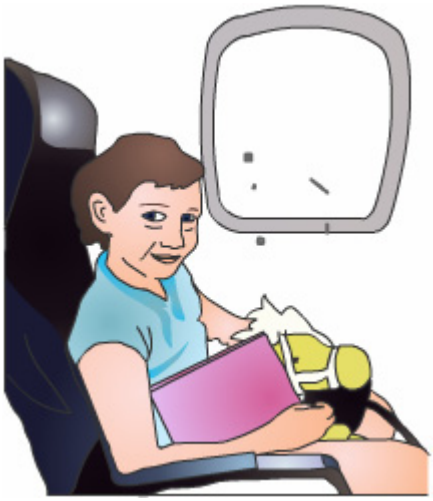
The middle part of the retina is called the "macula". The macula makes it possible for us to see things in front of us clearly.

The rest of the retina is called the periphery. It allows us to see things on either side of us. This type of vision is called peripheral vision or side vision.

Like other parts of the body, the retina needs blood to function. The retinal arteries supply the surface of the retina.

Symptoms

Retinal tears and detachments are painless. Seeing floaters or flashes is a warning sign that a person may have retinal tears.



Floaters are small, moving spots or specks that people see in their field of vision. Not all floaters are signs of retinal tears and detachment. About 7 out of 10 people experience floaters at some point during their lives.

Floaters may appear as dots, circles, lines, clouds, cobwebs, or other shapes. They usually look gray or white and are somewhat see-through. They may move or remain in one place.

About 70% of people have floaters. It is easiest to see floaters when looking at a plain background, like a blank wall or blue sky. Close one of your eyes and look at the

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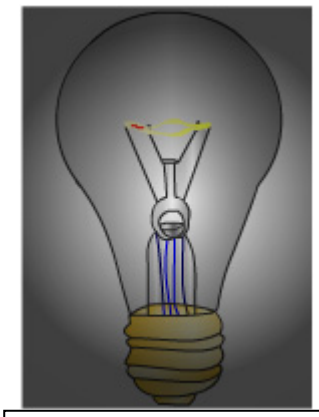
white space of the screen with the other eye. Do you see a dot or a shape moving? This is a floater!

Flashes of light, called flashes sometimes appear with floaters. Flashes may look like flashing strobe lights, arcs of light, or lightning streaks, even though no light is actually flashing. Flashes are similar to the sensation of "seeing stars" when a person is hit on the head.

Floaters and flashes are very common and are not usually a sign of a dangerous medical condition, especially if they have developed gradually and have not changed much over months or years. However, if floaters and flashes begin suddenly, it may indicate a more serious eye problem, such as a retinal tear or retinal detachment that needs prompt evaluation and treatment.



Shadow or curtain in vision

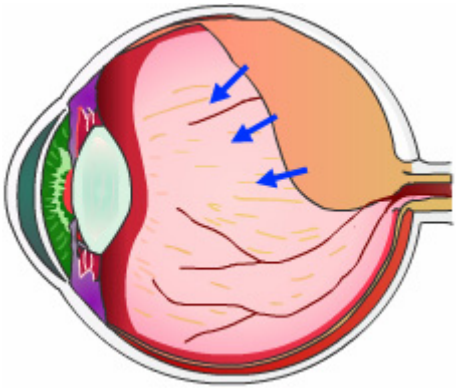
The signs of retinal tears and detachment also include:

- Reduction of vision
- A shadow or curtain in the peripheral vision. Typically the shadow will move toward the center of vision over hours, days or weeks.

If a floater appears all of a sudden or if there is a rapid increase in the number of floaters, you should see an eye doctor immediately. You may have a serious eye problem.

Causes

When we age, the vitreous gel thickens and starts to shrink. This causes it to pull away from the retina. The detachment is called posterior vitreous detachment or PVD. Debris from the detachment site drifts into the vitreous and becomes floaters.



Focused light travels through the vitreous gel to reach the retina. If an object is between the light and the retina, the object's shadow reflects on the retina. Therefore, floaters are shadows caused by debris suspended in the gel.

