

CATARACT

Shedding Light on Pseudophakic Dysphotopsia

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INTERVIEWING JONATHAN M. DAVIDORF, MD, KEVIN M. MILLER, MD, AND STEVEN I. ROSENFELD, MD

Negative and positive dysphotopsias have taken a prominent place on the list of pseudophakic patients' visual complaints. "Probably 20 percent of patients will have some form of dysphotopsia after cataract surgery," said Kevin M. Miller, MD, chief of cataract and refractive surgery at the University of California, Los Angeles. "Fortunately, for most patients, it's a transient issue. It's the cases in which it doesn't go away where we have to sweat it out."

Unpredictable Challenge

Positive dysphotopsias often appear as halos, starbursts, flashes, or streaks of light, while negative dysphotopsias are perceived as a shadow in the visual periphery.

"It's important to know that sometimes, despite our best efforts and despite a perfect operation, a patient can experience positive or negative dysphotopsia. There's no way to predict it," said Steven I. Rosenfeld, MD, who practices in Delray Beach, Fla.

Furthermore, when visually significant symptoms persist (which is more likely to occur in the case of negative dysphotopsias), the course of treatment depends largely on the surgeon's best judgment, said Jonathan M. Davidorf, MD, who practices in West Hills, Calif.

"The exact cause of these negative dysphotopsias is elusive. There's not a lab test you can get to prove what's causing them. And there's no tried-

and-true, slam-dunk treatment that will work in every patient."

Preventive Strategies

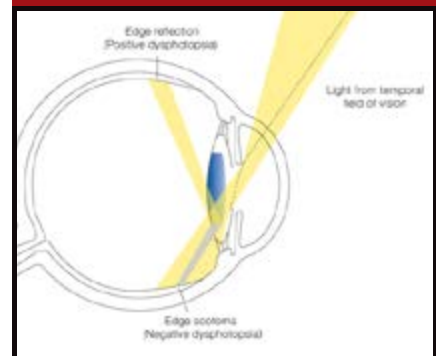
To date, prevention options are limited and largely empirical in nature. Moreover, scientists have yet to develop a device that can determine which, if any, intraocular lenses (IOLs) are more likely to cause problems for an individual patient. Nonetheless, the following may prove helpful.

Orient the haptics horizontally. Dr. Miller tells colleagues that they might avert much negative dysphotopsia by modifying their cataract surgery routines in one simple way: Whenever possible, orient the IOL's optic-haptic junctions at the 3 and 9 o'clock positions in the eye.

Doing so funnels some of the light bouncing around in the IOL toward shadow-prone retinal areas nearby, Dr. Miller said. "This is purely anecdotal, but in my practice this simple strategy has reduced the incidence of the problem from about 20 percent to maybe less than 5 percent."

He explained, "Some rays of light from the temporal field of vision enter the optic and then hit the square edge of the lens from the inside. If the lens is positioned properly, some of those rays are going to escape through the lens edge, enter the optic-haptic junction, and move into the proximal part of the haptic. They will scatter when they get there and fill in the area that might otherwise be in a shadow. The scattered light will kind of bleed through

Working Hypothesis



The origin of optical phenomena caused by sharp-edged IOLs.

the edge of the lens, and that will do a huge amount of good."

Proceed cautiously with second-eye cases. If a patient developed pseudophakic dysphotopsia after implantation in the first eye, the surgeon should undertake second-eye surgery cautiously, using a lower-risk IOL and surgical techniques that their experience or early research suggests might reduce the risk of visual disturbances. "If the IOL in the first eye is an acrylic with a high refractive index, or a one-piece lens with flat edges, I would want to switch perhaps to a silicone lens with a lower refractive index and rounded edges" for the second eye, Dr. Rosenfeld said. "And I would use reverse optic capture right from the start" (see below under "Surgical Approaches").

Nonsurgical Approaches

The number-one nonsurgical method of addressing dysphotopsia is the wait-

and-see approach, because these problems usually diminish within a matter of weeks. In the meantime, the following steps can be taken to improve the patients' visual function and/or satisfaction.

Validation. Patients who complain about visual disturbances need reassurance, especially in the early postoperative weeks, Dr. Rosenfeld said. "When someone complains of any form of dysphotopsia, I always validate the patient's feelings rather than trying to deny it." He recommended telling patients that their symptoms are likely to resolve over time.

