

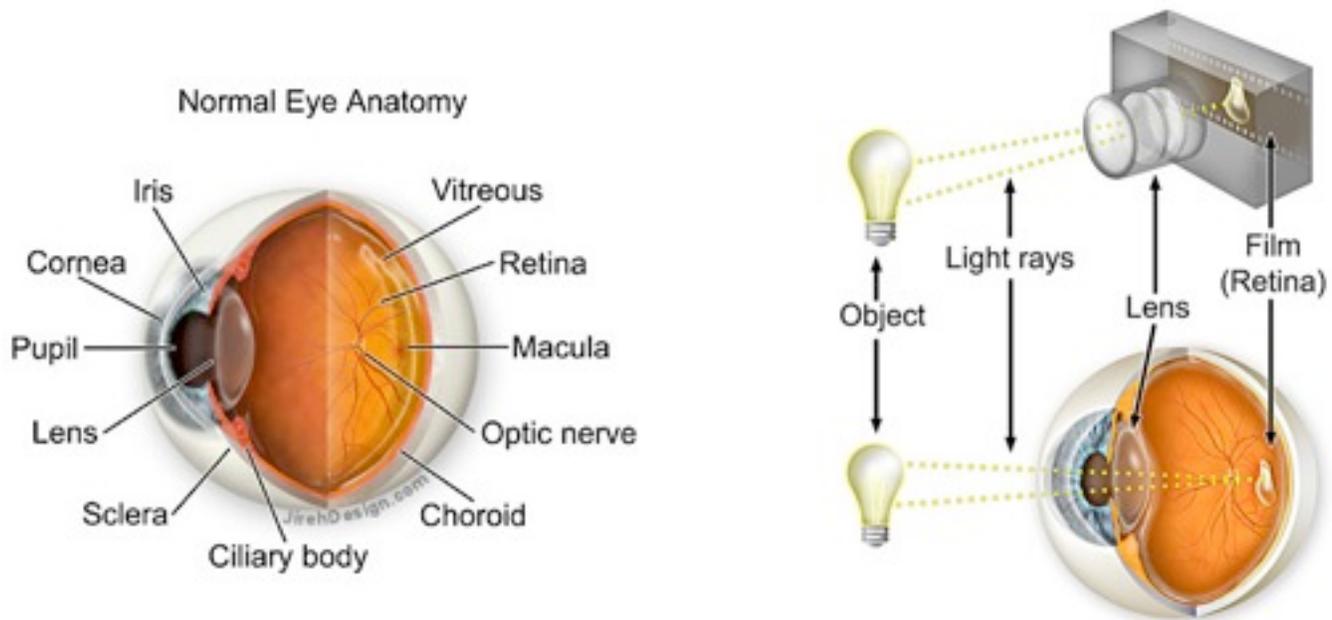
VRS VITREORETINAL SURGEONS

THOMAS G. WARD D.O



REPAIRING YOUR RETINAL DETACHMENT

How the Eye Works



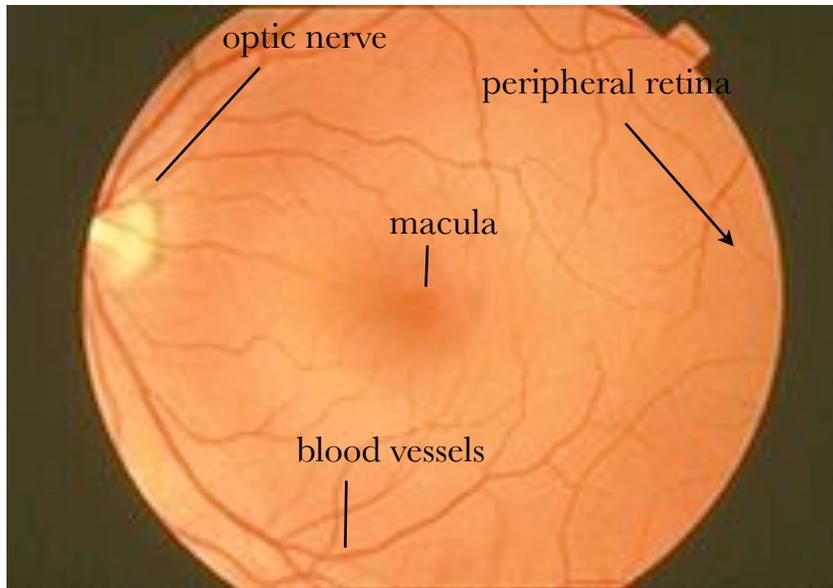
Before we talk about what can go wrong, it is important to understand how the eye works when it is working properly.

The eye is like a camera. When you take a picture, the lens in front of the camera allows light through and focuses that light on the film that covers the back inside wall of the camera. When the light hits the film, a picture is taken.

The eye works in much the same way. The front part of the eye (the **cornea**, **pupil**, and **lens**) are clear and allow light to pass through. The cornea and lens focus that light on the back inside wall of the eye. Light then passes through the jelly-like substance (called the **vitreous**) in the center of the eye. A thin layer of tissue called the **retina** lines the inside back wall of the eye. The retina is like the film in a camera. It is the seeing tissue. When the focused light hits the retina, a picture is taken. This picture is sent to the brain through the optic nerve. This is how we see.

In the diagram, you will note that there is a white covering around the eye. This protective, outer wall is called the **sclera**. In the front part of the eye, the sclera is covered by a thin lining called the **conjunctiva**.

