

# Treating, eliminating negative dysphotopsia

by Vanessa Caceres EyeWorld Contributing Writer

## AT A GLANCE

- Negative dysphotopsia can occur after cataract surgery, even if the surgery was perfect.
- Surgeons cannot predict who will experience negative dysphotopsia.
- It's best to observe patients for a few months before providing treatment, as many cases will resolve on their own.
- Treatment options include Nd:YAG laser capsulectomy, a piggyback lens, and lens exchange.

## Treatments linked to suspected causes; prevention remains under investigation

**T**he best way to treat negative dysphotopsia remains a hot topic among surgeons. Negative dysphotopsia that occurs right after cataract surgery is usually best left to resolve on its own. However, if the problem continues a few months after surgery, ophthalmologists must step in to provide a treatment. Their treatment approach usually depends on what they suspect is the cause.

### Looking at causes

Negative dysphotopsia appears in patients as a temporal crescent-shaped shadow after in-the-bag IOL implantation following cataract surgery. It was first reported in 2000 by **James Davison, MD**, cataract and refractive specialist, Wolfe Eye Clinic, with locations throughout Iowa.<sup>1</sup> Dr. Davison said he observed the phenomenon with acrylic square-edge IOLs, which were introduced in the 1990s as a way to prevent posterior capsule opacification.

"There's controversy with the exact mechanism of action," said **David V. Folden, MD**, North Suburban Eye Specialists, Minneapolis. "I think more physicians and data would support the fact that it's ultimately the sharp posterior optic edge design of the modern-day IOL that's likely the culprit."

Other suggested factors include an IOL's high index of refraction, transparency of the peripheral nasal

capsule, and type of incision used during surgery.

The immediate postop incidence for negative dysphotopsia appears to be around 20%, said **Samuel Masket, MD**, in private practice in Los Angeles, and clinical professor of ophthalmology, Jules Stein Eye Institute, David Geffen School of Medicine, University of California, Los Angeles. However, long-term chronic dysphotopsia complaints are closer to 1.5% to 3%, Dr. Masket said.

Surgeons cannot yet predict who will experience negative dysphotopsia, said **Jack T. Holladay, MD**, clinical professor of ophthalmology, Baylor College of Medicine, Houston.

Dr. Holladay wrote an article in 2011 that used ray tracing diagrams to explain negative dysphotopsia.<sup>2</sup>

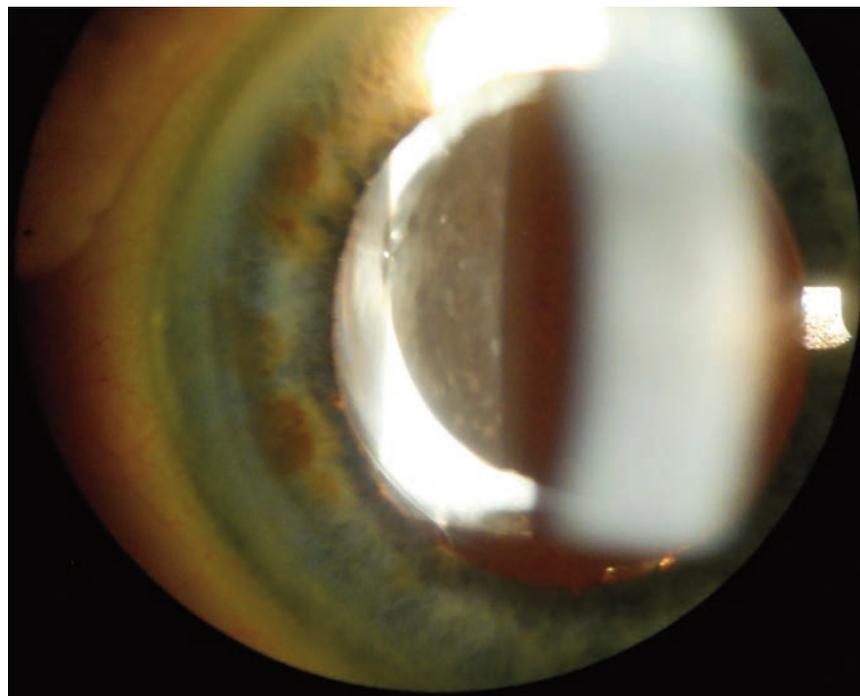
"The peripheral arcuate shadow that patients see is the result of square-edge optics causing a refraction of the rays that pass through the edge of the lens that go in opposite directions (leaving a blind spot), and that creates a shadow. That always happens. If that shadow falls anterior to the functional retina, then you can't see it. If it falls on the functional retina then you'll see it," he said.

