

Rainbow Glare

**BY RONALD R. KRUEGER, MD; R. DOYLE STULTING, MD, PhD;
AND KARL G. STONECIPHER, MD**

CASE PRESENTATION

A 50-year-old man had LASIK on his left eye in 2004. Three months ago, he underwent LASIK on his right eye and a PRK enhancement of his left eye. The manifest refraction before the most recent interventions was $+1.00 -0.75 \times 100 = 20/20$ OD and $+0.50 -0.75 \times 80 = 20/20$ OS.

The patient's procedure was performed using the WaveLight Refractive Surgery Suite/FS200 (Alcon Laboratories, Inc.) with no complications reported. Eleven days postoperatively, he noted "seeing halos and prisms at night." At that visit, his manifest refraction was plano $20/20-2$ OD and plano $-0.50 \times 10 = 20/40$ OS. The slit-lamp and retinal examinations were normal. The patient complained, however, of worsening rainbow glare since surgery, in his right eye only, under both mesopic and scotopic conditions. Six weeks postoperatively, his UCVA was $20/20$ OD, and he continued to see "prisms" in that eye. He had no complaint about the UCVA in his left eye, which was $20/20$.

Now 3 months postoperatively, the patient has UCVAs of $20/15$ OD and $20/20$ OS with a manifest

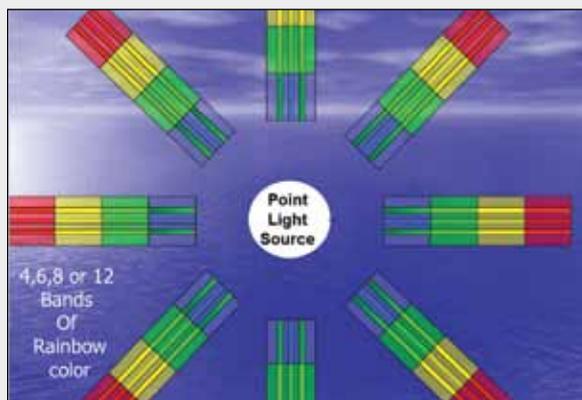


Figure 1. Typical pattern description of "rainbow glare" by the patient.

refraction of plano $20/15$ OD and $-0.25 -0.25 \times 140$ OS. The examination continues to be normal. The "rainbow glare," as he calls it, persists without change, and the patient requests an intervention (Figure 1).

—Case prepared by Karl G. Stonecipher, MD.

RONALD R. KRUEGER, MD

Reports of rainbow glare with the FS200 laser have not yet been published, but I have noted this finding with my FS200 and with my IntraLase FS60 (Abbott Medical Optics Inc.).¹⁻³ It is not a system or device malfunction; rather, it reflects the perfect grating pattern of the plasma disruption at the interface and, most specifically, from the back surface of the flap. The symptom can be elicited in most patients if they are placed in a dark room and one shines a muscle light at them from a distance. The fact that this is symptomatic in a hyperopic patient may in part be because the stromal bed is not centrally treated with the hyperopic ablation profile. Hence, the patient may be getting a stronger light scatter effect from the grating pattern by both the bed and the back of the flap. This is especially noted in flaps that are created but not lifted. In my experience, it is not a visually disturbing effect for most patients. If this patient feels that he cannot tolerate the effect, an enhancement, if needed, may help.

R. DOYLE STULTING, MD, PhD

Several years ago, a patient presented to me with complaints of rainbow glare after LASIK for 3.00 D of myopia. Three days previously, another ophthalmologist had made bilateral flaps with an IntraLase femtosecond laser. The surgeon was unable to perform the refractive ablation on the right eye, however, because bubbles in the anterior chamber prevented accurate tracking. The procedure in the left eye was uncomplicated, and the patient's UCVA was excellent. The manifest refraction in the right eye was

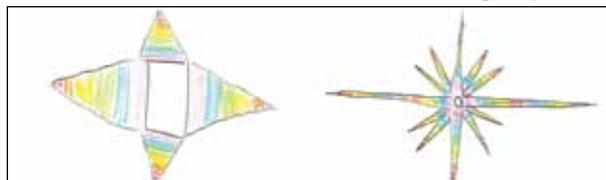


Figure 2. A patient brought drawings with him showing four large triangular rays from square light sources like windows and eight rays of rainbow-colored rays emanating from point sources of light like headlights.