Pupillary manipulation. Eyedrops that constrict the pupil, such as pilocarpine and brimonidine, can help with positive dysphotopsias at night as the patient's brain begins the process of neuroadaptation.

Although most patients quickly tire of instilling the drops, this approach can provide useful information. "With negative dysphotopsias, the drops usually don't help at all. Sometimes that's a nice way to distinguish what is going on," Dr. Rosenfeld said.

Spectacles. "Even if a patient doesn't really need eyeglasses, have them wear glasses, maybe with a slightly heavy or thick frame," Dr. Miller said. The brain will interpret the frame as the object that is blocking the patient's peripheral vision, and "This feels much more normal to the patient than the shadow does," he said. "This can actually buy you a lot of ground."

Address other visual complaints. Dr. Davidorf said he finds it helpful to deal with the patient's other visual problems while waiting for the dysphotopsia to improve. "Identify other potential confounding issues. Maybe you correct their residual refractive error, or help with their dry eye problems. These are things you can do without burning any bridges, and it might keep you from having to do an extra surgical procedure later."

Indeed, that is what happened with a patient who had negative dysphotopsia apparently caused by a femtosecond laser incision. Dr. Davidorf said he avoided an explantation of the man's

accommodating IOL by instead performing cataract surgery on his other eye. After the manual-incision surgery, the patient no longer had significant anisometropia, his far and intermediate acuity improved, and surgical correction of his dysphotopic eye no longer felt urgent to him. "The shadow in his eye was still there, and it was still bothersome to him. But overall he was functioning pretty well, and most of the time it wasn't affecting his life," Dr. Davidorf said.

Surgical Approaches

Explantation. Dr. Miller's preferred surgical treatment for severe and persistent negative dysphotopsia is in-the-bag IOL exchange with a different type of lens. Dr. Davidorf also favors replacing the problem IOL if nonsurgical options fail, as long as he is convinced that the dysphotopsia is being caused by the patient's current IOL.

Dr. Rosenfeld said he has successfully used all the available surgical approaches to dysphotopsia, including explantation, and chooses from them based on the case details. "For instance, there's some clinical evidence that IOLs with smaller optics are more inclined to have dysphotopsias. So I'm less inclined to leave a 5-mm optic in the eye." In contrast, if a patient has a lens optic of 6 mm or greater, "I'm more inclined to leave that lens in place and try something like reverse optic capture," he said.

Reverse optic capture. There are two forms of reverse optic capture, both of which are aimed at assuring that the anterior capsulotomy does not overlap the IOL optic.

- **Primary, as prophylaxis.** During primary cataract surgery, the surgeon places the IOL in the bag, then lifts the lens optic into position in front of the anterior capsulotomy margin. The haptics remain fixated in the bag. Dr. Rosenfeld employs primary reverse optic capture in the second-eye cataract surgery of any patients who had persistent dysphotopsia in the first eye.
- **Secondary, as a treatment.** The problem IOL's optic is moved into the sulcus, and the haptics remain in the

capsular bag. For Dr. Miller, this is his plan B procedure if an explant cannot be done. However, the anterior capsulorrhexis cannot be too large; it must be 0.5 mm smaller than the diameter of the optic for the procedure to work as intended, he said.

Sulcus fixation. Replacement of the problem IOL with a sulcus-fixated lens, which positions the anterior capsulotomy behind the optic, has been found effective.

Piggyback lens. Dr. Rosenfeld noted that he has resolved dysphotopsia in this way. And in one report, a piggyback IOL improved or eliminated symptoms in 8 of 10 eyes with negative dysphotopsias.¹

Anterior nasal capsule removal. In two case reports, surgeons reported limited success at resolving negative dysphotopsia by removing the nasal anterior capsule with an Nd:YAG laser.^{2,3} ■

1 FDA/AAO Workshop on Developing Novel Endpoints for Premium IOLs, held March 28, 2014, Silver Spring, Md.

2 Cooke DL et al. *J Cataract Refract Surg.* 2013;39(7):1107-1109.

3 Folden DV. *J Cataract Refract Surg.* 2013; 39(7):1110-1115.

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MORE ONLINE. For more on the underlying theories of what causes dysphotopsias and additional surgical pearls and considerations, see the Web Extra that accompanies this article at www.eyenet.org.