LASER FLOATER REMOVAL IN CLINICAL PRACTICE

Treatment pearls and clinical tips

BY INDER PAUL SINGH, MD

During the past 4 years, I have performed more than 1,400 Laser Floater Removal (LFR) procedures. It has been an incredible journey. I am continuously inspired by the improvement in our patients' quality of life that this procedure brings. During these past few years, I have learned a great deal and have subsequently refined my approach and technique for LFR. For example, today I have come to fully appreciate the benefits of using both on- and off-axis illumination to better gauge spatial context between the lens and retina. Here, I hope to share some treatment pearls and clinical tips to help guide ophthalmologists through the procedure.

WHICH PATIENTS ARE BEST SUITED TO LFR?

Many colleagues ask me to describe the ideal floaters and patients for LFR. First and foremost, patients need to have symptoms. Patients' symptoms should present for at least 3 to 4 months and be stable in behavior. For new onset of floaters, I recheck the retina and symptoms at a minimum of 3 to 4 months. This also allows time for patients to neuro-adapt, and if they do, may negate the need for the procedure. If patients describe symptoms of peripheral flashes of light, I tend to hold off on treatment and recheck in a few months in case there is an incomplete posterior vitreous detachment or an untreated defect that could pose a risk of further retinal tear or detachment regardless of the laser treatment.

In the beginning, I suggest treating well-defined, fibrous, Weiss-ring–type floaters caused by a posterior vitreous detachment. Because they are fibrous, they absorb the laser energy well and can be vaporized more efficiently. In addition, they are usually located safely away from the crystalline lens and the retina. In a study we presented at the annual American Society of Cataract and Refractive Surgery (ASCRS) meeting in New Orleans in 2016, we found patients who had Weiss-ring type of floaters needed only an average of 1.3 sessions to achieve a high degree of patient satisfaction.[1] These patients often need fewer shots and less time in the laser room.

In the beginning, I suggest treating well-defined, fibrous, Weiss-ring–type floaters, because they absorb the laser energy well and can be vaporized more efficiently.

I recommend initially holding off on treating the diffuse, amorphous cloud-like syneresis type of floaters, which can take more shots and multiple treatment sessions. I have treated many of these patients with very good outcomes. These floaters can sometimes be positioned close to the lens, or often be more difficult to visualize and to treat effectively. In fact, in that same study presented at ASCRS, patients needed three sessions to achieve a high degree of satisfaction.[1]

Regardless of the type of floater, I also recommend starting off with patients who are pseudophakic. Pseudophakia allows for an optimized view and, more importantly, removes the concern of inducing a cataract if one should inadvertently hit the crystalline lens. Patients with multifocal lenses are still good candidates, but may be more difficult to treat due to the properties of the lens. Often, the aiming beams and floaters are more difficult to visualize, and the aiming beams can be altered by the IOL. Also, as the floater moves, the view may change depending on the part of the multifocal lens you are looking through.

THE IMPORTANCE OF ON-AXIS AND OFF-AXIS ILLUMINATION

It is important to obtain a clear view of the floater as well as the surrounding structures with a 100% confidence in 3-D space. Ellex's proprietary Reflex Technology allows you to toggle between on- and off-axis modes to better visualize the floaters and to assess their position relative to the lens and/or retina. Accidental shots to the lens or to the retina may occur if one does not appreciate spatial context.

At the start of the procedure, I use on-axis illumination to view the retina, before coming anteriorly to use off-axis illumination, ie, slit lamp in the oblique position. On-axis refers

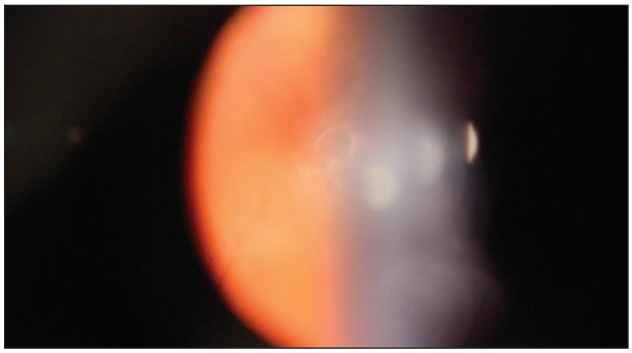

Figure 1. The on-axis mode enables great visualization of the middle and posterior vitreous and allows for spatial context, especially near the retina. Red reflex helps with contrast for certain floaters.

