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TREATING SYMPTOMATIC FLOATERS WITH LFT

Advanced laser technology
is changing the paradigm
for treatment of
vitreous opacities.

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TREATING SYMPTOMATIC FLOATERS WITH LFT

Advanced laser technology is changing the paradigm for treatment of vitreous opacities.

Today, ophthalmologists have come to understand how floaters affect patients' vision, even when VA is 20/20. Through contrast sensitivity, OCT, and other methods, physicians can clearly see the "shadows" their patients describe. Doctors are acknowledging floaters as a medical concern and becoming more proactive in efforts to treat floaters and improve patients' quality of life. New treatment technologies have emerged to treat floaters, including advances in YAG laser technology which, supported by recent research, are bringing laser floater treatment (LFT) into the mainstream. Retina Today hosted a roundtable with four leaders in this field at AAO Chicago 2018, chaired by Ellex Chief Medical Officer, David Lubeck, MD. The group discussed effective diagnosis, the shifting treatment paradigm for vitreous opacities, and data from a recent clinical trial (Figure 1).



Figure 1. Leading retina specialists talk at the LFT roundtable at AAO Chicago 2018. Left to right: David Lubeck, MD (moderator); Peter A. Karth, MD, MBA; Chirag Shah, MD, MPH; Netan Choudhry, MD, FRCS(C); and Kirk H. Packo, MD, FACS.

CHALLENGES AND PRECONCEIVED NOTIONS OF LFT

► **The concept of laser floater treatment, or LFT, has been around for more than 2 decades. Only now is it receiving widespread attention. What were the impediments to LFT in the past that prevented its earlier adoption?**

Kirk H. Packo, MD, FACS: We were conditioned by a lack of papers on the science of LFT to question its viability. In addition, many physicians who were performing the procedure and continue to do it today were mainly marketing on the internet, adding to the impression among many of our colleagues that this was not something of value. When we saw so much marketing without science behind it, we held back on learning the procedure. Studies of LFT started to come out only recently, and we have some of the authors sitting here today.

Finally, the technology used for this procedure has evolved over those decades. Lasers are different now, and not all YAG lasers are created equal.

Peter A. Karth, MD, MBA: I absolutely agree. Most of the time, vision is determined by Snellen VA, which we know is not significantly affected by floaters. We see floaters' effects in other important aspects of vision—primarily contrast sensitivity and internal aberrations. Those aspects of vision and how they relate to floaters were not widely understood in the past, and floaters were not recognized as a potentially significant visual complaint. Now that we have more data and better diagnostic techniques, we can determine just how much floaters affect a patient's vision. When we combine this enhanced diagnosis with the new treatment technologies, including the novel Ellex laser and modern vitrectomy technologies, it is clear why LFT is now joining the mainstream.

METRICS FOR ASSESSING VISUAL EFFECTS OF FLOATERS

► **As Dr. Karth mentions, most of our patients who are considering LFT have normal or near-normal Snellen VA. What metrics do you use to assess the impact of floaters on their vision?**

Netan Choudhry, MD, FRCS(C): It is tricky. We are all trying to work toward finding some sort of objective metric to quantify and appreciate the degree of visual impairment that patients are experiencing. Our practice has been one of the early adopters of LFT, and we look at two things in addition to standard vision: contrast sensitivity and aberrometry. Contrast sensitivity gives us information that VA does not. In addition, we can actually see on aberrometry the impact of coma that is induced by some of these floaters, particularly when they move into the central visual axis. Once we quantify the visual impact of floaters based on contrast sensitivity impairment and aberrometry, we then confirm that we can actually see it on a color fundus image, which is the same confirmation used in the clinical trial.¹

Dr. Packo: I have seen criticism for both LFT and vitrectomy treatment simply based on the fact that these are 20/20 eyes. The logic goes, “How could you subject a patient with 20/20 vision to the risks of a procedure?” But as we have pointed out, 20/20 vision is the wrong metric to assess vision problems related to floaters. Just as we accept visual fields as an alternate metric for patients with retinitis pigmentosa, who can have 20/20 vision but be legally blind or severely impaired, we need to accept that other conditions require alternative metrics.