"Not everyone's peripheral retina is at the same point. People who have a functional retina extending far anteriorly will have a higher chance of experiencing this than people who don't," Dr. Holladay said. "We have no clinical way of determining how far a patient's functional retina goes." However, Dr. Holladay added that if someone experiences negative dysphotopsia in one eye, it's more likely that he or she will experience it in the fellow eye as well.

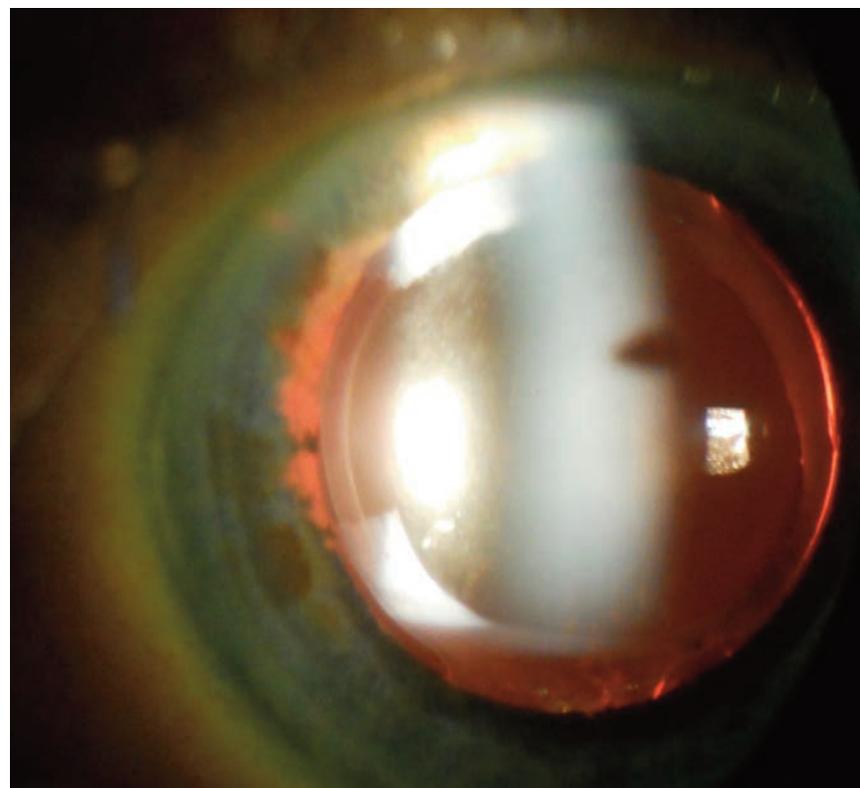
### Available treatments for negative dysphotopsias

The first recommended treatment for negative dysphotopsia is observation. "Observation is a great first step. Ultimately, we think the capsule peripheral to the optic edge on the nasal side clouds over time, increasing light scatter into that shadow, and that eliminates the negative dysphotopsia," Dr. Folden said.

If the patient still has the problem 3 to 4 months later, the use of



Slit lamp image shows the nasal anterior capsule overlying the anterior surface of the IOL optic prior to Nd:YAG laser anterior capsulectomy.



This shows the creation of an anterior capsule sector along the nasal aspect of the capsulorhexis following Nd:YAG laser anterior capsulectomy.

Source (all): David Folden, MD; *J Cataract Refract Surg.* 2013;39:1110-1115

thick-framed glasses or a trial dilation can take place, Dr. Folden said. However, not many patients want to use thicker frames, and dilation is good for diagnosis but not for treatment, he cautioned.

Even if patients must wait a few months before treatment, Dr. Masket

reassures them what they are experiencing is a legitimate—and bothersome—visual phenomenon.

A treatment approach published recently by Dr. Folden in one report and **David L. Cooke, MD**,



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## Health Care Professional Information Sheet – All CustomVue Indications

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As with any surgical procedure, there are risks associated with the CustomVue Treatment. Before treating patients with the CustomVue Procedure, you should carefully review the Professional Use Information Manual, complete the Physician CustomVue Certification Course, provide your patients with the Patient Information Booklet for CustomVue LASIK Laser Treatment, and discuss the risks associated with this procedure and questions about the procedure with your patients.