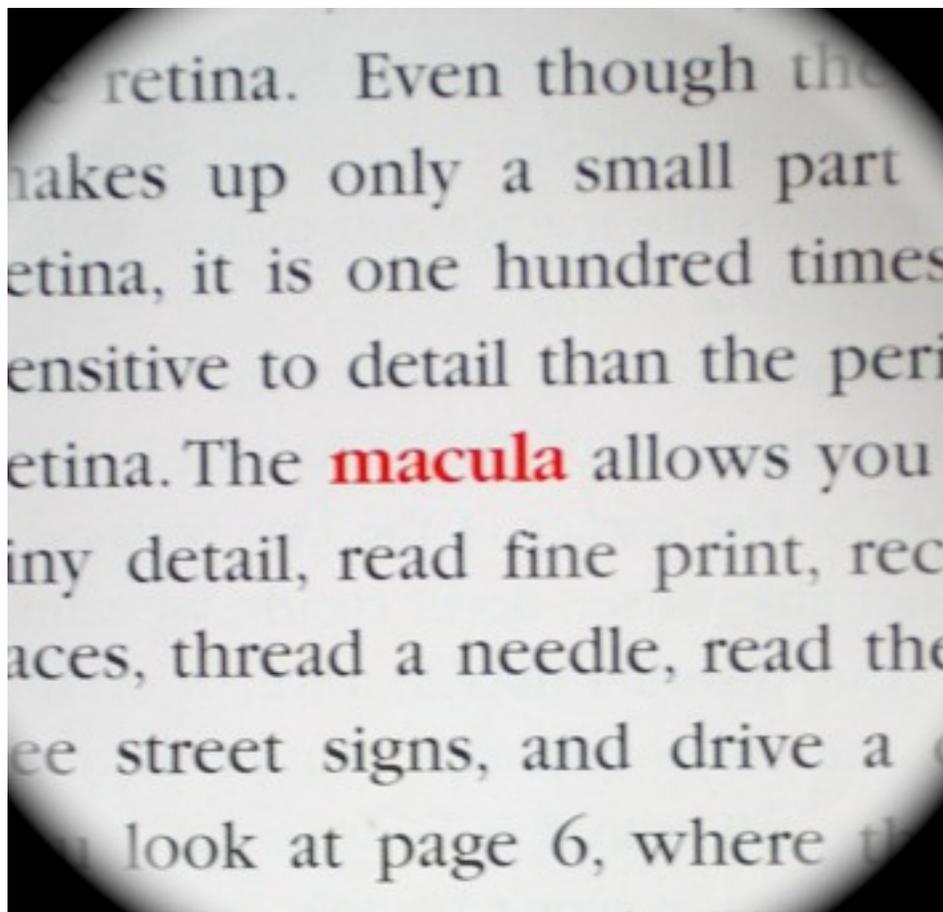
The Retina



The retina has two parts: the **peripheral retina** and the **macula**. If you imagine the retina as a circle with a bull's-eye at the center, the macula is like the bull's-eye. It is very small, but very important.

The large area of the retina that surrounds the macula and makes up 95% of the retina is called the *peripheral retina*. The peripheral retina gives us vision to the side, called “peripheral” vision. It is this part of the retina that is at work when we see something out of the corner of the eye. Because the peripheral retina is not able to see detail clearly, we cannot use our peripheral vision to read, thread a needle, drive, or even recognize a face. If you see someone off to your side, “out of the corner of your eye,” you may be able to tell who it is because you recognize the person’s general shape, but you won’t be able to see the expression on the person’s face.

In order to see fine detail, you must look straight ahead, using the macula, the “bull’s-eye” center of the retina. Even though the macula makes up only a small part of the retina, it is one hundred times more sensitive to detail than the peripheral retina. The macula allows you to see tiny detail, read fine print, recognize faces, thread a needle, read the time, see street signs, and drive a car.



If you look at the figure on page 5, where the word “**macula**” is seen in bold red letters, and look directly at that word, you are looking at it with your macula.

If you keep your eye fixed on the word “**macula**,” you are aware of other words on the page because of your peripheral vision, but you won’t be able to read any of the other words well. If you can read them clearly, it is because you moved your eye and are looking at those words instead of at the word “**macula**.”

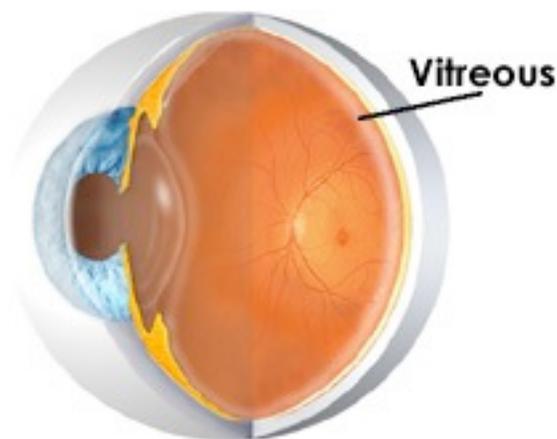
If you look at the figure on page 4, you will note that there are dark, red, curving, and branching lines of the retina. These are the blood vessels in the retina. The blood vessels bring oxygen and nutrition to the retina. In order for the peripheral retina and macula to work properly, the blood vessels must be normal.

The Vitreous

Most serious retinal problems that require surgery are caused by changes in the vitreous. The vitreous is much like the clear “white” of an egg and it fills the central cavity of the eye. The vitreous is attached to the retina. It is most strongly attached to the front part of the retina in an area called the **vitreous base**. It is also attached in the back part of the eye to the optic nerve and the macula.

Posterior Vitreous Detachment (PVD)

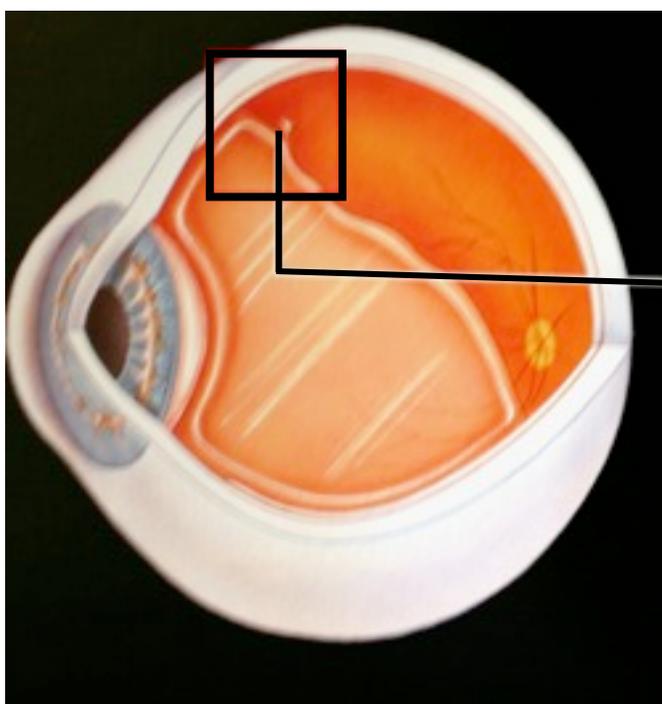
As a person ages, the thick vitreous gel degenerates and becomes less like a gel and more like a fluid. Small pockets of fluid form within the vitreous gel. As the eyeball moves, the liquefied vitreous also moves and shifts around inside the vitreous cavity. This movement causes the vitreous to pull on the retina. With time, the vitreous can pull free and separate from the retina and optic nerve in the back (or posterior) part of the eye. This is called a **posterior vitreous detachment** (PVD). A PVD happens eventually in each eye of most people and only infrequently causes a problem. A PVD can cause “floaters” which are floating spots, circles, or threads in the vision.



Flashes and Floaters

When a person develops a posterior vitreous detachment, **flashes** of light or spots in the vision may be seen. The flashes of light are caused by the tugging of the vitreous where it is attached to the retina. As the vitreous pulls on the retina, the brain interprets this pulling as flashes of light. As the vitreous gel liquefies and pulls away from the retina, it becomes somewhat condensed and stringy and forms strands. The patient can see these moving (floating) strands and strings as spots, small circles, or irregular fine threads in the vision. They seem to float and are therefore called **floaters**. Symptoms of floaters usually diminish over time.

Vitreous changes occur with aging, but they can also be caused by blood in the vitreous, inflammation in the eye, nearsightedness, diabetes hereditary problems, trauma, cataract surgery, or other factors. If a patient has floaters, he or she should be examined to be sure there are no other serious retinal problems, such as a retinal tear or retinal detachment. If there are no problems, the patient can feel reassured, and will almost always learn to ignore the floaters.