For floaters, contrast sensitivity is, in my opinion, currently the leading accepted, validated metric. In a brilliant work, Jerry Sebag, MD, FACS, FRCOphth, FARVO, who is arguably the most knowledgeable person in vitreous anatomy and physiology, showed that the contrast sensitivity drops with floaters, especially if there is posterior vitreous detachment (PVD).²⁻⁴ If you add a multifocal IOL to these patients’ eyes, the combination creates havoc, and yet they are 20/20.

20/20 vision is the wrong metric to assess vision problems related to floaters...For floaters, contrast sensitivity is, in my opinion, currently the leading accepted, validated metric.

—Kirk H. Packo, MD, FACS

Dr. Karth: To me, floater treatment is about making patients satisfied and happy with their vision. I use a visual quality of life questionnaire (VFQ-25, National Institutes of Health) validated specifically for floaters to get an idea of how my patients are seeing. As you said, this is important to know even for patients who are 20/20. A good corollary is cataract surgery, where physicians can use a brightness acuity test to see how bright light affects vision, even with a fairly mild cataract.

When we examine scores for the VFQ-25 before and after floater surgery, we see a significant improvement, sometimes even exceeding the improvement from cataract surgery. Patients want to be happy with their vision, not with any metric or number we tell them, and the data show that floater treatment significantly improves their visual quality of life.

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—Peter A. Karth, MD, MBA

Dr. Packo: We are all proud of the fact that we are doctors. We have chosen this field for a reason. We have all taken an oath that begins with *primum non nocere*, do no harm. We never forget that concept as we look at the efficacy and risk/benefit ratio for any treatment.

At the same time, we have also taken a similar oath as doctors to help people solve their health problem. We accept cataracts as a health problem. We accept diabetic retinopathy as a health problem. People have to accept floaters as a true health problem. I think many physicians have walked away from floaters or discounted them when a patient is complaining. They do not feel floaters are a problem.

One major reason for this error is that doctors are not looking at the right metric. Once we start putting some numbers on true visual deficits related to floaters, we accept floaters as a problem, and we do our jobs and help patients.

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—Kirk H. Packo, MD, FACS

developing new ways to put a metric on how floaters affect vision. The things we have mentioned—aberrometry, contrast sensitivity, light scattering—all have value. The VFQ-25 has also been beneficial as part of many current trials of vitreolysis.^{1,4,5}

Dr. Karth: An excellent corollary is LASIK surgery. These are typically patients with healthy eyes who are unhappy with their vision (with correction). They might be 20/20 with glasses or contact lenses, but they want a better quality of life from their eyes. It is very well accepted to do invasive LASIK surgery on these patients to make them happy with their vision.