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The VIXS STAR S4 Excimer Laser System and WaveScan WaveFront System are approved to perform wavefront-guided laser assisted *in-situ* keratomileusis (LASIK) treatments for the reduction or elimination of low to moderate myopic astigmatism up to -6.00 D MRSE, with cylinder between 0.00 and -3.00 D in patients 21 years of age or older; and in patients with documented evidence of a change in manifest refraction of no more than 0.50 D (in both cylinder and sphere components) for at least one year prior to the date of preoperative examination.

Wavefront-guided LASIK for correction of low to moderate myopic astigmatism is an elective procedure with the alternatives including but not limited to eyeglasses, contact lenses, photorefractive keratotomy (PRK), conventional LASIK, and other refractive surgeries. Approval of the low to moderate myopic astigmatism application is based on a clinical trial of 351 eyes (189 primary and 162 secondary). Of all eyes treated, 318 were evaluated for effectiveness with 98.8% accountability at 3 months, 277 eyes with 96.9% accountability at 6 months, 102 eyes with 95.3% accountability at 9 months, and 86 eyes with 95.6% accountability at 12 months. The studies found that of the 277 eyes eligible for the uncorrected visual acuity (UCVA) analysis of effectiveness at 6 months, 100% were corrected to 20/40 or better, and 95.8% were corrected to 20/20 or better in 71 spherical myopia eyes; and 99.5% were corrected to 20/40 or better, and 93.2% were corrected to 20/20 or better in 206 astigmatic myopia eyes. The study showed that at the 6 month stability time point: there was a loss of  $\geq 2$  lines of best corrected vision that can be obtained with spectacles in 1 of 239 astigmatic myopia eyes and there was no loss of  $\geq 2$  lines of best corrected vision in 79 spherical myopia eyes; there was 1 of 239 astigmatic myopia eyes with best spectacle corrected visual acuity (BSCVA) worse than 20/25 and none in 79 spherical myopia eyes with BSCVA worse than 20/25. During the course of study, no eye lost  $> 2$  lines of BSCVA and no eye had a BSCVA worse than 20/40.

The VIXS STAR S4 IR Excimer Laser System with VSS Technology and WaveScan WaveFront System are approved to perform wavefront-guided laser assisted *in-situ* keratomileusis (LASIK) treatments for the reduction or elimination of high myopic astigmatism from -6.00 D to -11.00 D MRSE, with cylinder between 0.00 and -3.00 D in patients 21 years of age or older; and in patients with documented evidence of a change in manifest refraction of no more than 1.00 D (in both cylinder and sphere components) for at least one year prior to the date of preoperative examination.

Wavefront-guided LASIK for correction of high myopic astigmatism is an elective procedure with the alternatives including but not limited to eyeglasses, contact lenses, photorefractive keratotomy (PRK), conventional LASIK, and other refractive surgeries. Approval of the application is based on a clinical trial of 184 eyes. Of all eyes treated, 180 were evaluated for effectiveness with 97.8% accountability at 3 months, 178 eyes with 96.7% accountability at 6 months, 170 eyes with 96.5% accountability at 9 months, and 107 eyes with 93.9% accountability at 12 months. The studies found that of the 178 eyes eligible for the uncorrected visual acuity (UCVA) analysis of effectiveness at 6 months, 98.3% were corrected to 20/40 or better, 97.2% were corrected to 20/32 or better, and 84.3% were corrected to 20/20 or better without spectacles or contact lenses. The study showed that of 83 spherical and 101 astigmatic eyes, no eyes lost 2 or more lines of best corrected vision that can be obtained with spectacles (BSCVA) and none of the eyes had BSCVA worse than 20/40.

The VIXS STAR S4 Excimer Laser System and WaveScan WaveFront System are approved to perform wavefront-guided laser assisted *in-situ* keratomileusis (LASIK) treatments for the reduction or elimination of hyperopic astigmatism up to 3.00 D MRSE, with cylinder between 0.00 and 2.00 D in patients 21 years of age or older; and in patients with documented evidence of a change in manifest refraction of no more than 1.00 D (in both cylinder and sphere components) for at least one year prior to the date of preoperative examination.

