

What is a *macular hole*?

A macular hole is a small full-thickness defect in macula, the most important region of your retina (Figure 1 and Figure 2). The macula is the center of the retina, which is the light sensing part of the back of the eye. Formation of this hole causes loss of central vision (reading, driving, recognizing faces is affected).



Figure 1 – Normal Macula



Figure 2 – Macular hole

What types of symptoms to patients with macular hole have?

Symptoms vary based the size of the hole. The most typical symptoms are:

- Distortion of vision (called “metamorphopsia”) – letters look crooked
- Blurred vision or loss of visual acuity
- Dark spot at center of vision (“central scotoma”) – patients describe missing letters in words when looking right at the word. These dark spots are different than “floaters” as they do not move around.
- Patient often first notice the vision loss when they cover-up the unaffected/good eye

What causes a macular hole?

The most common cause of a macular hole is a posterior vitreous degeneration. This is when the vitreous gel that fills the center of the eye liquefies and separates from the back surface of the inside of the eye (the retina). This results in traction/pulling in the central macula. If there is enough traction a hole forms.

Direct ocular trauma by a blunt force, like a tennis ball, can cause macular holes to form as well. This group of patients is more likely to have spontaneous closure without surgery.

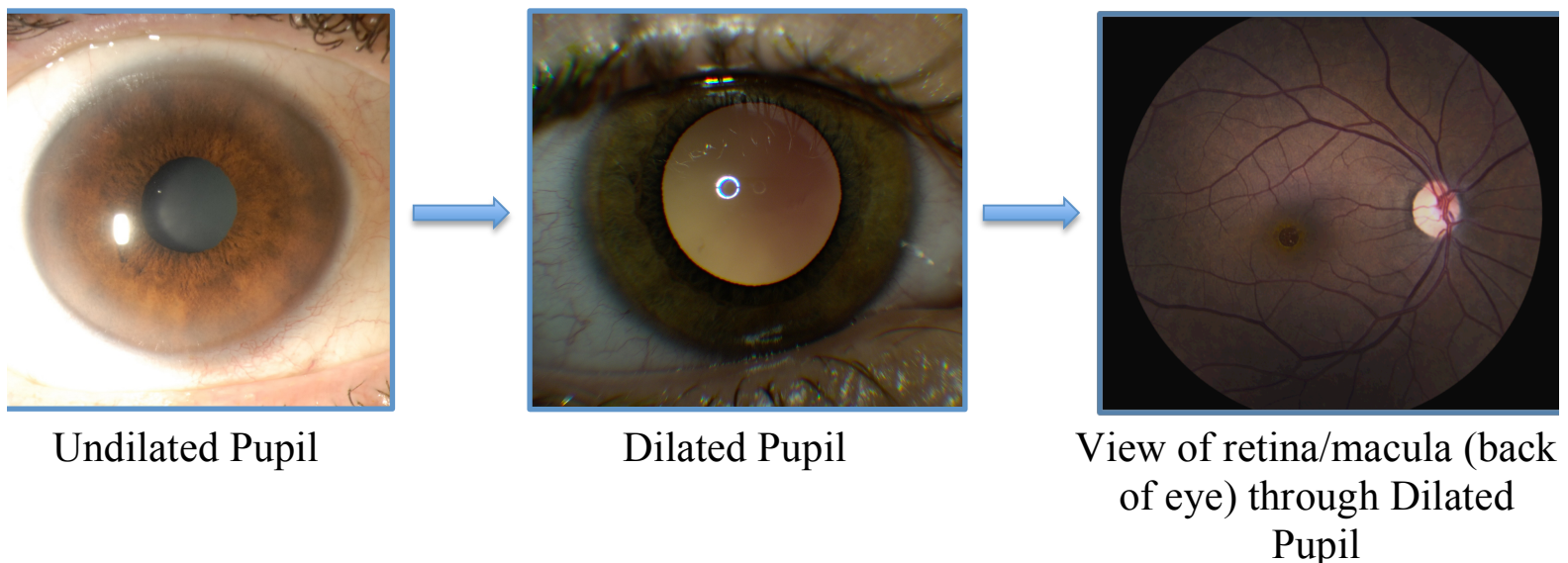
Who is at risk for having a macular hole?