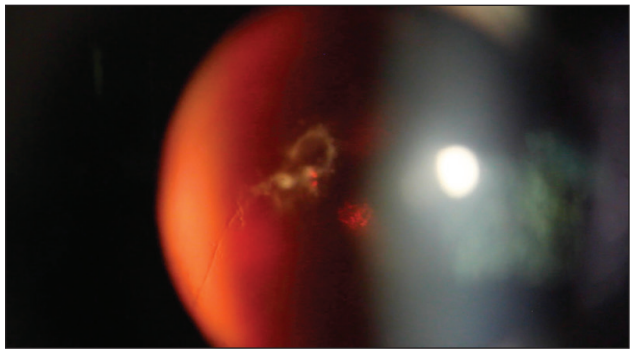

Figure 2. The off-axis mode is beneficial for visualizing anterior floaters, helps to better define the posterior capsule, and decreases glare in some situations. Red reflex is lost, which allows for floaters to appear white.

to the slit lamp, aiming beam, and laser being on the same optical axis. This will enable a red reflex and allow you to see all the way to the retina and, therefore, give spatial context of where the floater is in relation to the retina (Figure 1). Off-axis refers to the slit lamp in the oblique position, which is necessary to appreciate the anterior vitreous and posterior capsule and also provide the necessary spatial context to identify the floaters and surrounding anterior structures (Figure 2). With the off-axis position, you lose the red reflex, but the floaters stand out due to the black background.

If the retina and floater are both in focus, or both close to being in focus at the same time, then it is recommended not to fire the laser.

In on-axis (coaxial illumination) positioning when treating floaters located in the middle and posterior vitreous, keep in mind that if the floater is in focus and the retina is not in focus, you will have sufficient space to fire the laser. This is the best clinical confirmation that you are far enough away from the retina. If the retina and floater are both in focus, or both close to being in focus at the same time, then it is recommended not to fire the laser.

For anterior floaters, it is recommended to use off-axis illumination to help visualize the posterior capsule in determining if there is sufficient distance between the floater and the lens. Again, off-axis illumination can provide additional contrast of the floater by removing the red glow and thus causing floaters to appear white in front of a black background. I use the same principle as judging the depth of the anterior capsule to judge how far the floater is from the posterior capsule.

I usually toggle back and forth between off-axis and on-axis modes to achieve the optimal visualization of the floaters and surrounding structures throughout the procedure.

A LESSON IN ENERGY

The energy level, of course, depends on the density, size, number, and location of the floater. Most treatments can be performed at approximately 5 to 6 mJ per shot. It is not uncommon, however, to use energy levels of approximately 8 to 9 mJ. When I first began using the technique, I used 3 to 4 mJ, but many shots were required and I did not feel like I was vaporizing as efficiently. I quickly came to learn that with 5 to 8 mJ, I was able to vaporize floaters more efficiently using fewer shots. In our study presented at ASCRS, we found the average energy was 5.9 mJ.[1] More energy will be required if the floater is located deep in the posterior vitreous. For example, the same floater may be vaporized at 4 mJ in the anterior vitreous, at 5 mJ in the midvitreous, and 6 mJ in the posterior vitreous.

The number of shots required will vary depending on the type of floater to be treated. There is no official limit to the maximum energy or number of shots, but most physicians limit each procedure to a maximum of approximately 1,000 shots. This is largely due to the fact that, after a significant number of shots, gas bubbles can build up and make visualization more difficult. ■

1. Singh IP. Treating vitreous floaters: patient satisfaction and complications of modern YAG vitreolysis. Paper presented at: American Society of Cataract and Refractive Surgery annual meeting; May 7, 2016; New Orleans, LA.

Inder Paul Singh, MD
- glaucoma specialist, president of The Eye Centers of Racine and Kenosha, Racine, Wisconsin
- financial disclosure: serves on the speakers' bureau for Ellex
- ipsingh@amazingeye.com