Wavefront-guided LASIK for the correction of hyperopic astigmatism is an elective procedure with the alternatives including but not limited to eyeglasses, contact lenses, photorefractive keratotomy (PRK), conventional LASIK, and other refractive surgeries. Approval of the hyperopic astigmatism application is based on a clinical trial of 144 eyes (74 primary and 70 secondary). Of all eyes treated, 134 were evaluated for effectiveness with 98.5% accountability at 3 months, 131 eyes with 97.0% accountability at 6 months, 118 eyes with 90.8% accountability at 9 months, and 27 eyes with 87.1% accountability at 12 months. The studies found that of the 131 eyes eligible for the uncorrected visual acuity (UCVA) analysis of effectiveness at 6 months, 97.3% were corrected to 20/40 or better, and 66.2% were corrected to 20/20 or better in 74 spherical hyperopia eyes; and 93.0% were corrected to 20/40 or better, and 56.1% were corrected to 20/20 or better in 57 astigmatic hyperopia eyes. The study showed that at the 6 month stability time point: there was no loss of  $\geq 2$  lines of best corrected vision that can be obtained with spectacles in either 63 astigmatic hyperopia eyes or 74 spherical hyperopia eyes; none of the 63 astigmatic hyperopia eyes or 74 spherical hyperopia eyes had best spectacle corrected visual acuity (BSCVA) worse than 20/25. During the course of study, one of 63 eyes with astigmatic hyperopia lost  $> 2$  lines of BSCVA at 1 month, no eyes with spherical hyperopia lost  $> 2$  lines of BSCVA, and no eye had a BSCVA worse than 20/40.

The VIXS STAR S4 IR Excimer Laser System with VSS Technology and WaveScan WaveFront System are approved to perform wavefront-guided laser assisted *in-situ* keratomileusis (LASIK) treatments for the reduction or elimination of naturally occurring mixed astigmatism when the magnitude of cylinder (from 1.0 to 5.0 D) is greater than the magnitude of sphere and the cylinder and sphere have opposite signs; in patients 21 years of age or older; and in patients with documented evidence of a change in manifest refraction of no more than 0.50 D (in both cylinder and sphere components) for at least one year prior to the date of preoperative examination.

Wavefront-guided LASIK for the correction of mixed astigmatism is an elective procedure with the alternatives including but not limited to eyeglasses, contact lenses, photorefractive keratotomy (PRK), conventional LASIK, and other refractive surgeries. Approval of the mixed astigmatism application is based on a clinical trial of 86 eyes. Of all eyes treated, 86 were evaluated for effectiveness with 100.0% accountability at 3 months, 80 eyes with 95.2% accountability at 6 months, 69 eyes with 86.3% accountability at 9 months, and 63 eyes with 94.0% accountability at 12 months. The studies found that of the 86 eyes eligible for the uncorrected visual acuity (UCVA) analysis of effectiveness at 3 months, 95.3% were corrected to 20/40 or better, 91.9% were corrected to 20/32 or better, and 61.6% were corrected to 20/20 or better without spectacles or contact lenses. The study showed that of 86 astigmatic eyes, one eye temporarily lost 2 lines of best corrected vision that can be obtained with spectacles at 1 month and at 6 months and none of the eyes had best spectacle corrected visual acuity (BSCVA) worse than 20/40.

## CONTRAINDICATIONS:

Wavefront-guided LASIK is contraindicated in patients with collagen vascular, autoimmune or immunodeficiency disease, signs of keratoconus or abnormal corneal topography, patients taking isotretinoin (Accutane®) or amiodarone hydrochloride (Cardarone®) or are pregnant or nursing.

## WARNINGS:

Wavefront-guided LASIK is not recommended in patients who have diabetes, a history of Herpes simplex or Herpes zoster keratitis, significant dry eye that is unresponsive to treatment, or severe allergies. For the treatment of low to moderate myopic astigmatism, lower uncorrected visual acuity may be anticipated in the treatment of higher degrees of myopia with and without astigmatism ( $\approx 5.0$  D MRSE).