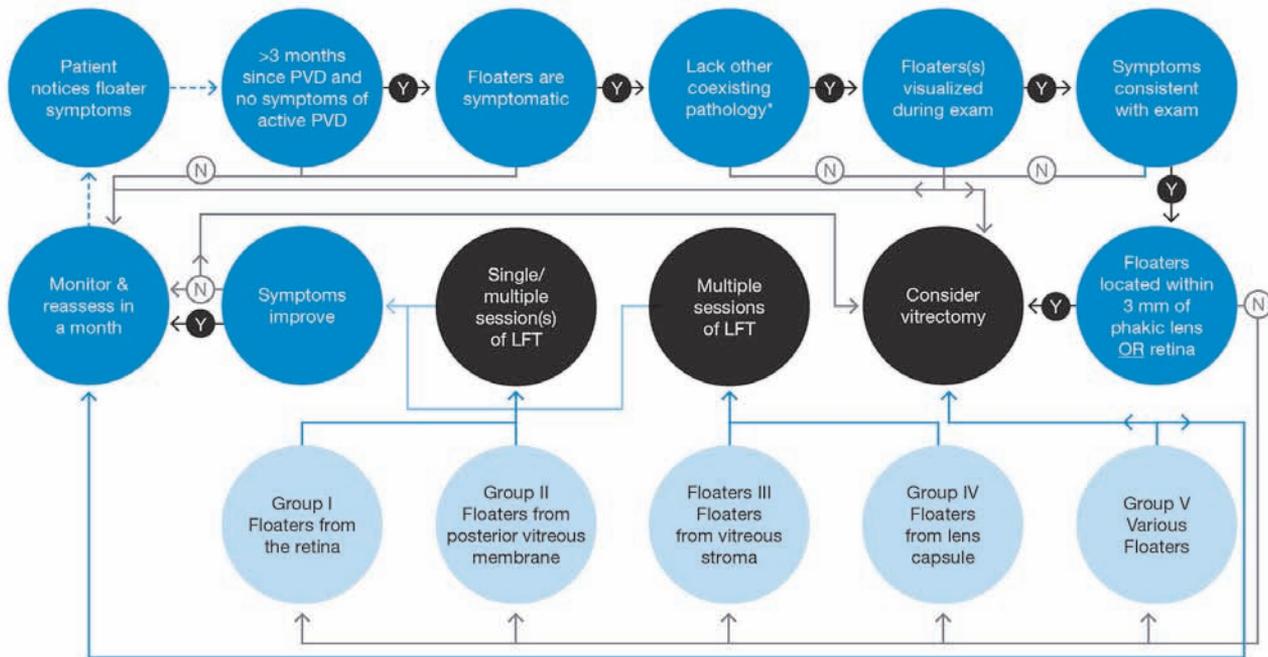
CLINICAL AND EMOTIONAL OUTCOMES OF LFT

▶ **Dr. Shah, as the lead author of the LFT study,¹ how has your thinking evolved since the study was completed?**

Chirag Shah, MD, MPH: I have seen tremendous improvement in some of these patients after YAG vitreolysis as shown by the VFQ-25. Patients reported that there were improvements in their general vision as well as other parameters. What is interesting to

▶ **Do you think that physicians are also more likely to accept floaters as a problem when they have the appropriate technology to deal with them effectively?**

Dr. Packo: Yes. Both the technology to image and quantify floaters and the therapy are evolving now. We are learning and



LFT laser parameters

Anterior vitreous	4-6 mJ/pulse	Posterior offset 0-100µm
Mid-vitreous	5-8 mJ/pulse	No offset
Posterior vitreous	5-10 mJ/pulse	Anterior offset 0-100µm

*Coexisting pathology should be assessed per case, and may include:

Active inflammation	Vitreous haemorrhage
Uncontrolled glaucoma	Corneal opacity

Figure 2. Decision Tree: Floater Treatment.

If someone has a clear-cut Weiss ring floater and just a few floaters that could be amenable to YAG vitreolysis, I refer the patient for the treatment. If they have more diffuse floaters and more nebulous floaters, then we have a long conversation about performing a vitrectomy.

—Chirag Shah, MD, MPH

me is that we brought most of these patients back for follow-up visits at 2 and 3 years, and we found that they showed improvements in mental health. I thought it was fascinating that not only did we maintain the same degree of efficacy a few years after YAG vitreolysis, but patients also had improved mental health.

Dr. Choudhry: Some of those results may speak to the patient selection. When we are deciding which patients should have which type of procedure or any procedure at all, we have a discussion with them where we try to determine the degree of impairment and how it affects their lives. All of us see patients with PVD in our practice every day, and most of them do not complain about their vision. But there is that fraction of people who are debilitated. They cannot do their jobs anymore. They cannot paint or draw. It is not surprising to see that, when we do something about their visual problems and help them make a living and enjoy life, that treatment would prompt a significant improvement in their mental and emotional health.

TREATMENT ALGORITHM FOR FLOATERS

► How do you determine which of your patients with floaters should have LFT versus vitrectomy?

Dr. Karth: These two treatments go hand in hand for me. Vitrectomy is also an important tool to treat patients who are unhappy with their vision from floaters. Modern vitrectomy technology has advanced so much, especially with 27-gauge ultralow-invasive surgery, that we can do vitrectomy safely in most cases.

Floaters are more appropriate for laser, in my opinion, when there is a clear Weiss ring or few consolidated clumps and patients tell me it bothers them. And we always have vitrectomy as a backup if LFT does not quite produce the desired results or if there are other floaters that cannot be addressed with the laser. Working with these two procedures hand in hand, we can make patients happy with their vision (Figure 2).

Dr. Shah: I find that YAG vitreolysis serves as a nice niche or, as you alluded to, a stepping stone towards vitrectomy. If someone has a clear-cut Weiss ring floater and just a few floaters that could be amenable to YAG vitreolysis, I refer the patient for the treatment. If they have more diffuse floaters and more nebulous floaters, then we have a long conversation about performing a vitrectomy.