Most patients that develop macular holes are in their 60's or 70's and women are more commonly affected. Most people will experience vitreous degeneration, but macular hole is not very common. It is not associated with any systemic disease.

How are macular holes diagnosed?

The macula can be visualized during a routine eye exam after dilation of the pupil (Figure 3). Optical coherence tomography is a type of non-invasive imaging that allows your physician to view the macula and macular hole (if present) in cross-section (Figures 4 and 5). This allows your physician to measure the exact size of the hole and study the anatomy. This is useful for knowing the likelihood of closure with surgery.

Figure 3



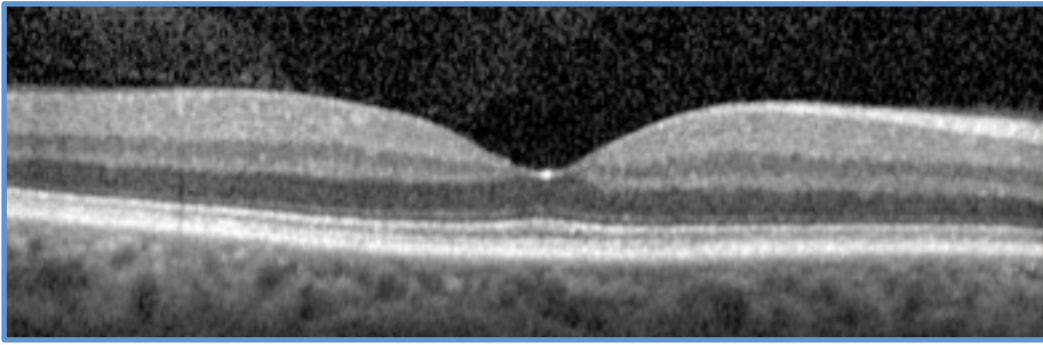


Figure 4. Cross sectional image (Optical Coherence Tomography, or OCT) of a normal macula. The “dip” in the center is the very center part of the vision, or the “fovea.” This is the “20/20” portion of the vision.

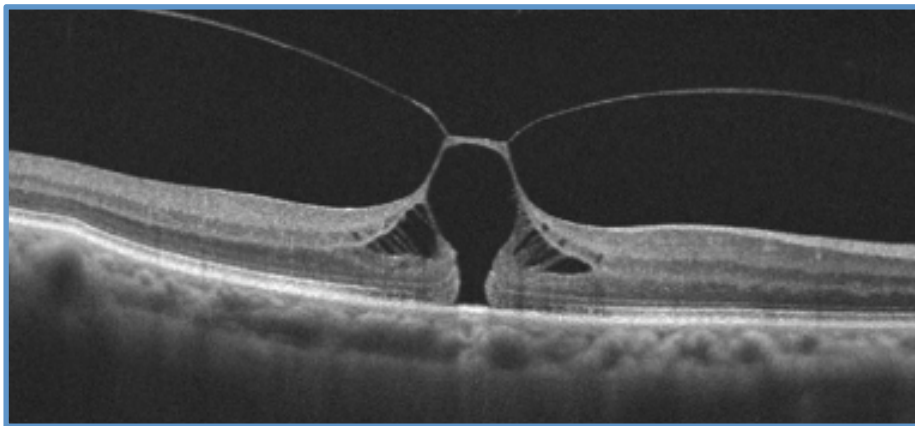


Figure 5. Cross sectional image (OCT) of a macula with a macular hole. Notice the loss of the “dip” and black space (hole) at the center. There is residual gel (vitreous) pulling at the tissue over the hole. Vision is decreased and distorted due to this hole.