**LIQUID VITREOUS
TUGS ON RETINA AND
CAUSES FLASHES**

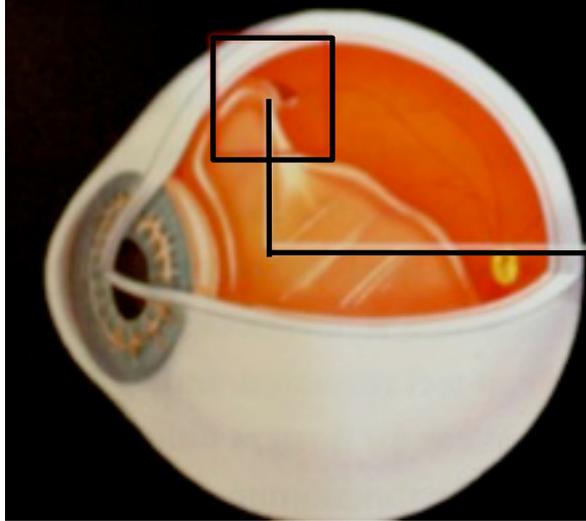
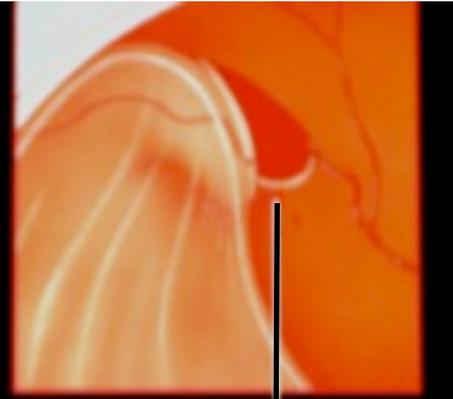
Retinal Tear and Vitreous Hemorrhage

There are areas where the vitreous is very strongly attached to the retina, such as the peripheral retina. If the vitreous pulls hard enough on the retina, especially in an area where the retina is weak, the retina may tear. Imagine a piece of adhesive tape attached to tissue paper. If you try to pull the tape off the tissue paper, you will tear the paper. A tear of the retina occurs very much the same way. If the vitreous is firmly attached, as it pulls, it can tear the retina. If the retina tears across a retinal blood vessel, blood will enter the vitreous. This is called a **vitreous hemorrhage**.

When there is only a small amount of blood, red blood cells floating and moving in the vitreous create the sensation of walking through a swarm of bees. When a larger vessel is torn, more blood enters the vitreous and it may look like a spider web or a swirling mass of dark or red lines. A small amount of blood in the vitreous is like a drop or two of food coloring in a glass of water; a small amount will make the water murky. Similarly, a small amount of blood in the vitreous can blur vision. If there is a great deal of bleeding into the vitreous, vision may be reduced significantly, or even become very dark. If a vitreous hemorrhage also occurs, it can make the retinal detachment more difficult to fix.

The retina can tear immediately following a posterior vitreous detachment (PVD), or weeks to months later. If no tear has developed within about three to four months after a PVD, it is unlikely that the retina will tear later.

**AS WE AGE VITREOUS
TURNS FROM A GEL
INTO A LIQUID**



**VITREOUS GEL
PULLS ON
RETINA
AND TEARS**

Any patient who experiences sudden or new floaters, or flashing lights of any kind, should have a complete retinal examination immediately. These symptoms may be an indication that a retinal tear has occurred. When a retinal tear occurs, it is a potentially serious problem that can lead to a retinal detachment. Since retinal detachments usually begin in the peripheral retina, testing your peripheral vision is frequently recommended to be sure to detect possibly changes quickly.

Patients with a recent PVD should be re-examined within six to twelve weeks, because new retinal tears may develop with no, or only few, new symptoms. If new, or more sever symptoms occur, you should call your doctor promptly.

Treatment of Retinal Tear

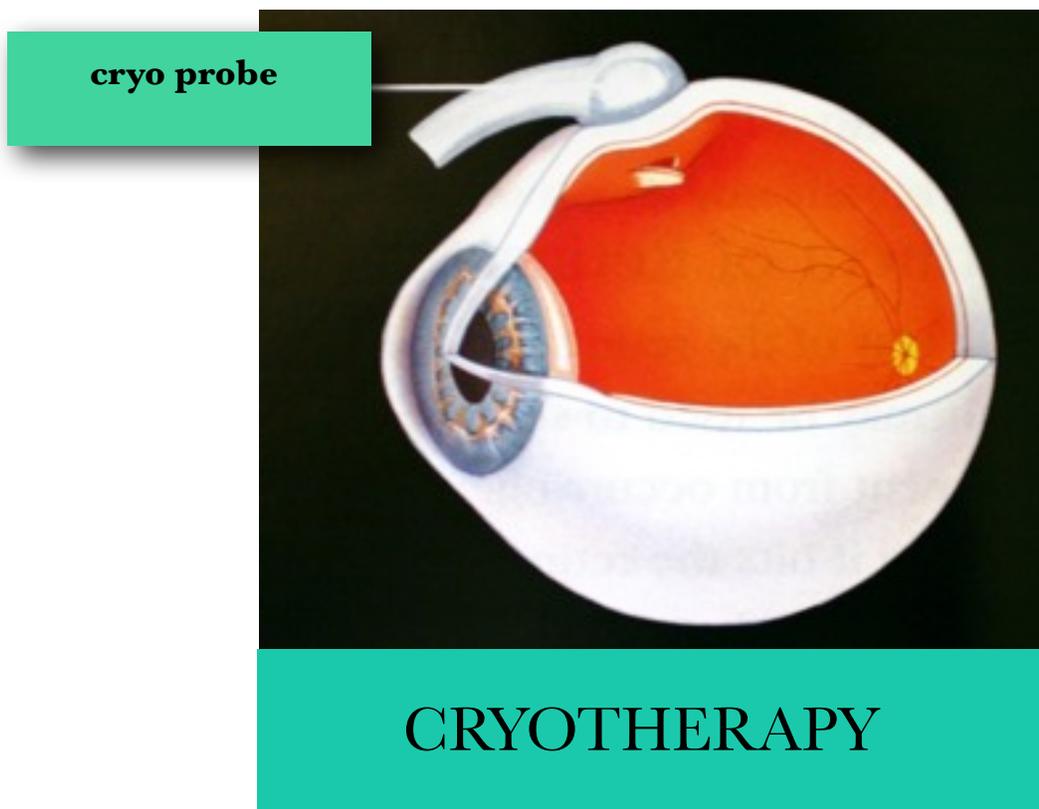
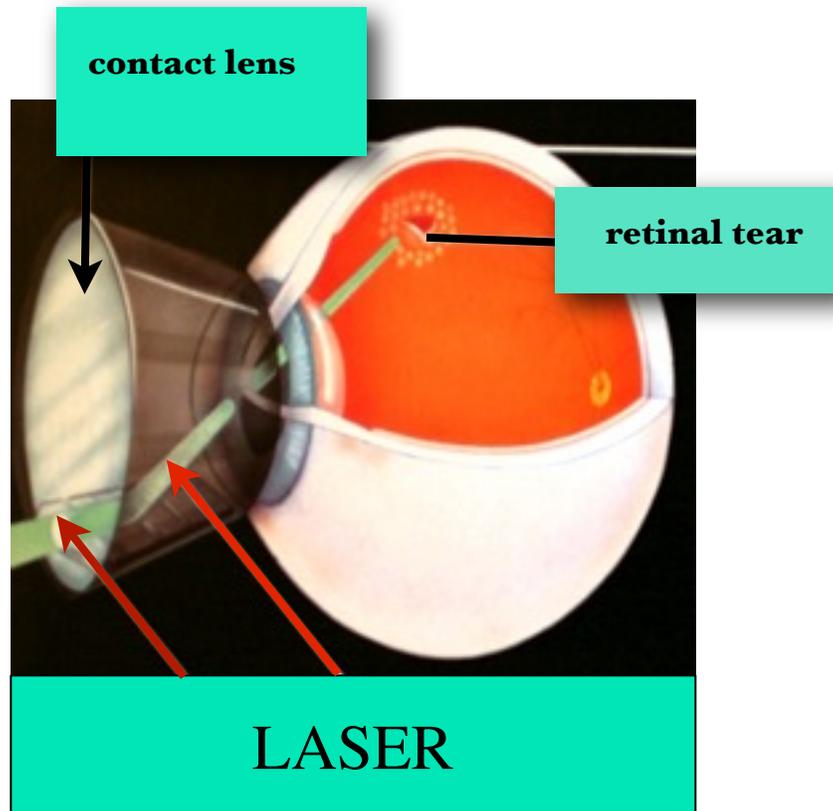
If a tear of the retina has occurred, laser treatment or cryotherapy, or both, may be used to seal the retinal tear in order to prevent a retinal detachment from occurring. The laser is a beam of light that turns to heat when it hits the retina. As the body heals this heated area with a scar, a seal is created around the tear. The laser light is directed through a special contact lens or indirect ophthalmoscope. Cryotherapy (also called **cryo**) is a means of making a similar scar by freezing the part of the retina that needs to be treated. This is done with a cryoprobe which is placed on the outside of the eye directly behind the retinal tear.