Dr. Choudhry: My approach is similar. I also do vitrectomy on a handful of patients per year for floaters. That number has dropped since I gained access to the Ellex laser because there are patients who fit the criteria of this in-office procedure. And, as you mentioned, for that subset of patients who still have residual deficits, vitrectomy is an option.

Dr. Packo: There is a branch point in the algorithm for these patients. I am called on more often to evaluate patients for vitrectomy, and the first thing that is important for me to know is whether they have a PVD. Patients in both camps complain of floaters and debris. The Weiss ring with PVD is the easy procedure. We have great data that show the concurrent vitreous detachment that accompanies Weiss ring floaters decreases contrast sensitivity, so it is not just aggravation from the Weiss ring's shadow.²

Then we have the younger patients with floaters, typically myopes, who do not have a PVD. They have large mats of condensed collagen in the vitreous in various places in the eye, whether it is the front or middle, and those mats are very annoying to them. Contrast sensitivity can be affected with those patients. If we do a vitrectomy, there is significant risk of inducing a PVD. This is the branch in our algorithm, because laser may be the more appropriate choice for these mats of floaters. It takes more time to get rid of those, and we might need two sessions, but the less invasive approach may be best for these patients.

Once I evaluate PVD's effect on treatment options, I look at patients' phakic status—not just phakia versus pseudophakia, but also phakia versus pseudophakia versus multifocal implants, since multifocal IOLs aggravate a patient's awareness of floaters while concurrently reducing contrast sensitivity further.⁶ The final factor is the patient's age. For younger patients, I consider the risk of cataract formation associated with vitrectomy. There are vitrectomy techniques we can choose to reduce that risk. For example, Dr. Sebag has shown that, if we do not induce an iatrogenic PVD at the time of surgery and instead just remove the floaters during vitrectomy, then we reduce the chance of retinal tears and significantly lower postoperative cataract formation in patients under 50 years of age.³ A good deal of decision-making goes into picking the right procedure for each patient.

If patients say there is one particular problem area or one floater, and I can correlate that inside the eye by looking at the Weiss ring, then it is an easy decision to perform LFT. If patients are talking about huge nets and clouds, which I call diffuse floaters, I more closely evaluate for a vitrectomy.

—Peter A. Karth, MD, MBA

HOW TO EVALUATE FLOATERS

► How do you evaluate and quantitate floaters?

Dr. Karth: In my practice, evaluation is primarily based on the slit-lamp examination. I obtain an OCT to absolutely confirm PVD and make sure there is no vitreoschisis or other problems. I also really like to listen to my patients and understand what they are seeing. I view this as strictly a quality-of-vision paradigm, so I want to hear what they are seeing and what bothers them. It is critical to make sure that we are discussing the same problem in their vision, because sometimes we can treat a Weiss ring and know it is gone, but patients are still not very happy because we have not addressed the actual source of the floater-related vision problem.

If patients say there is one particular problem area or one floater, and I can correlate that inside the eye by looking at the Weiss ring, then it is an easy decision to perform LFT. If patients are talking about huge nets and clouds, which I call *diffuse floaters*, I more closely then evaluate for a vitrectomy. We can nearly always determine the best choice with good listening.

Dr. Shah: I have not done laser vitreolysis before or after our clinical trial, but during our clinical trial, I found it very helpful to have the same conversation you are describing with patients about how many floaters they see and how floaters are bothering them. Then as I looked at wide-angle color photography, I could point to the floaters that were causing the symptoms. That was critical. If they tell me that the one large floater is causing symptoms, but there are also a lot of diffuse smaller floaters that may not be visible in the photograph, then the patient may be a better candidate for vitrectomy rather than YAG vitreolysis.

Dr. Choudhry: The link between symptoms and testing needs to be stressed. We are making sure that we correlate what the patient is reporting to what we are actually seeing. Using a wide-field image is obviously important. We do it before and after treatment, so we can show the patient that there has been a change. By pointing out the floaters that are now gone, we can actually demonstrate the improvement that we think they will experience.

I also recommend that, when we decide to use the laser, in addition to the slit lamp, we also bring the laser lens to the clinic. The laser view is very different from the slit lamp, so I examine the patient with the laser lens to make sure that I will see the floaters on the laser as I see them in the clinic.

These measures are part of being suitably cautious and taking our oath to do no harm very seriously, while making sure we can deliver on the promise to improve the patient's quality of vision.