## PRECAUTIONS:

The safety and effectiveness of wavefront-guided LASIK surgery has ONLY been established with an optical zone of 6 mm and an ablation zone of 8 mm for myopic astigmatism, and an optical zone of 6 mm and an ablation zone of 9 mm for hyperopic and mixed astigmatism. Long term risks of wavefront-guided LASIK beyond 12 months have not been studied. The safety and effectiveness of the STAR S4 IR Excimer Laser System have NOT been established for wavefront-guided treatment of low to moderate myopic astigmatism in patients: whose WaveScan WaveFront diameter is less than 6 mm, for treatments greater than 6 diopters of MRSE or with greater than 3 diopters of astigmatism and for retreatment with CustomVue LASIK. The safety and effectiveness of the STAR S4 IR Excimer Laser System have NOT been established for wavefront-guided treatment of high myopic astigmatism in patients: whose WaveScan WaveFront diameter is less than 5 mm, for treatments greater than -11 diopters of MRSE or with greater than 3 diopters of astigmatism. The safety and effectiveness of the STAR S4 IR Excimer Laser System have NOT been established for wavefront-guided treatment of hyperopic astigmatism in patients: whose WaveScan WaveFront diameter is less than 5 mm; for treatments greater than 3 diopters of MRSE or with greater than 2 diopters of astigmatism and for retreatment with CustomVue LASIK. The safety and effectiveness of the STAR S4 IR Excimer Laser System have NOT been established for wavefront-guided treatment of mixed astigmatism in patients: whose WaveScan WaveFront diameter is less than 5 mm, for treatments greater than 5 diopters or less than 1 diopter of astigmatism and for retreatment with CustomVue LASIK.

Although the WaveScan WaveFront System measures the refractive error and wavefront aberrations of the human eyes, including myopia, hyperopia, astigmatism, coma, spherical aberration, trefoil, and other higher-order aberrations through sixth order, in the clinical studies for low to moderate myopic astigmatism, hyperopic astigmatism and mixed astigmatism, the average higher order aberration did not decrease after CustomVue Treatment. In the clinical studies for high myopic astigmatism, the average higher-order aberration increased after CustomVue Treatment.

It is possible, after wavefront-guided LASIK treatment, that patients will find it more difficult than usual to see in conditions such as very dim light, rain, snow, fog, or glare from bright lights at night. Visual performance possibly could be worsened by large pupil sizes or decentered pupils. Pupil size should be evaluated under mesopic illumination conditions.

The use of Percentage Nomogram Adjustment should be based upon careful consideration of patient and surgeon information, in addition to environmental conditions surrounding the surgery. The simultaneous use of the Percentage Nomogram Adjustment and the Physician Adjustment has not been studied in controlled investigations, and should not be attempted until the accuracy of the Nomogram setting has been verified for the same laser, treatment conditions and type of treatment. Therefore, the combined simultaneous use of the Percentage Nomogram Adjustment and the Physician Adjustment is not recommended without careful analysis of postoperative refractive results.

## ADVERSE EVENTS AND COMPLICATIONS:

The clinical trial for low to moderate myopic astigmatism showed that the following adverse events or complications occurred in at least 1% of the 351 eyes at any interval up to 6 months post-treatment: inflammation of the cornea under the flap (1.4%); double or ghost images (1.4%); and scratch on the surface of the eye (1.4%). The following subjective symptoms frequency rated "often or always" were increased in the effectiveness cohort at 6 months post-treatment on 258 eyes compared with pre-treatment on 332 eyes: dryness (9% vs. 6%); fluctuation of vision (3% vs. 2%); glare (4% vs. 2%); and halos (7% vs. 5%).

The clinical trial for high myopic astigmatism showed that the following adverse events or complications occurred in at least 1% of the 184 eyes at one or more postoperative examinations up to 6 months post-treatment: epithelium in the interface (1.1%); peripheral corneal epithelial defect at 1 month or later (2.2%); corneal edema between 1 week and 1 month post-operatively (2.7%) and double vision (or "ghost images") in the operative eye (6.0%). The following subjective symptoms were reported as present "often or always" by a higher percentage of subjects 6 months after treatment than before treatment: dryness (10.8% vs. 9.3%); halos (21.6% vs. 15.4%); and ghosting or shadowing of images (2.8% vs. 1.1%).