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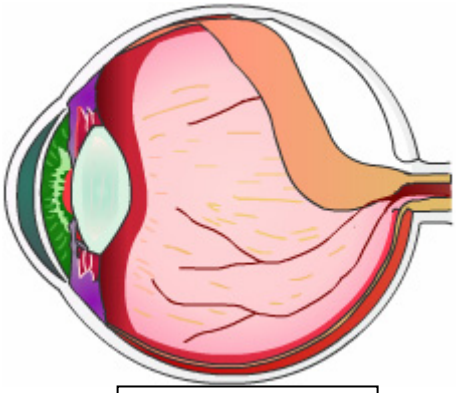
Flashes are caused when the vitreous pulls on the retina. The retina does not feel pain. When stimulated, it makes images. When the vitreous pulls on the retina it excites the retina and produces images.

When a person sees an increased number of floaters and flashing lights, it is often a sign of PVD.

In most cases the vitreous will separate cleanly from the retina and will not cause any further problems. The flashes gradually fade away, and then disappear altogether. Floaters caused by PVD may continue, but become less noticeable within two to three months.

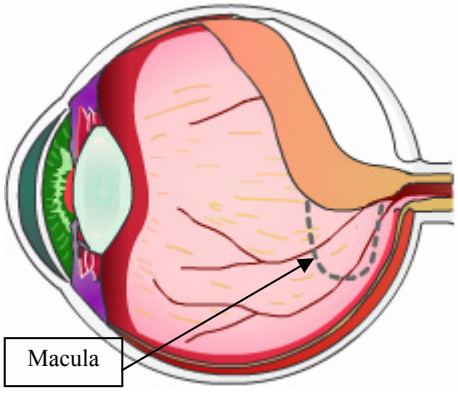

Retinal Detachment

If the vitreous is strongly attached to the retina or if the retina is weak in a certain area, a retinal tear can occur as the vitreous separates from it.

Once a retinal tear develops, there is a large chance that the liquefied vitreous will go through the tear, causing the retina to detach. This is known as retinal detachment. If the retina detaches from the back of the eye, partial or total loss of vision may occur.

Complications

When the retina detaches, it separates from the choroids, the tissue underneath that nourishes and supports it. Retinal cells become weak and start to die if they do not have nourishment and support.



As retinal detachment gets worse, the retina begins to detach from the macula, or the center of vision. This causes macular cells to not work correctly. When macular cells do not work right, a person's vision becomes poor.

If the macula completely detaches, the retinal cells start wasting away. The cells keep getting weaker and weaker the longer the macula is detached. This can eventually cause a person to go blind.

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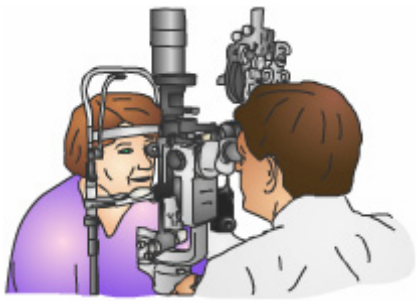
With treatment, some of the weak cells from retinal detachment will heal and get stronger. However, some of them will remain weak and will never heal. So it is best if retinal detachment is diagnosed and treated before the macula becomes detached. Once it detaches, permanent damage is done.

Even if the macula is detached, it is still important to repair the detachment. This helps prevent total blindness and restore some lost vision. You should get your eyes checked by an ophthalmologist RIGHT AWAY if you notice floaters, flashes or poor vision. This will give you the best chance of finding and treating retinal detachment before it affects the macula.

Diagnosis

Patients who have floaters, flashes or decreased vision visit their ophthalmologist to determine the cause. An ophthalmologist is a medical doctor who specializes in diseases and surgery of the eyes.



The ophthalmologist examines your eyes to determine if your floaters and flashes are due to a tear in the retina or other eye problems. The doctor will ask you to describe any floaters and flashes you may be having. The doctor will then examine your eyes to check for retinal damage. The doctor will not be able to see your floaters unless they are very large.

Without eye drops, the doctor can see a small portion of your retina through the pupil. After dilating or widening your pupil with eye drops, the doctor will be able to see your entire retina with an ophthalmoscope. Dilation is a very safe procedure done using eye drops. Most people only experience blurry vision, difficulty reading up close, and a sensitivity to light for a few hours after the exam. These side effects of the dilating drops may last longer in people with blue or green eyes than in people with brown eyes.

You may not be able to do close work that requires eye coordination, such as reading or sewing, for a few hours after the exam. Very rarely, dilation can bring on a type of glaucoma called narrow angle glaucoma, or NAG.