Dr. Packo: When evaluating floater patients, I look at the slit lamp first to verify their presence, but I have found that this is not quite enough. Sometimes, when I saw very minimal floaters, I would wonder if the patient was just fixated on them and might be a problematic patient to treat. The wide-field photography is different than standard camera photography of the eye and shows floaters better due to the shadows it induces. I have found that the shadow evaluation of floaters is really helpful with our current technology.

I do an OCT as well to make sure the macula is healthy. I also look at the kinetic OCT on the infrared screen during the OCT acquisition by my technician. The infrared scanning laser image beautifully heightens the visibility of the floaters. It shows me their motion. I have patients look up and look down, and I can see multiple layers of floaters that move in one direction closer to the retina or in the opposite direction in the front of the eye. Patients simulate reading by looking to the right, then back to the left, and I can see where the floaters ultimately hang as the eyes refixate.

Like wide-field photography, infrared kinetic OCT imaging shows the retinal shadow induced by the floaters. Those closer to the retina appear smaller and more discrete on the image, while more anterior floaters cast a larger and more diffuse shadow. In the end, this effect is valuable, too, because it mimics the shadow induced in the patient's actual vision. When we show a short video capture of that infrared screen to patients, they often say, "That is exactly what I see."

Although quantifying floaters by the retinal shadow cast may be helpful to understanding their impact, the problem with this method is that we do not accurately know their size. A Weiss ring deep in the eye tends to have a very discrete, small shadow. A floater anterior to the eye may be the same physical size, but its shadow appears larger.

PATIENT EXPECTATIONS AND PLANNING

► **We mentioned that it is important to correlate imaging with the patient's symptomatology. Does that help you to set expectations for treatment?**

Dr. Karth: Data from the clinical trial turned out to be accurate in my own practice, so I lay that out to the patient in broad strokes. I assure them that the floaters that bother them will be about 85% better.¹ I also like to stress that 85% is not complete treatment, and they will have floaters if they look for them after LFT treatment. But because we agree on the floaters that they want to eliminate, I can assure them that I will largely get rid of those. With these kinds of preprocedural expectations, my patients are nearly always satisfied.

Dr. Packo: Managing expectations is critical to every procedure we offer, including LFT and vitrectomy. It is important that patients understand that we are not removing all floaters. We tell them that LFT is not complete, but 85% of patients are happy with the difference. If patients are not satisfied with the results of LFT and we move to vitrectomy, we explain that the removal of floaters will be more complete. A very small percentage of patients are still bothered by floaters after either procedure, even when we see a crystal clear vitreous after either of these treatments. Forewarning the patient that they may still see some floaters postoperatively is important.

After one or two treatments, 85% of these patients are happy. They are done with their issue. For the 15% who may have residual issues, we can have a discussion about other options like vitrectomy.

—Netan Choudhry, MD, FRCS(C)

Dr. Choudhry: It really boils down to picking the right cases. When I do that, I do up to two sessions with the patient over 30 days. After the first session, I see patients back in a few weeks and make sure that they are happy and seeing better. If there is a residual problem that can be visualized and treated, then I offer them a touch-up. After one or two treatments, 85% of these patients are happy. They are done with their issue. For the 15% who may have residual issues, we can have a discussion about other options like vitrectomy.

► **How do you time your sequential LFTs, if more than one is needed?**

Dr. Choudhry: I usually wait a few weeks to 1 month between sessions. That gives them some time for the changes and the debris to become normalized. Once they become comfortable with their vision, we see where they are. I do not think we have a clear guideline that lays out how to follow this longitudinally, because we are still in this early phase of exploration in terms of timing.

UNDERSTANDING THE LFT PROCEDURE

► **Surgeons have used YAG lasers for many years. Has performing LFT increased your understanding of how advanced YAG lasers work—and how their efficiency allows us to perform LFT both safely and efficaciously?**

Dr. Shah: You raise an important point. If you look back in the literature, in 2002, Yvonne Delaney, MB, BCH, BAO, MRCP, FRCOphth, and colleagues published a very small study of 39 eyes that they treated with vitreolysis.⁷ They did not raise the power above 1.2 mJ, and they found that only 38% of patients had moderate improvement.⁷ This efficacy was lower than that reported in our study. We went up to 7 mJ, significantly higher than Delaney and colleagues. When we get the laser to a higher power, we actually start vaporizing tissue rather than fractionating it. That might be the reason that we are seeing better outcomes in our study, compared to the study from Dr. Delaney and colleagues.