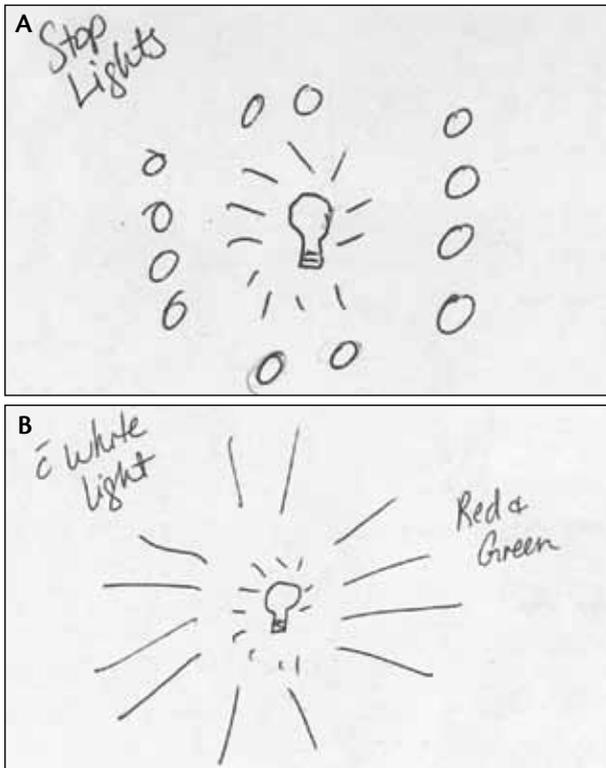


Figure 3. A patient's diagram reporting the difference between monochromatic light (A) and polychromatic light (B).

-2.50 +0.75 × 75, yielding 20/25; however, rainbow glare persisted even with correction. Two weeks later, the symptoms remained, even with correction, and the patient brought drawings with him showing four large triangular rays from square light sources like windows and eight rainbow-colored bands emanating from point sources of light like headlights (Figure 2). The blue end of the color spectrum was adjacent to the light source, and the red end of the spectrum was farthest away. My colleagues and I concluded that the ablation pattern of the Intralase diffracted light to create the rainbows and that a routine flap-lift ablation would eliminate the symptoms. Thirty-four days after the original procedure, a flap-lift enhancement was performed. The next day, the patient's UCVA was 20/15, and the rainbows had disappeared.

In this case, the rainbows are probably the result of the femtosecond laser's spot pattern, which was not smoothed out by the refractive ablation, perhaps because the correction was not enough to do so. I believe the rainbows can be eliminated by phototherapeutic keratectomy under the flap or by offsetting (myopic and hyperopic) refractive ablations.

KARL G. STONECIPHER, MD

I have had three patients whom I would define as having classic rainbow glare. I have not seen it since using my newer

femtosecond platforms (iFS [Abbott Medical Optics Inc.] or the FS 200). All three patients' problems resolved with time—in a few cases up to 2 years. Whether resolution or neuroadaptation is really what happened is unknown. Some of my patients have reported the phenomenon for up to 3 months, but I have only seen persistence longer than 1 year in the three aforementioned patients. In the early postoperative period, I think it is mainly an optical problem related to flap edema, but Krueger et al have reported persistent light scattering from the back of the Intralase flap that creates a spectral pattern.¹

Upon early reports from patients, I have found that reducing inflammation through aggressive treatment with corticosteroids and hyperosmotics has been successful for persistent phenomena. I also encourage the patients by letting them know that the problem is self-limiting and that resolution will occur. As for the late or longer-than-3-month rainbow glare, I tell patients that I have seen it before and that resolution or adaptation does occur. I offer miotics such as brimonidine tartrate ophthalmic solution (Allergan, Inc.). In addition, I share with them pictures provided by other patients (Figure 3), from the literature, from my practice, and from Dr. Krueger to let them know that they are not alone in their problems and that their condition will improve with time. ■

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