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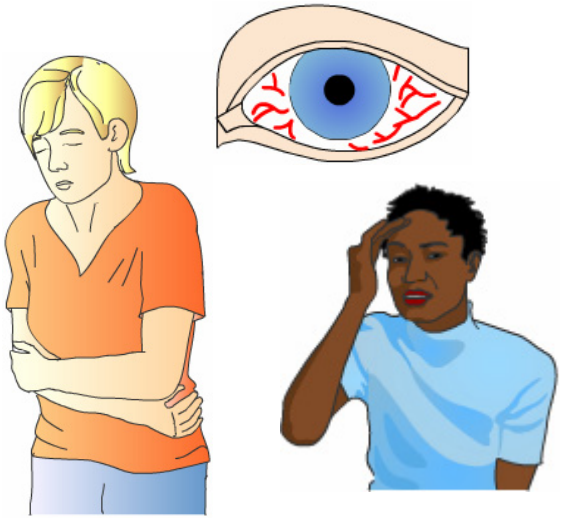
People with NAG have less than the normal amount of space between the cornea, the clear part of the eye, and the iris, the blue, green, or brown part of the eye. If a person develops NAG after dilation, they would have eventually developed it anyway. Sometimes dilation just brings it on sooner.



The symptoms of NAG include:

- Eye pain
- Eye redness
- Blurred vision
- Headache
- Nausea
- Vomiting

If NAG is present, these symptoms will show up within a few hours of dilation. If NAG does not occur within 24 hours of dilation, it is not going to. If you have any of these symptoms after dilation, you should see your ophthalmologist immediately. NAG is treatable if taken care of right away.

During your exam, the doctor will ask you to look in different directions. Make sure to follow his or her instructions. The doctor will push gently on your eyes with a cotton swab or a blunt metal instrument called a scleral depressor.

Pushing on the eye, called scleral depression, lets the doctor see areas of the retina that he or she cannot see any other way. It is necessary for a thorough retinal examination. Scleral depression may be a little bit uncomfortable. Your doctor may use anesthetic eye drops to make you more comfortable.

The doctor will use a very bright light to examine your retina. You will notice that everything looks dark purple for a minute or so after your eyes are examined. The dark purple will gradually fade to pink. This purple/pink sensation occurs because the light used to look at your eyes stimulates all of the retinal cells at once. They need time to recover. The light is not harmful and things should look normal after 10 minutes or less. If the sensation lasts longer, tell your doctor.

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Your doctor may do additional eye tests, such as a vision test, eye pressure test or eye ultrasound to diagnose the cause of your symptoms.

If the doctor finds no retinal tears at the first exam, it is important to be re-examined in 1 to 2 weeks or sooner if new symptoms develop. The vitreous can continue to separate and pull on the retina for several weeks or longer. The retina could develop a tear during that time.

Unfortunately, a retinal tear sometimes leads to detachment immediately. However, there may not be any symptoms of a PVD, retinal tear or detachment. Many people will have a retinal detachment when first examined that almost always requires some sort of surgery.

Treatment

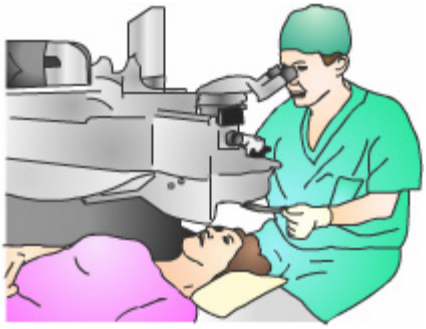
If a retinal tear is discovered before a detachment occurs, treatment can prevent the retina from detaching. A retinal tear or break is usually treated with a laser.

Some retinal tears do not need treatment. However, if a retinal tear is discovered because of new symptoms of a PVD or there are other high risk factors, treatment may be recommended. High risk factors include family history, very near-sightedness, retinal detachment in the other eye, history of eye trauma and prior cataract surgery.

Laser and cryoprobe treatments for retinal tears are very successful. Retinal detachment can usually be avoided if retinal tears are found and treated.

The laser creates burns around the tear, which eventually scar and seal the retina to the tissue underneath. This prevents vitreous fluid from seeping through the tear and causing detachment.

Rarely, the laser cannot be used so a retinal cryoprobe is used to treat a tear. The cryoprobe freezes the tissue around a tear, which scars like the laser burns. These scars also seal the retina to the tissue underneath.



Even if a tear is discovered and treated, follow-up examination is important. This allows the doctor to make sure the treatment is working and that no more tears have developed.