Both laser treatment and cryotherapy seal the retina to the back wall of the eye by forming a scar. This scar, which takes approximately one week to heal, forms a bond which seals the retina around the retinal tear and greatly reduces the risk of detachment.

Sometimes a very small retinal detachment develops around a retinal tear. Although surgery can be performed for a small retinal detachment, frequently it is so small that either laser or cryotherapy alone can be used to “wall-off” the detachment and prevent it from getting bigger. The retinal detachment may occasionally extend through the laser or cryotherapy scar, so the patient must be alert for the possibility of developing a retinal detachment, which usually is experienced as a progressive loss of peripheral vision. Your doctor may suggest that you test your peripheral vision daily.

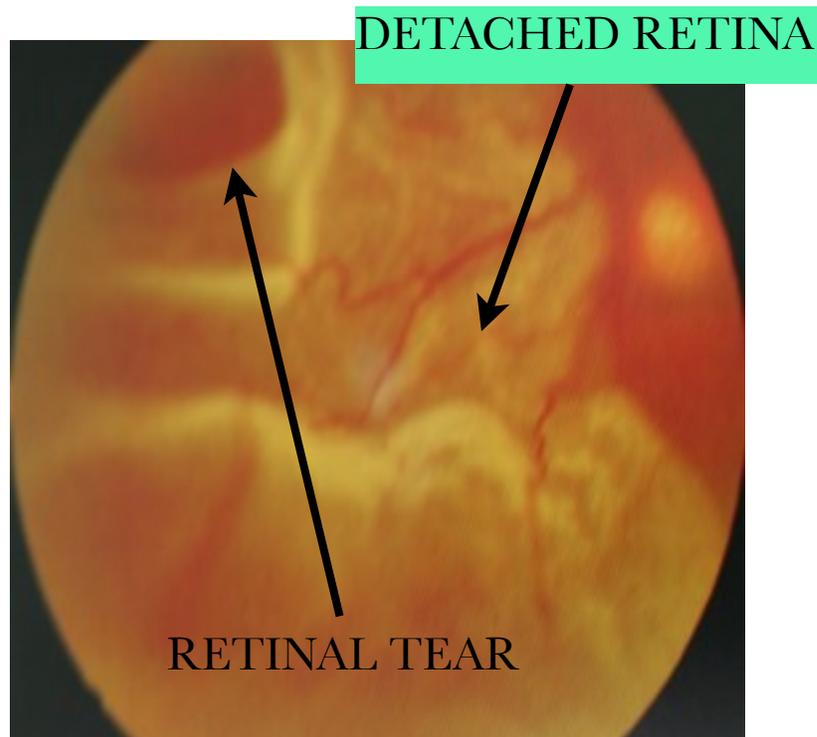
Both laser surgery and cryotherapy are done on an outpatient basis. Patients may return to full and normal activity, without restrictions, in a short period of time. Vision may be blurred for several days following laser or cryotherapy. If cryotherapy is used to treat the retinal tear, the eye may be red for several days or longer.

Treatment of Retinal Tear



Retinal Detachment

A retinal tear may lead to a more serious problem. When a tear of the retina occurs, the liquid in the vitreous may pass through the tear and get under the retina. The liquid collects under the retina and lifts it up off the back wall of the eye. Little by little vitreous fluid passes through the retinal tear, separating it from the back wall of the eye. This separation of the retina is called a **retinal detachment**. Vision is lost wherever the retina becomes detached, and the longer it is detached the less likely vision will return when the detachment is repaired. Retinal detachment first results in loss of peripheral vision because most tears are located in the peripheral retina. A patient may notice a dark shadow, or a black veil, coming from one side, above, or below. In most cases, after a retinal detachment starts if it is not treated, the entire retina will eventually detach and all useful vision in that eye will be lost.



Who Gets a Retinal Detachment?

Each year in the United States approximately one out of 10,000 people develops a retinal detachment. Certain people have a greater chance of getting a retinal detachment than others: those with a high degree of nearsightedness, a family history of retinal detachment, a history of eye trauma, previous eye surgery, or those who have had a retinal detachment in the other eye. Patients who have had cataract surgery have about a 1% or 2% chance of developing a retinal detachment. Any person in one of these high risk groups should have a thorough dilated retinal examination regularly and should be seen promptly if he or she experiences sudden flashing of lights, new floaters, or loss of peripheral vision.

Lattice Degeneration

Some patients have areas of abnormal thinning of the peripheral retina, called “**lattice degeneration.**” Degeneration is a misleading term implying that the thinning becomes worse with age. This is not the case. Those with lattice degeneration are born with a certain amount and degree of thinning which does not progress with age. Sometimes the thinning is significant enough that a retinal hole is present within the lattice degeneration. Infrequently, liquid vitreous may pass through such a hole and detach the retina. More worrisome, a posterior vitreous detachment (PVD) may cause a retinal tear at the edge of the lattice degeneration. Therefore, patients who have lattice degeneration are at increased risk of developing a retinal detachment.