How are macular holes treated?

Small holes will often spontaneously close/heal without treatment. In some cases medication (Jetrea) can be injected into the eye that will release traction on the hole and allow it to close, however there are very few eyes that are candidates for this medication. Most macular holes are treated with surgery.

Surgery consists of “vitrectomy” to remove the vitreous gel (“floaters”) from the middle of the eye (Figure 6). Micro-forceps are then used to gently peel the membrane away from the retinal surface from around the hole (Figure 7).

Figure 6. Removal of the vitreous from inside the eye using the “vitrector” (left side of picture). A small instrument (right side of picture) provides the light to see inside the eye. This is done under a microscope.

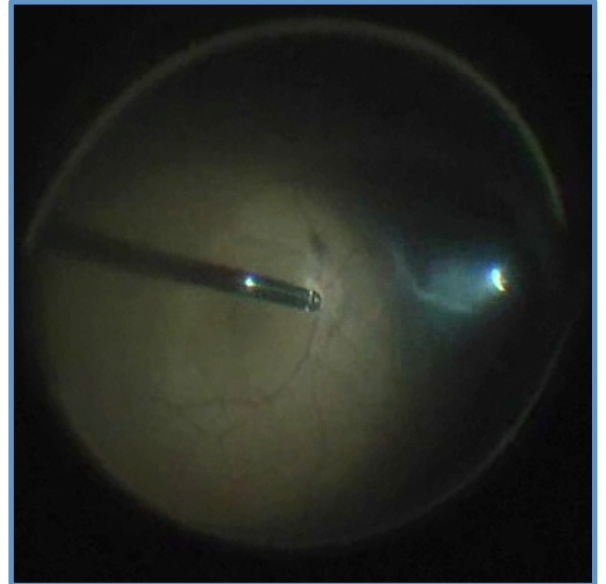


Figure 7. Gently peeling of the internal limiting membrane from around the macular hole using micro-forceps. This relieves the traction causing the distortion and swelling of the retina/macula.



The fluid in the back of the eye is then replaced with a gas bubble. This bubble covers the hole and allows it to close.

What is the vision like after surgery?

The vision is poor the day after surgery due to the gas bubble. Vision through gas is distorted and will remain so until the bubble resolves. There are usually position requirements after surgery to ensure the bubble is correctly positioned against the hole (each surgeon has their own post-operative position requirements based on their specific surgical technique). Historically, the patient was required to position face down for 14 days but currently close to 100% anatomical success can be achieved without face down positioning. The only requirement is that the patient not sleep on his /her back but to favor the opposite cheek being in the pillow.

Vision will improve after the gas bubble dissolves (this takes several weeks and timing depends on the type of gas used). Visual improvement can continue to occur for 9-12 months after successful surgery. If it has not already been removed, the cataract (cloudy lens of the eye) will worsen with this type of surgery and this will cause worsening vision. Many times a combined approach is used and the cataract is removed at the same time as surgery for the macular hole.

Healing and approximation of the edges of the hole is out of the control of the surgeon. If the hole was small, the margins may come back perfectly and the vision returns to near normal. However, the tissues may not meet perfectly and there can be some residual distortion and blurred vision even if the hole is closed. There can be a persisting central dead spot in the vision if the central defect is filled in with scar tissue and the edges did not meet. This is most common in longstanding holes and larger holes.

What are the restrictions after surgery? What are the risks of surgery?

Restrictions in the postoperative period are most commonly related to the gas and the secondary poor vision. You cannot fly or travel to the mountains with an eye filled with gas. Patients should not drive or participate in activities that require depth perception and may result in injury.

Any intraocular surgery involving vitrectomy has a low risk of infection, bleeding, retinal detachment, and other complications, which can all lead to permanent vision loss. Risks, benefits, and alternatives to surgery should be discussed with your surgeon prior to proceeding with vitrectomy for macular hole.