Dr. Choudhry: I agree. When we are performing LFT, we are broaching higher powers than we are accustomed to using for a simple YAG capsulotomy, for example, which is where we have all originally learned to use the YAG laser. For most of my cases, I start the laser above 5 mJ and then dial up higher. I use the gas bubbles and the markers of changes within the floaters to guide where we are in terms of the power.

Dr. Packo: It is also total power. If you are conditioned with your knowledge of YAG lasers for capsulotomies, then you are used to completing the capsulotomy in 10 to 20 pulses, or perhaps less. You do not treat floaters with one or two pulses, even if you are at 7 mJ. It can be surprising how many total shots are needed to adequately treat the floaters.

Dr. Karth: The number one thing that makes the Ellex laser appropriate and workable for LFT is visualization. Years ago, I used to attempt to treat some anterior floaters with an older, “legacy” YAG laser. Results were not good due to visualization. With True Coaxial Illumination (TCI) from Ellex, we can see all the way back to the retina. We can see all the floaters deep into the eye, with increased depth and field of view (Figure 3).

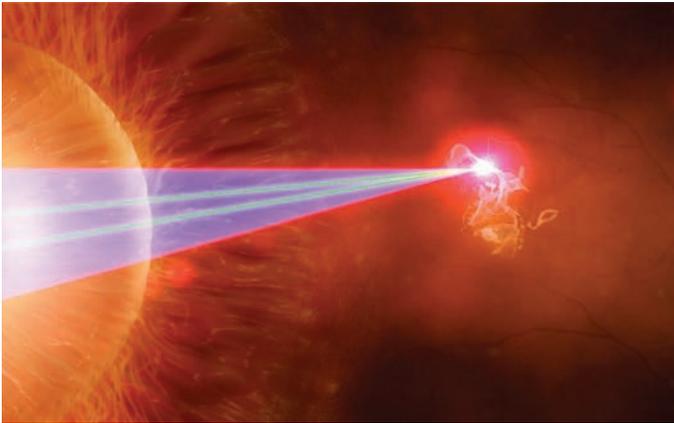


Figure 3. Ellex Reflex Technology with TCI brings together the illumination, laser aiming beam, and laser delivery beam into the same plane, allowing better visualization of vitreous opacities.

This is a key feature that is totally different from other lasers, and it has taken LFT out of the dark ages.

In terms of the physics of the new YAG laser for LFT, the Ellex is a 3-nanosecond laser. Typical lasers are 4 nanoseconds. The technology is putting the same amount of power into a shorter duration. That gets us to the ablation zone of shot delivery in a much more efficient manner.

Finally, it is essential to note where the blast of ablation goes with the new YAG laser. It comes forward, toward the operator. This means that you can essentially get right up on the retina and still not have any effect on the retina itself. Obviously, we do not do that, but you can actually safely do that. We can use a YAG laser to lyse strands of fibrotic vitreous in diabetic retinopathy, tractional detachments, and other conditions, which I occasionally do. The bottom line is that the Ellex YAG laser is dramatically different, and those differences make LFT and other treatments viable and successful options.

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—Peter A. Karth, MD, MBA

Dr. Shah: I teach our fellows that, when we are doing surgery, the three most important things are visualization, visualization, and visualization. If they can see, they can safely perform vitrectomy or any other procedure. As the YAG laser technology has evolved to give us better visualization, I think that it has helped improve the safety profile of the YAG vitreolysis procedure.

Dr. Packo: TCI allows us to see what the patient is complaining about as well (Figures 4 and 5). I ask patients to move their eyes around during the treatment, which brings floaters up into that corridor. Coaxial light gets us there.

We have used our legacy lasers for capsulotomies, and we know that, if we get coaxial illumination, we will interrupt the laser beam. The laser will even turn off until we move it to the side again. With the Ellex YAG laser designed for LFT, we can be dead central-coaxial, and the technology flips it out of the way for the brief second that the laser needs to burst. It is an elegant design.

