

Macular Pucker

In order to maintain its round structure, the central portion of the eye is filled with a jelly-like substance known as the vitreous. At birth and through early years, the vitreous has a fairly solid structure, having a consistency somewhat between Jell-O and molasses. As a person ages, however, the vitreous jell begins to shrink and becomes more condensed toward the front part of the eye, being replaced by liquid as the process continues. As the vitreous shrinks, it pulls away from the surface of the retina. In most cases, this pulling away or vitreous separation occurs without any negative effect. A patient may notice floaters but no significant visual damage occurs. In some individuals, however, there may be an area where the vitreous is firmly attached to the surface of the retina. As the shrinkage and forward movement of the vitreous progresses, traction or pulling can be exerted on the retina, resulting in microscopic damage to its inner surface. When this focal area of damage or irritation occurs in the macular region, the retina initiates a healing response with mobilization and migration of cells found within the retina itself, which then spread outward along the surface of the retina, in an attempt to "heal" the area of damage. Unlike a macular hole, a full thickness defect or break in the retina has not taken place. Instead, only superficial irritation has occurred with a normal healing response taking place.

This thin layer of scar tissue is known as a macular pucker. Macular pucker is known by a variety of names, including epiretinal membrane, surface wrinkling retinopathy, cellophane retinopathy, and internal limiting membrane disease. All of these names relate to the fact that there is a layer of thin scar tissue on the surface of the macula which resulting in mechanical wrinkling and distortion of the retina.

In most cases, the healing response is mild, and results in a very thin layer of cells lying on the surface of the retina. These cells may be clear and may produce no significant visual disturbance. In other cases, this healing process may progress, with an overabundance of cells being produced, forming a thicker, more opaque membrane or layer of scar tissue on the surface of the macula.

In most patients, even with the formation of a significant macular pucker or epiretinal membrane, there is very slow growth that takes place, and eventually the scar tissue stops proliferating or extending. With time, contraction or pulling of the cells may take place, causing a wrinkled or rippled appearance to this scar tissue. Since the scar cells are attached to the retina, the retina itself becomes wrinkled in association with the progression of the scar. When this occurs in the central, critical portion of vision, the macula, visual symptoms may result.

The symptoms of a macular pucker are common to many conditions affecting the central part of the retina. These include: distortion in lines or letters while reading, a decrease in central vision for distance and reading activities, and blurring or distortion of images when looking at television or in the theater. The diagnosis of a macular pucker is made when an ophthalmologist performs a dilated retinal examination and examines the back of the eye. A fluorescein angiogram (injection of a dye into the vein, with

photographs taken of the back of the eye) may be recommended to evaluate the situation and determine if leakage or swelling of the retina is taking place as a result of the scar tissue being present on the surface of the macula. OCT testing can easily demonstrate the macular pucker on the surface of the retina.

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In most cases, no treatment is recommended for macular pucker. This is due to the fact that the visual distortion and decreased reading and distance vision is minimal in the majority of patients. Although some mild visual problems are noted, these are usually easily adjusted to and pose no limitation on full activity. In some instances, however, the distortion and vision loss may be significant. There may be an inability to perform certain daily tasks such as reading or driving. It is at this point, that consideration for surgical repair would be entertained. Surgery would also be considered if vision loss is moderate, but there is evidence on the fluorescein angiogram of significant leakage posing a threat to permanent damage to central vision in those individuals.

Repair of a macular pucker or epiretinal membrane is accomplished through use of vitreoretinal surgery. Using microsurgical instruments, a procedure known as a vitrectomy, the microscopic removal of vitreous jelly from the center of the eye, is performed. Particular attention is paid from moving any vitreous attachment from the central macular region. Specialized microsurgical instruments are then used to gently peel and remove the scar tissue from the surface of the retina, relieving the traction and reducing the distortion to the retinal surface. During the course of the surgical procedure, a fluid which is chemically similar to the fluid naturally produced by cells inside of the eye is used to replace the vitreous. As part of the procedure, careful inspection for retinal tear or detachment formation is performed, which can occur in association with the development of a macular pucker or occur as a rare complication of the surgical procedure itself. If a tear or break is found, laser treatment may be applied to these areas. In the rare instance where retinal tears or detachment occurs the replacement fluid will be removed and replaced with a gas bubble. As a result positioning and altitude restrictions will be necessary for a few weeks after surgery.

The surgical procedure itself is typically performed under local anesthesia and a patient may remain in the hospital overnight or may be scheduled for ambulatory surgery, able to return home by the end of the day of the surgical procedure itself. A postoperative examination within 24 hours of surgery is required in all cases. Regular follow-up examinations are performed during the three months of recovery, and then at regular intervals after that. Patients typically utilize several eye drops applied to the operated eye over the course of several weeks following the surgical procedure.

Approximately 10–12 weeks after surgery, when the eye has recovered from the surgery and the macula has had a chance to return to a more normal configuration, the

patient is sent for an update on measurement for glasses. Full visual recovery may not occur for at least 3–4 months following the procedure.

As with all surgical procedures, there are potential complications and side-effects associated with repair of macular pucker. As mentioned, these include a small percentage of patients that develop retinal tears or detachments during the procedure or in the immediate postoperative period. These problems are usually easily repairable. In patients who have not already undergone cataract surgery, development of a cataract may occur more rapidly following vitrectomy surgery. Surgical removal of the cataract and placement of an intraocular lens is then required.