The clinical trial for hyperopic astigmatism showed that the following adverse events or complications occurred in at least 1% of the 144 eyes at any interval up to 6 months post-treatment: cells growing under the flap (2.1%); feeling of something in the eye (1.4%); double or ghost images (11.3%); and scratch on the surface of the eye (2.1%). The following subjective symptoms rated "often or always" were increased in the effectiveness cohort at 6 months post-treatment on 131 eyes compared with pre-treatment on 136 eyes: dryness (17% vs. 6%); blurry vision (10% vs. 7%); fluctuation of vision (14% vs. 6%); halos (10% vs. 5%); double or ghost images (7% vs. 3%).

The clinical trial for mixed astigmatism showed that the following adverse events or complications occurred in at least 1% of the 86 eyes at one or more postoperative examinations up to 3 months post-treatment: miscreated flap (1.2%); cells growing under the flap (4.7%); and double vision (or "ghost images") in the operative eye (8.1%). The following subjective symptoms were reported as present "often or always" by a higher percentage of subjects 3 months after treatment than before treatment: dryness (22% vs. 6%); halos (20% vs. 13%).

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Great Lakes Eye Care, St. Joseph, Mich., in a separate report is the use of a neodymium (Nd):YAG laser anterior capsulectomy.<sup>3,4</sup>

Dr. Folden's study focused on six patients with negative dysphotopsia, five of whom had an Akreos AO M160 posterior chamber (PC) IOL (Bausch + Lomb, Rochester, N.Y.); symptoms completely resolved in three patients and partially resolved in the two others. In one patient who had an AcrySof IOL (Alcon, Fort Worth, Texas), symptoms did not go away.

"Because the anterior capsulectomy did not resolve the symptoms in the patient with the AcrySof IQ toric PC IOL, the anterior capsule should be considered an optical risk factor for negative dysphotopsia and important in the manifestation of symptoms in only some patients," Dr. Folden wrote. This approach is conservative, Dr. Folden said.

Dr. Cooke's report focused on negative dysphotopsia that was present in a patient 2 months after receiving a toric plate-haptic IOL that resolved after Nd:YAG removal of a portion of the nasal anterior capsule. The anterior capsule always has a certain degree of translucency and potential for light scatter even immediately following surgery. Light scatter that occurs through the anterior capsule may provide a route for light to reach the sharp posterior optic edge resulting in shadow creation. Although the capsule peripheral to the edge of the optic can help improve symptoms over time, the anterior capsule can contribute to symptoms, and if so, may respond well to Nd:YAG laser anterior capsulectomy.

"In our articles, Dr. Folden and I dramatically improved most cases of negative dysphotopsia with YAG anterior capsulectomy," Dr. Cooke said. He added that the patient who still had symptoms in Dr. Folden's report had a toric IOL where the haptics were oriented horizontally instead of vertically. However, Dr. Folden emphasizes that all patients in these two articles received IOLs that had either 360 degrees of sharp posterior optic edge or optic edge discontinuity (at the optic-haptic junction or as in the plate-haptic IOL), all capable of shadow creation regardless of orientation inside the eye. "Unfortunately, some mystery still remains on this topic," Dr. Cooke said.

Other possible treatments for negative dysphotopsia reported by Dr. Masket and Nicole Fram, MD, Los Angeles, have included the use of a piggyback IOL, a reverse optic capture procedure, and bag for sul-

cus IOL exchange.<sup>5</sup> Drs. Masket and Fram found piggyback IOL implantation and reverse optic capture were the most successful approaches in their study, leading to complete or partial symptom resolution by three months. These results led them to believe that symptoms depend on IOL coverage of the anterior capsule edge. Their study, which included UBM analyses, did not support the concept that increased posterior chamber depth was a causative factor for negative dysphotopsia. Another finding from Dr. Masket: "We've found that negative dysphotopsia can occur with any lens so long as it's in the capsular bag," he said.

Dr. Masket and H. Burkhard Dick, MD, chairman, University Eye Hospital Bochum, Germany, have tested the Masket Anti-Dysphotopic IOL (Morcher, Stuttgart, Germany) in Europe. The IOL allows for any haptic and edge design as well as toric and multifocal designs. The design features a groove on the anterior optic surface that captures the anterior capsulotomy and allows a portion of the optic to overlap the capsulorhexis. Dr. Masket has recently received a U.S. patent for the IOL design, which also received a CE mark last year. It's been used investigatively in five patients, none of whom have experienced negative dysphotopsia, Dr. Masket said. He believes that the IOL design, which mimics an aspect of reverse optic capture, will help patients avoid negative dysphotopsia.