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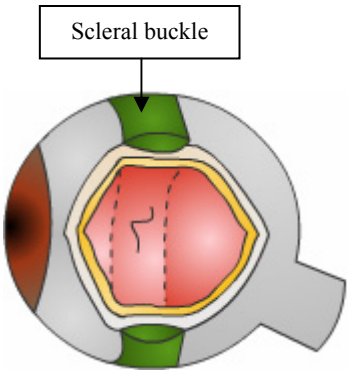
Once a retinal detachment occurs, it is almost always too late for laser or cryoprobe treatment. This is why it is so important to be examined immediately if you have symptoms of a PVD.

If a detachment has developed that is too big for laser or cryo treatment, several treatment options are available to prevent vision loss and possibly restore vision. These treatments include:

- Pneumatic retinopexy: injection of a gas bubble in the eye
- Scleral buckle: surgery to place a band around the eye
- Vitrectomy: surgery to remove the vitreous gel

Scleral buckle prevents any retinal tears from spreading. Cryo treatment may be used on tears that are supported with a scleral buckle. The buckle is usually a piece of silicone sponge or solid silicone. The type and shape of buckle depends on how many retinal tears there are and where they are located.

The buckle is sewn to the outer wall of the eyeball, or the sclera. This creates an indentation, or buckle effect, inside the eye. The buckle pushes on the retinal tear, closing it up. After the tear is closed, the fluid under the retina, or subretinal fluid, usually drains away in 1 to 2 days.



A scleral buckle procedure is usually done with general anesthesia as outpatient surgery. After the procedure, the person can resume most activities within several days, except for anything that jerks the head.

Vitrectomy is the removal of vitreous gel. It is also called a trans pars plana vitrectomy (TPPV). The doctor makes small incisions in the wall of the eye. Then small instruments are inserted into the vitreous cavity, the middle of the eyeball, through the incisions.

The first part of a vitrectomy is removing the vitreous using a vitreous cutter. Then, depending on the type and cause of the detachment, other instruments and techniques are used to reattach the retina. If you need a vitrectomy, your doctor can explain which instruments and techniques will be used for you.

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A TPPV is usually done as outpatient surgery with general anesthesia. It is sometimes important to maintain a specific head position after TPPV to keep the retina attached.

Pneumatic retinopexy involves injecting a gas bubble into the middle part of the eye, or vitreous cavity. It is critical to position the patient so that the gas bubble covers the retinal tear. If the bubble covers the tear, the subretinal fluid usually drains away in 1 to 2 days.

The retinal tear is either cryo treated before the bubble is injected or laser treated after the retina has flattened.

The main advantages of pneumatic retinopexy are

- It can be done in the office, thus avoiding hospitalization.
- It avoids some of the complications of scleral buckling surgery, although there are still possible complications

The main disadvantages of pneumatic retinopexy are

- The requirement for precise head positioning for 7 to 10 days after the procedure
- A slightly lower initial success rate as compared to a scleral buckle

Fortunately, more than 90% of retinal detachments can be repaired with 1 of these 3 procedures. Depending on the size, location, and complexity of the retinal detachment, the surgeon may recommend more than 1 procedure.

Prognosis

Laser or cryoprobe treatment for retinal tears is very successful. Retinal detachment is usually avoided if retinal tears are found and treated.

About 90% of detachments caused by PVD are repaired with one or both of these procedures.

Visual results mostly depend on the health of the retina before it detached. If the macula is not detached, vision can usually be restored back to the way it was before the tear/detachment after a successful repair.

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If the macula is detached, there may be permanent central vision loss even if the retina is successfully repaired. Vision loss is more likely the longer the macula is detached.

If the macula is detached for more than 4 or 5 days, there will be major central vision loss after surgical reattachment.

Conclusion

The retina is the layer of tissue in the back of the eye that is responsible for vision. It is attached to the choroid tissue, which supplies the retina with some blood. Retinal detachment is a disease where the retina separates from the choroid.

Retinal detachment is a serious eye condition. If left untreated, it can lead to blindness.

Most retinal tears result from the vitreous pulling on the retina. The vitreous shrinks as a person grows older. This shrinking causes the vitreous to pull on the retina.

Floaters and flashes are a sign that a person may be developing a retinal tear or a retinal detachment. When diagnosed early, most retinal problems can be treated, and vision can be saved.

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