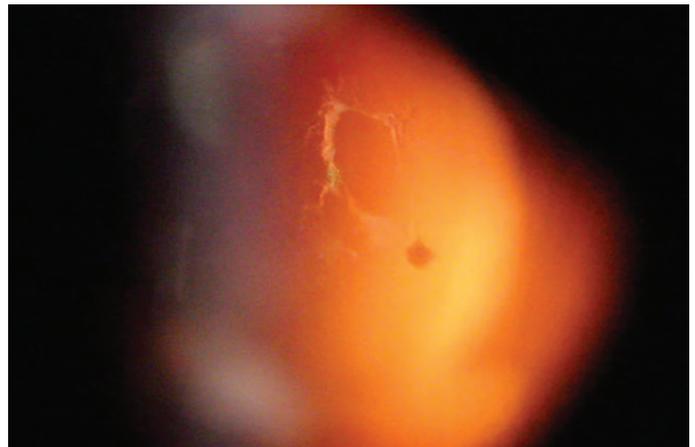


Figure 4. On-axis TCI allows floater to be clearly visualized against the red reflex of the retina.

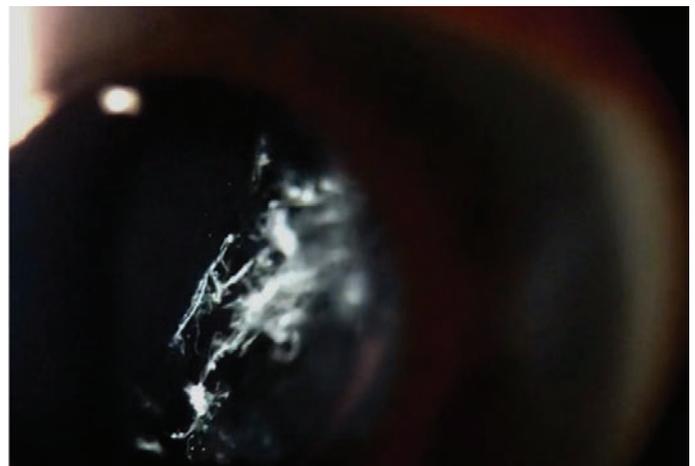


Figure 5. Off-axis (oblique) illumination allows floater to be clearly visualized against a dark background.

Courtesy ofINDER PAUL SINGH, MD.

Courtesy ofINDER PAUL SINGH, MD.

At ARVO 2017, Dr. Singh presented a poster about nearly 1,300 eyes that he had treated with YAG laser vitreolysis. He looked specifically at adverse events, and he found that there was less than a 1% risk of developing glaucoma, lens damage, or retinal damage. In that large sample, there were no cases of RD.

—Chirag Shah, MD, MPH

THE SAFETY PROFILE OF LFT

► **What are your thoughts on the safety and efficacy profile of YAG laser vitreolysis with current technology? Are you concerned about inducing a retinal detachment (RD)?**

Dr. Karth: In patients who have already had a PVD, which for me is essentially every patient for whom I perform LFT, data show that the risk of inducing a new retinal tear is extremely low.⁸ It is important to look for high-risk lesions such as lattice degeneration preoperatively, as well as to adhere to follow-up care, but the risk is low.

There have been reports of some surgeons hitting the retina and causing a little bleed.⁹ We have to be careful and aware to avoid disrupting tissue that we should not. With the improved visualization afforded by Reflex Technology (Ellex), it is extremely easy to ensure the safety of treatment. Overall, as I tell my patients, LFT has a very favorable risk profile.

Dr. Shah: At AAO 2017, Inder Paul Singh, MD, presented a poster about nearly 1,300 eyes that he had treated with YAG laser vitreolysis.⁸ He looked specifically at adverse events, and he found that there was less than a 1% risk of developing glaucoma, lens damage, or retinal damage. In that large sample, there were no cases of RD.

My colleagues and I conducted a randomized controlled trial of 52 eyes and found that, at 6 months, there were no retinal tears in the 36 patients treated with YAG vitreolysis.¹ What was really interesting is that one of the sham patients treated with sham laser, who had preexisting lattice degeneration, developed a tear during the observational period. I think this speaks to the possibility that this patient population may be slightly predisposed to developing retinal tears and RDs, not attributable to YAG vitreolysis because she did not have it.

We recently conducted a long-term follow-up study, bringing the same patients back 2 to 3 years after their last YAG vitreolysis session.¹⁰ In the 35 patients that came back, three had stable retinal tears that definitely were not present at the 6-month

mark. This was shown on wide-angle color photography and depressed dilated fundus examination. Follow-up of the control arm did not go out that far, but my sense is that these patients may be predisposed to developing tears simply because they are myopic. They have visually significant vitreous floaters. Perhaps there is something more leathery about their hyaloid that predisposes them to tears and symptoms.