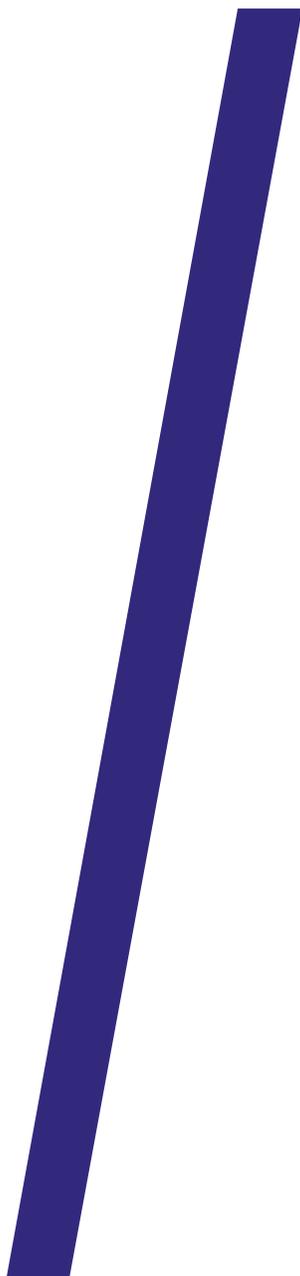
Another IOL called the bag-in-the-lens IOL from Marie-José Tassignon, MD, Antwerp, Belgium, similarly prevents negative dysphotopsias. However, use of that lens involves the performance of a posterior capsulotomy, which many surgeons would prefer to avoid so as to not risk encountering vitreous, Dr. Holladay said.

The IOLs from Dr. Masket and Dr. Tassignon are under use or experimentation outside the U.S.

Lens exchange is yet another possible treatment. When Dr. Davison encounters negative dysphotopsia, he will remove the lens, put in a silicone rounded IOL, and perform an optic capture. He said he has tried using the Nd:YAG laser but it did not help, although he acknowledges that others have found success with it.

Although negative dysphotopsia does not occur often, Dr. Davison said surgeons still wish that they could find ways to prevent the problem. **EW**

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# Managing multifocal IOL dysphotopsia

by Ellen Stodola EyeWorld Staff Writer

## AT A GLANCE

- Dysphotopsias can occur with all types of IOLs but may be more common with multifocals.
- Many adapt to dysphotopsias, but in severe cases, a lens exchange may need to be performed.
- Choosing the right candidate for a multifocal at the onset is important.

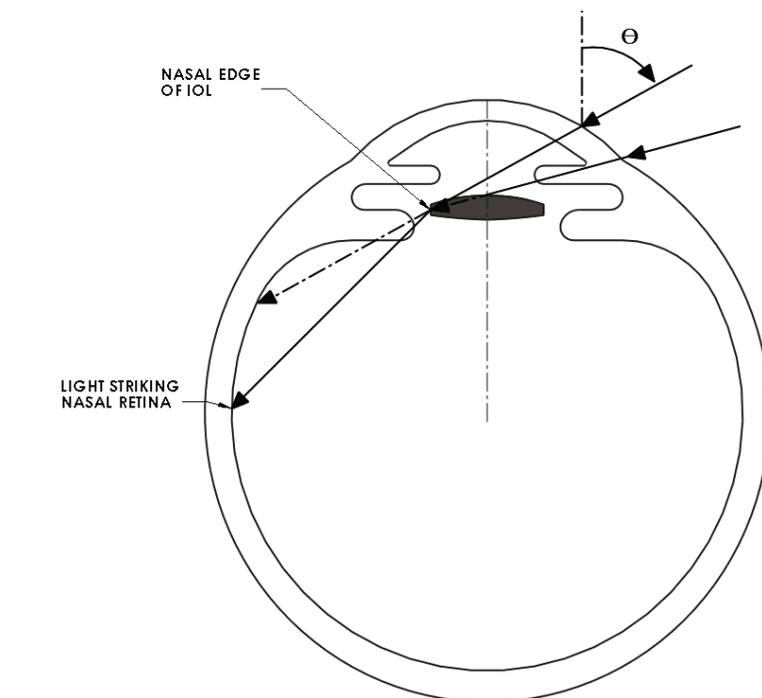
## Dysphotopsias can be a potential problem after surgery, especially with multifocal IOLs

One issue for patients receiving multifocal IOL implants is the potential for dysphotopsias, which can be bothersome and sometimes affect vision. **Richard Tipperman, MD**, Wills Eye Hospital, Philadelphia; **John Berdahl, MD**, Vance Thompson Vision, Sioux Falls, S.D.; **Audrey Talley Rostov, MD**, cornea, cataract, and refractive surgeon and partner, Northwest Eye Surgeons, Seattle; and **Douglas Katsev, MD**, Sansum Clinic, Santa Barbara, Calif., commented on dysphotopsias and how to address them in multifocal IOL patients.