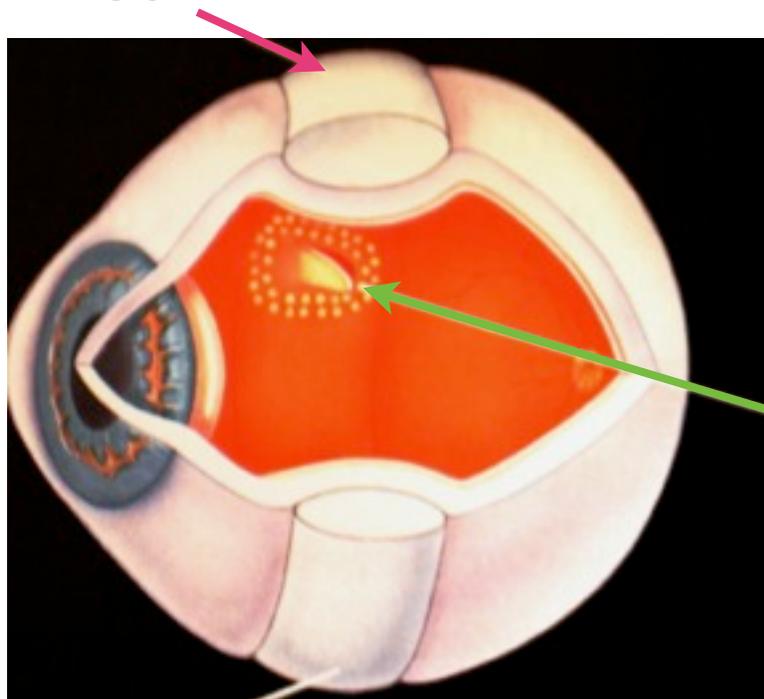
Repair of Retinal Detachment

If the retina has detached and the detachment is too large for laser treatment or cryotherapy alone, surgery is necessary to “reattach” the retina. Without some type of retinal reattachment surgery, vision may be completely lost. There are three types of surgery for retinal detachment: scleral buckling surgery, pneumatic retinopexy, and vitrectomy.

Scleral Buckling Surgery for Retinal Detachment

A traditional surgery for retinal detachment is scleral buckling surgery. The surgery is performed under local or general anesthesia. The surgeon first treats the retinal tear with cryotherapy by placing the cryoprobe on the outside of the eye (the sclera) and freezing the tear. A piece of silicone plastic or sponge is then sewn onto the outside wall of the eye (sclera) over the site of the retinal tear. This pushes the sclera in toward the retinal tear and holds the retina against the sclera until scarring from the cryotherapy seals the tear.

SCLERAL BUCKLE



RETINAL TEAR
TREATED WITH
LASER

This surgery is called **scleral buckling** because the sclera is buckled (pushed) in by the silicone. The buckle is covered by a thin tissue called the conjunctiva and is left on the eye permanently.

The buckle may also be placed all around the outside circumference of the eye. This is called an **encircling scleral buckle** or **band**. The purpose of the encircling scleral buckle is to reduce the pulling of the vitreous on the retina as well as to seal the retinal tears. During the surgery, the surgeon may drain the fluid from beneath the retina by passing a small needle through the sclera into the space where the retina is detached. The fluid under the retina drains through the needle, and the retina reattaches.

Occasionally, the surgeon may place a gas bubble into the vitreous cavity. Following surgery, the patient is positioned so that the gas bubble rises and pushes the retinal tear against the scleral buckle to help keep the tear closed.

In most cases, there is a better than 80% chance of successfully reattaching the retina with one operation. With additional surgeries, more than 90% of detached retinas can be reattached. However, successful reattachment does not necessarily mean restored vision. The return of good vision after the surgery depends on many factors. Most important is whether the macula was detached prior to surgery and, if so, for how long. If the macula was detached, vision usually does not return to normal. In some cases, even if the macula was still attached before the surgery, and even if the surgery results in successful reattachment of the retina, some vision may be lost. Fortunately, if the retina is successfully reattached, vision usually improves. The best vision does not occur for many months after surgery. If the first retinal detachment operation fails, a second surgery is usually possible.

Postoperative period: Following surgery, the eye will be red and slightly sore for a few weeks. Patients often feel a scratchy and itchy sensation due to irritation produced by the stitches and swelling of the conjunctiva. The eye will be sensitive to light and may water for a time. The patient may find it more comfortable to wear a patch on the operated eye. Severe pain is uncommon; if it occurs, the surgeon should be notified immediately. Usually, eye drops are taken after the surgery. These drops are used to prevent infection and to help the eye heal and feel more comfortable. Dr. Ward will tell you how often to use your drops and when you can stop. In most cases, the patient may leave the hospital the day of surgery, though some patients may need to spend the night. Each patient is unique, and each surgeon handles treatment differently.

Following the surgery, vision will be blurry; it typically takes many weeks for the vision to improve. During this period, the main concern is that the retina remains attached. A scleral buckle changes the shape of the eye, and new glasses may be necessary for best vision.

Complications of scleral buckling: Surgery for retinal detachment is generally successful. However, certain complications can occur and result in failure of the operation, loss of some or all vision, and in rare situations, even loss of the eye.

Retinal detachment surgery done by scleral buckling can affect the eye muscles that move the eye and keep the eye straight. Eye muscle problems may result in double vision which is rarely permanent. Corneal problems, such as swelling, erosion, or ulceration occur rarely. Retinal detachment surgery may be associated with bleeding under the retina, cataract formation, glaucoma (high pressure in the eye), retinal detachment, excessive scar tissue formation, vitreous hemorrhage, drooping of the upper lid, and infection. Although such complications can result in the need for more surgery, or even total loss of vision, they are infrequent.

The most common problem is retinal redetachment. The risk of this varies from person to person. If this occurs, your surgeon will discuss the chance that a reoperation will successfully reattach the retina.

Pneumatic Retinopexy

Another type of surgery that can be performed for some retinal detachments is called **pneumatic retinopexy**. Pneumatic retinopexy is performed on an outpatient basis using local anesthesia, and is often done in your doctor's office.

Cryotherapy is first performed to seal the retinal tear. Then, instead of placing a scleral buckle on the outside of the eye, the surgeon injects a gas bubble through a fine needle into the vitreous cavity. The patient is instructed to tilt his or her head in a specific position so that the gas bubble will float to where the retinal tear is located. The bubble pushes the detached retina against the back wall of the eye to close the retinal tear. The patient is asked to remain in this position for several days until the retinal tear is sealed by the cryotherapy against the back wall of the eye. Your surgeon will tell you how long special positioning is necessary. In some cases, laser or cryo treatment is performed a day or two after the gas bubble is injected.

Postoperative period: The eyelid is frequently swollen, and the white of the eye may be red for several days. The vision is usually blurred for several weeks as the eye and the retina heal. The bubble in the eye moves as the head is tilted from side to side, and it causes a shadow to be seen in the lower part of your vision. Sometimes a patient may see a large bubble and a few smaller bubbles. This is normal and not a cause for concern. Antibiotic eye drops may be used during the days following surgery. Since the retinal tissue in the eye is slow to heal, it usually takes several months before the best vision is obtained.

The gas bubble in the vitreous cavity of the eye expands for several days and takes two to six weeks to disappear. During this time, **airplane travel or travel to a high altitude must be avoided** because high altitudes can result in an expansion of gas and an increase in pressure that can damage the eye. Ask your surgeon when it is safe to travel to higher altitudes. It is also important for a patient with a gas bubble not to lie face up, as the gas bubble will come to rest against the lens of the eye and may cause a cataract or high pressure in the eye. Lastly, you must **avoid any other surgery that uses nitrous oxide gas anesthesia** as long as the gas bubble remains in your eye.