YAG vitreolysis does have risks. We know that the ASRS put out a surveillance paper, led by Paul Hahn, MD, examining the complications reported by retina specialists over time.¹¹ RDs and retinal tears were reported, but we do not have a denominator for that study, so we cannot calculate the rates. Despite not having a direct, head-to-head comparative trial, I think it is still safe to say that the risk of developing a retinal tear or RD is much lower after YAG vitreolysis than after vitrectomy surgery.

Dr. Karth: Going back to the significant visual dysfunction that is causing these patients to seek treatment, once I explain the relatively minor, or at least manageable, risks, I find that nearly all patients choose the treatment. It is similar to LASIK. Patients who are unhappy with their vision undergo LASIK or a clear lens exchange, willingly taking minor risks for the visual satisfaction they want.

WORKING TO ENHANCE LFT

► **Dr. Karth, you mentioned that you are establishing ways to keep this procedure safe. Could you explain that in more detail?**

Dr. Karth: Considering that the laser blasts toward the operator, we know we can get very close to the retina safely, but I always like to go at least 3 mm anterior to the retina to be safe. This is something I do by feel, but it is very clear. When the retinal vessels are starting to resolve, I have gone far enough.

With the laser's two-dot aiming beam system, we can clearly see exactly where we are in the eye with the TCI. Similarly, in the anterior segment, I stay 3 to 5 mm posterior to the crystalline lens, and I have never had a cataract form. Again, you know when to stop when you see it. If you are in front of the laser, it is very easy not to come too close to the lens.

Dr. Shah: In our study, we quantified the floaters using B-Scan ultrasonography.¹ It allowed us to see where the Weiss ring was located with respect to the retina and the posterior lens capsule in phakic patients. We found that, in every single case, if a patient had a PVD with the Weiss ring, the Weiss ring was always greater than 3 mm from the retina and greater than 5 mm from the posterior surface of the lens. Those were our a priori parameters, and every single person fell into that parameter. As long as you are focusing on the Weiss ring, you are going to be in that safe zone.

The other thing we found is that OCT helps us confirm if a patient has a PVD. There are times when we are fooled by myopic vitreopathy appearing like a Weiss ring, but there is no PVD.

Dr. Packo: Some of these patients are myopic without PVDs. They are younger patients who are almost always phakic. I have found that those patients are also more likely to have more diffuse floaters or mats of floaters in the mid- or anterior vitreous. It takes a good deal of laser pulses to eliminate them. Do you go after those patients as well? I know LFT has the potential to help them. What are your thoughts?

Dr. Choudhry: I have operated on some myopes in my practice. I think the patients you are describing have a PVD. They have liquid vitreous, and then they have floating strands. My approach is basically the same with these patients. I want to make sure that the periphery is safe and free from lattice and other high-risk features, but if it is of visible opacity that I can see and I can treat and the other risk factors have been mitigated, then those things do not stop me from offering LFT to the patient.

WOULD YOU RECOMMEND LFT TO A LOVED ONE?

▶ **If a loved one had visually significant floaters and had access to LFT, would you recommend it?**

Dr. Karth: Absolutely.

Dr. Shah: Yes, I would.

Dr. Choudhry: Yes, I would also. Our answers speak to the fact that the risk profile is quite favorable. There is another option, if need be, but what we have seen thus far with the

studies and our own clinical experiences is that these patients do very well and they are very happy.

Dr. Packo: If I were counseling a family member, I would make the exact same recommendation I would offer to a patient. I would listen to what they are telling me. If they just say, "I have floaters," I would not jump to laser treatment. I have a PVD and floaters in my right eye, but I have not had laser treatment because they do not really bother me. If floaters do not bother someone, leave them alone. But if the floaters are bothering them or interfering with their occupational or recreational needs, I listen and acknowledge that it is a problem. I recommend LFT or vitrectomy depending on the situation, and I would do the same for my own loved ones. The goal is to convince more ophthalmologists to acknowledge that floaters are a problem and then understand that we do have treatments available that help. ■

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To learn more about LFT go to www.Floater-LFT.com

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