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Patients may complain of an arc image, usually in one quadrant, that bothers them. It is usually described after many of the square-edge optic lenses are placed in the bag. The image is depicted by the drawing of the light rays hitting the square edge of the optic.

Source: Doug Katsev, MD

### Characterizing dysphotopsias

“One of the things you want to do is characterize them as positive dysphotopsias or negative dysphotopsias,” Dr. Berdahl said. “Positive dysphotopsias are things like glare, halos—something that you see. A negative dysphotopsia is more like a shadow, something you’re missing that you feel like you should see.”

*Editors’ note: Dr. Holladay has financial interests with the Holladay IOL Consultant, Abbott Medical Optics (Santa Ana, Calif.), and WaveTec Vision (Aliso Viejo, Calif.). Dr. Masket designed the Masket Anti-Dysphotopic IOL mentioned in the article. He has financial interests with Alcon (Fort Worth, Texas). The other physicians interviewed have no financial interests related to their comments.*

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He said that negative dysphotopsias can occur with any type of lens, but positive dysphotopsias are more common with multifocal IOLs.

Dr. Talley Rostov said that dysphotopsias can occur with both multifocal and monofocal IOLs. “What’s more troublesome are the dysphotopsias of the typical glare and halos, especially with the multifocal IOLs,” she said. In a small number of patients, these can be so disabling that the physician needs to do a lens exchange.

Typically, dysphotopsias from multifocal IOLs are circles or rings around light, Dr. Tipperman said. It is important when evaluating patients to get a clear description of what they are seeing. He said patients oftentimes come in with pictures or drawings to illustrate. “Until you can understand it and categorize it, you can’t even begin to treat it,” he said.

### Causes

Dr. Katsev said dysphotopsias are light rays that are altered to create an image that falls incorrectly on the retina, and this alteration causes visual complaints in some patients. “They are often caused by the edge of the lens, imperfections in the

lens, as well as the diffractive or refractive aspect of the multifocal lens,” he said. “As for the premium IOLs, a zonal refractive lens will result in the most complaints, especially early in the recovery process.”

“Dysphotopsias may be permanent but always soften with time,” Dr. Katsev said. “Most often they decrease to a very tolerable level and may even go away.”

Dr. Berdahl said that when using a multifocal IOL, it’s important for the optical system to be pristine. “A multifocal IOL splits light and therefore decreases contrast sensitivity,” he said. “Anytime there is a change in a structure at the interface then there’s an opportunity for light to be scattered. Multifocal IOLs purposely have changes in them, the rings that are on the IOLs, and when the light hits, it can be scattered, leading to glare or halos. So part of it is the IOL itself,” he said. “The second part of it is that light is traveling through a more complex optical system in general.” Therefore, if there is some light scatter from an irregular cornea, anterior basement membrane dystrophy, or another condition, this light scatter can reach an intolerable point when paired with a multifocal IOL.

“Part of it is choosing the right candidate for a multifocal IOL at the onset,” Dr. Talley Rostov said. It’s important to ask about the patient’s occupation. If the patient will be doing a lot of night driving, he or she might not be the best candidate for a multifocal IOL. It’s important to look for uncorrected astigmatism preoperatively as well as any refractive error because they could contribute to dysphotopsias.

“The other thing to look for is any dry eye. Make sure that the ocular surface is healthy because the first thing that we get to is the tear layer when we’re looking at how light is refracted by the eye, so any ocular surface disease can certainly be problematic for the patient. If there is ocular surface disease, that needs to be adequately treated because it can either change the refraction and/or cause some dysphotopsia,” Dr. Talley Rostov said.

### Counseling patients

Dr. Berdahl explains to his patients that multifocal IOLs are the best technology to make them spectacle