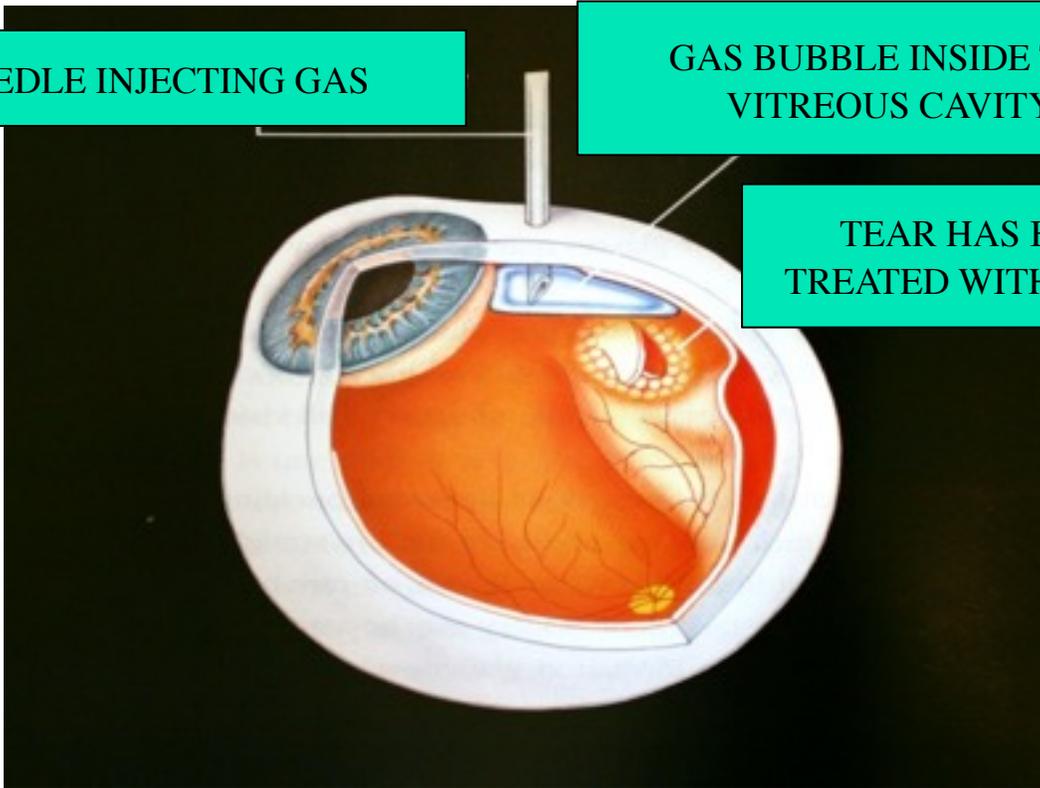
The chance of successfully reattaching the retina with pneumatic retinopexy is slightly less than with scleral buckling surgery. But, with pneumatic retinopexy, hospitalization, general anesthesia, surgical incisions, and many other potential complications are avoided. Pneumatic retinopexy cannot be used for every retinal detachment. Your surgeon will discuss with you whether pneumatic retinopexy is feasible and the chances for successfully reattaching your retina.

Complications of pneumatic retinopexy: Possible complications include retinal redetachment, cataract formation, glaucoma, gas getting under the retina, recurrent retinal detachment due to excessive scar tissue formation, and infection. Any one of these complications can lead to a total loss of vision but each is rare. The most common complication is the formation of new retinal tears and recurrence of the retinal detachment. If the retina becomes detached again, scleral buckling surgery and/or vitrectomy can usually be performed to reattach it.

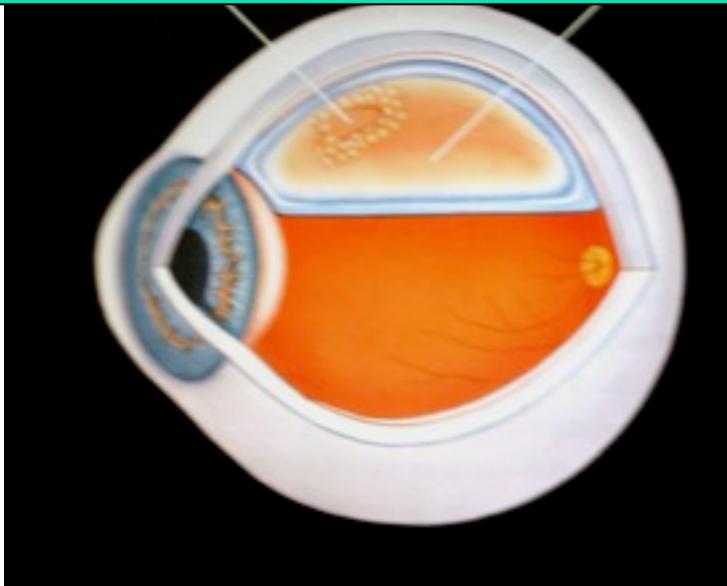
NEEDLE INJECTING GAS

GAS BUBBLE INSIDE THE
VITREOUS CAVITY

TEAR HAS BEEN
TREATED WITH LASER



GAS BUBBLE SEALS TEAR AND
REATTACHES RETINA



PNEUMATIC RETINOPEXY

Vitreous Surgery (Vitreotomy)

Vitreotomy surgery is done for a number of conditions which are discussed in the following sections. Vitreous surgery is performed in an operating room under local or general anesthesia. The vitreous is removed and, therefore, this procedure is called a **vitreotomy**.

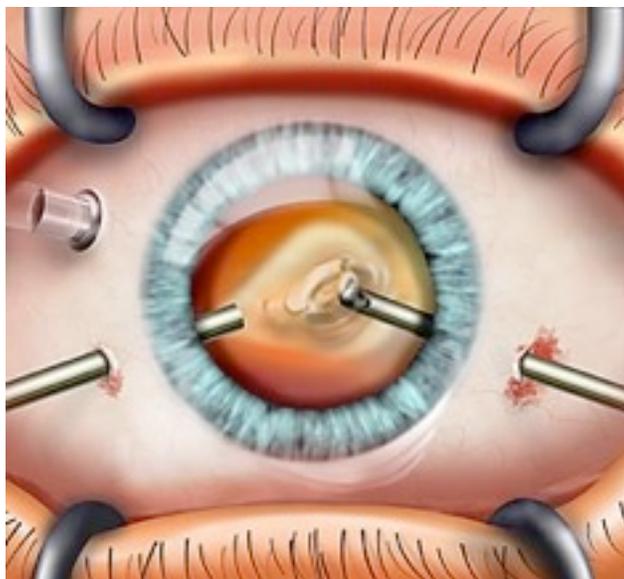
During vitreotomy surgery, instruments are passed through the sclera into the vitreous cavity. These openings are very small, about the size of a needle that is used when you have a blood test done. The surgeon uses a fiberoptic light to illuminate the inside of the eye and a small cutting instrument to remove the vitreous. The vitreous fluid is replaced with a saline solution that is compatible with the eye. Within several days, the eye replaces this solution with its own fluid. In some cases a gas bubble is placed in the eye. The eye gradually absorbs this bubble and replaces it with its own fluid, but does not replace the vitreous gel. This gas may stay in the eye for up to eight weeks. In other cases, silicone oil may be used. The eye cannot absorb this, and the silicone oil is usually removed from the eye several months later with a second operation. Your surgeon can explain if a gas bubble, or silicone oil is necessary for your surgery. If a gas bubble or silicone oil is placed in the eye, you will usually have to lay face down (prone) for several days so that the gas bubble (or silicone oil) can float up to the back of the eye for proper healing of the retina.

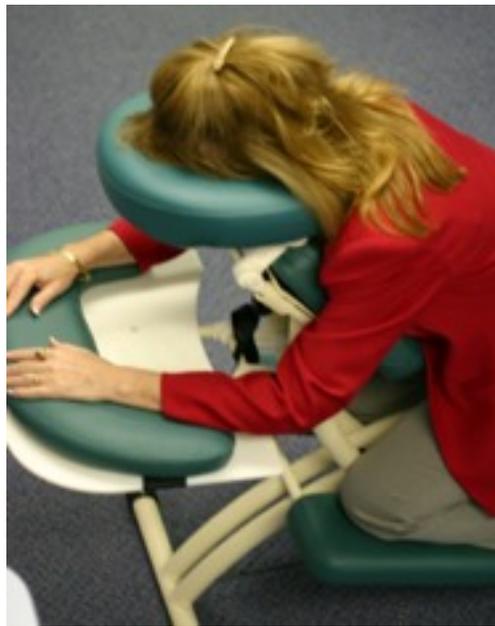
Other special instruments used during surgery may include forceps and scissors for removal of scar tissue. A laser probe can also be placed inside the eye to permit laser treatment when necessary.

These instruments are passed through the sclera through small openings. These openings are closed at the end of surgery with a small suture. Recent developments allow for many vitrectomy surgeries to be performed with even smaller openings that do not require any stitches. Your surgeon will decide if your surgery can be done with a sutureless technique. Vitreous surgery usually lasts one-half hour to two hours but, with very severe and difficult problems, may take longer.

Vitrectomy Surgery for Retinal Detachment

A third technique for repairing a retinal detachment is vitrectomy surgery. Vitrectomy removes the vitreous traction which allows the surgeon to reattach the retina with a gas bubble. Once the retina is attached, laser treatment is performed to seal the retinal tears that caused the retinal detachment. A gas bubble is placed in the eye to hold the retina in place. This remains in the eye usually for up to eight weeks. Over time, the gas is absorbed by the eye and is replaced by the eye's own fluid. As long as gas is present in the eye, airplane travel, travel to high altitude, and surgery using nitrous oxide anesthesia must be avoided.





Postoperative period: After vitreous surgery to repair a retinal detachment, it is common to have to remain face down (prone) or on one's right or left side for several days or more. This allows the gas bubble in the eye to press against the retina and hold it in place while the laser or cryotherapy treatment heals. Dr. Ward will tell you if you need to do this, and for how long.

Some redness of the eye is common after surgery. The eye may feel scratchy, and the eyelid may be swollen particularly if you are required to lay face down.

When the eye is completely filled with gas, the eye cannot see normally. Vision begins to improve as the gas bubble is absorbed by the eye. How much vision returns after surgery depends on how severe the retinal detachment was, how much of the retina was detached, and for how long.

Complications of vitrectomy: The most common complication of vitrectomy surgery is cataract formation in eyes with an intact crystalline lens. It is a guaranteed side effect that the lens will turn cloudy within a year of vitrectomy surgery. Other complications include intraocular bleeding, glaucoma, and retinal redetachment.

Vitreous Hemorrhage and Retinal Detachment

When a retinal tear occurs, retinal blood vessels may also be torn. When this happens, blood enters the vitreous cavity; this is called a **vitreous hemorrhage**. Because there is a tear in the retina, a retinal detachment may also occur. When a vitreous hemorrhage is thick, your doctor may not be able to see the retina. In such a case, a special test called **ultrasonography** may be done to determine if a retinal detachment has occurred. Ultrasonography is a painless test. It is like the sonar on a submarine. Sound waves sent into the eye travel through the hemorrhage and bounce off of the retina. The sound waves are used to make an image on a monitor that indicates whether the retina is attached or detached.

The combination of a vitreous hemorrhage and retinal detachment is difficult to treat because the hemorrhage prevents the surgeon from seeing the retina and treating the retinal tears. In this case, a vitrectomy must be performed to remove the blood so that the surgeon can see the retina. As part of this surgery, a scleral buckle may be placed around the eye. The combination of retinal detachment and vitreous hemorrhage increases the risk for developing proliferative vitreoretinopathy.

Proliferative Vitreoretinopathy (PVR)

Following surgery for retinal detachment, the retina can redetach 5% to 10% of the time due to excessive scar tissue forming in the eye. If this occurs, it is usually within four to eight weeks of the initial surgery. When scar tissue redetaches the retina, it is called **proliferative vitreoretinopathy** (PVR). Scar tissue growing on the retina puckers the retina into stiff folds, like wrinkled aluminum foil. Also, the vitreous contracts and pulls on the retina, detaching it from the back wall of the eye. The only way to unfold and reattach the retina is to remove the vitreous contraction and peel the scar tissue with vitrectomy surgery.

Removing the vitreous, and especially the scar tissue from the surface of the retina, is a delicate process that requires the surgeon to lift and peel strands of scar tissue away from the retina. The natural lens of the eye must often be removed during the surgery. If an intraocular lens implant is in the eye, it can usually be left alone. If a scleral buckle has not been previously placed around the eye, one is usually placed during surgery. The eye is then filled with a special heavy liquid or air so that the retina is pushed against the back wall of the eye and against the scleral buckle. Once the retina is in place, laser is used to seal the retinal tears, and to form a strong attachment between the retina and the back wall of the eye.

At this point, the surgeon will replace the air or special heavy liquid with a gas bubble or silicone oil. The gas remains in the eye for many weeks before it is naturally absorbed. The vision is always very poor when gas or oil is in the eye. The gas or oil keeps the retina pushed up against the eye wall long enough for the laser treatment to heal and take hold. If silicone oil is placed into the eye, it is removed surgically at a later time. Following surgery, the patient's head may need to be positioned depending on the location of the tears so that the gas will close the retinal tears. In some cases, extra injections of gas may be required after surgery. This is usually done in the office and usually does not require returning to the operating room.

The chance of successful retinal reattachment with vitrectomy for PVR is about 80%. The chance of regaining vision that is good enough just to get around is about 60%. Reading vision only rarely returns. It should be clearly understood that the purpose of PVR surgery is to give the patient an eye that would have some vision, a "spare tire" that could serve usefully if the other eye every loses vision entirely.

It takes the vision weeks or months to recover completely after a vitrectomy. It is important to know that in some cases the scar tissue may re-form after the surgery and cause redetachment of the retina once again.

Questions and Answers

1. If I see floaters and flashing lights, do I need to see my eye doctor?

Flashes and floaters are sometimes important signs that a retinal problem such as a retinal tear or detachment is present. Although flashes and floaters may not be serious, a retinal examination must be performed promptly to be sure.

2. What is the purpose of retinal detachment surgery?

When the retina is detached, it cannot function properly and vision is lost. The purpose of the surgery for retinal detachment is to reattach the retina. If the surgery is successful, the vision will usually improve. The final vision depends greatly on whether the macula was detached.

3. If pneumatic retinopexy does not work, may I then undergo the scleral buckling procedure or vitrectomy?

If pneumatic retinopexy fails to reattach the retina, the patient can undergo a scleral buckling procedure, vitrectomy, or a surgery combining both scleral buckling and vitrectomy.

4. Does the scleral buckle ever need to be removed?

Once a scleral buckle is sutured onto the wall (sclera) of the eye, it stays in position forever. It may slightly change the shape of the eye and, after the eye has healed, a new pair of glasses may be necessary. On rare occasions, a scleral buckle placed around the eye may cause pain or double vision. If either are severe and cannot

be relieved with medicine, it may be necessary to loosen or remove the buckle. Rarely, the scleral buckle may work its way out from under the conjunctiva and/or an infection may occur. In such instances, the buckle will probably need to be removed from the eye. When the buckle is removed, the retina usually remains attached, but rarely may redetach. In most cases, however, the scleral buckle remains against the eye forever and causes no serious problem. The scleral buckle cannot be seen by other people.

5. How is vitrectomy surgery performed?

The surgery is performed using local or general anesthesia. Vitrectomy surgery is performed through an operating microscope, which allows the surgeon to look through the dilated pupil at the retina. Small openings through the sclera are made in order to insert vitrectomy instruments into the eye. A variety of instruments are used, including a fiberoptic light with lights the inside of the eye, and a variety of vitreous cutters, scissors, and forceps.

6. How long will the vitreous or retinal surgery take?

The length of the surgery depends on the type of problem you have. If you have an epiretinal membrane or uncomplicated retinal detachment, surgery may take under an hour. For more advanced problems, the surgery can take significantly longer.

7. What are the possible complications of vitrectomy surgery?

There are risks to any surgery. The risks must be outweighed by the benefits if surgery is to be performed. Cataracts occur as a side effect of vitrectomy surgery in almost every case in someone

over the age of 50. Other risks include the development of a tear of the retina, glaucoma, corneal problems (such as swelling, erosion, or ulceration), double vision, bleeding into the eye, excessive softening of the eye with pain, infection, retinal damage, or redetachment of the retina with a need for further surgery. Any one of these complications may result in severe loss of vision, or even the loss of the eye itself.

8. How long will I be in the hospital for my surgery?

The majority of surgery that Dr. Ward performs is done as an outpatient at All Saints Surgery Center. The facility is on the campus of Oak Hill hospital. Even though the surgery will only last for an hour or so plan on being at the facility for approximately 4 hours after which you will be discharged home.

9. Are there risks to anesthesia?

Local anesthesia with sedation carries a very low risk of complication. General anesthesia carries a greater degree of risk. Minor risks include postoperative nausea, vomiting, and hiccuping. Some patients experience an upset stomach following surgery. If nausea does develop, it can be controlled with medication. Occasionally, patients will experience some confusion and prolonged sleeping. Very rarely, serious reactions occur that result in liver failure, cardiac arrest, and even death.

10. Will my eye hurt after surgery?

You may note some discomfort around the eye, but severe pain is unusual. Discomfort can be relieved with medication if necessary. Your eye may remain swollen, red, somewhat tender, and uncomfortable for several weeks. You may also notice a scratchy sensation when opening or closing the eye as if an eyelash is in the eye. This is usually caused by

small stitches on the outside of the eye. These stitches will gradually become soft and dissolve, probably within two weeks. This sensation is typically very mild, and less common if vitrectomy surgery was performed by a sutureless technique. If you have pain that is not controlled by medication, you should notify your doctor.

11. What instructions must I follow when I go home after surgery?

The amount of physical activity that is allowed depends on the type of surgery that you have had. Dr. Ward will discuss your restrictions after surgery. You will be asked to use some eye medications when you go home. The purpose of the drops is to prevent infection and make the eye more comfortable as it heals.

12. Will I see better right after surgery?

The vision following surgery depends on the type of surgery that you have had. In general, it takes a long time for you to reach your best vision. The vision in the eye will almost certainly be blurry for many weeks. The front of the eye heals much quicker than the back of your eye (the retina). Because the retina heals slowly, visual improvement typically takes many weeks. Your surgeon will discuss how much vision you can hope to regain. It is important to realize that recovery of vision following any type of retinal or vitreous surgery takes a long time.

Additionally, vision will be very poor until the intraocular gas resorbs. If an encircling scleral buckle has been placed, the eye will be more nearsighted, and won't see its best until a new pair of glasses has been prescribed.

13. Why is postoperative head positioning important and how long must it continue?

Patients are often asked to remain in a certain position after surgery if they have air, gas, or silicone oil in their eye. These materials rise to the highest point in the eye. If there have been retinal tears that have received laser or cryotherapy during surgery, the air, gas, or oil help to keep the tear closed, and the retina attached, while the laser or cryotherapy heals and seals the tear. The length of time varies, and Dr. Ward will tell you when it is safe to stop this special positioning.

14. After surgery, while an air or gas bubble is present in my eye, what can I do, and what must I avoid?

High altitude travel, by plane or any means, can cause the gas to expand within the eye and cause high pressure, pain, and even total loss of vision. Also, you must avoid general anesthesia for other types of surgery that are performed using nitrous oxide gas. The nitrous oxide dissolved in the blood stream can enter the air or gas bubble in the eye and cause it to expand and cause permanent loss of vision. It may be prudent to wear a wrist bracelet, placed in the operating room or doctor's office, alerting medical personnel to the presence of intraocular gas. Discuss this with your surgeon prior to surgery. When the gas in the eye is gone, high altitude and nitrous oxide cannot cause these problems.

15. Is it possible that I may not see after surgery?

Despite our increasing knowledge about retinal detachment and vitreous disease, and despite the sophisticated surgical equipment

and techniques that we bring into the operating room, it may be impossible to improve a patient's vision. The chance for blindness with severe retinal disease is real. When considering surgery, the patient and the doctor must weigh the risks, including the possibility of total blindness, against the possible benefits of either stabilizing or improving vision. It is important for the patient to know that surgery may fail due to complications, or simply due to the progressive nature of the retinal disease.

16. Is there a time when an eye is too hopelessly damaged to consider surgery?

This is a difficult question. Whether to perform any surgery depends on whether the patient feels that the benefits of the surgery outweigh the risks. This decision will be different for every patient, since every patient's needs are different. If an eye is badly damaged, there may not be much to gain with surgery, and a patient might decide not to have surgery. If, however, the patient has only one eye, then any vision that is saved will be tremendously important. No two patients, and no two retinal problems, are alike. Your surgeon will help you understand what you can hope to gain with surgery, and what you risk to lose.

Conclusion

The essential decision that you and Dr. Ward must make when considering surgery is this: Do the benefits of the surgery sufficiently outweigh the risks? To answer this question you need to make sure you understand what you can hope to gain by surgery. You need to know what the complications are and what the chances are of those complications occurring. You'll want to understand what alternative treatments are available, and what can happen if no treatment is done. Only when you have all of this information can you make an informed, considered decision about the value of surgery for your eye.

This booklet was written to help you understand the problems surrounding retinal detachment and vitreous surgery. If you have any questions, please be sure to ask Dr. Ward.