

# MODERNIZING THE APPROACH TO OCULAR DOMINANCE



A shift in mindset is required for refractive cataract surgeons.

BY EHSAN SADRI, MD, FACS

## ASSESSING OCULAR DOMINANCE: RETHINKING THE CURRENT PARADIGM

**Pepose JS, Thompson V, Hoopes P, et al<sup>1</sup>**  
*Industry support for this study: None*

### ABSTRACT SUMMARY

This prospective, multicenter, double-masked, noninterventional comparative study assessed the level of agreement between a binary, motor sighting test of ocular dominance and a new sensory test that uses a simultaneous, binocular, head-mounted visual simulator. For the former method, patients completed a hole-in-the-card test through their distance refraction.

Strong ocular dominance was found at far and near in 50% (n = 163) and 56% (n = 183) of patients, respectively. The remaining distribution between weak and equidominance was approximately equal. The eye selected as dominant with the hole-in-the-card sighting method did not match the results of the sensory dominance test in 41% of patients (n = 134). Additionally, 26% of patients (n = 49) changed from right eye dominance with the hole-in-the-card sighting method to left eye dominance with the sensory method.

## STUDY IN BRIEF

- ▶ A prospective, multicenter, double-masked, noninterventional comparative study assessed the level of agreement between a binary, motor sighting test of ocular dominance and a new sensory test that uses a simultaneous, binocular, head-mounted visual simulator. The assignment of ocular dominance with the hole-in-the-card test often failed to match the patient's preferred eye using the sensory test. Additionally, approximately one-quarter of patients changed from right eye dominance with the hole-in-the-card sighting method to left eye dominance with the sensory method.

### WHY IT MATTERS

A nuanced understanding of ocular dominance could enhance surgical outcomes with monovision strategies and presbyopia-correcting IOLs. Additionally, the use of more robust testing methods and a recognition of ocular dominance as a dynamic trait could help refractive cataract surgeons better align procedures with patients' specific visual needs and their neural adaptive potential.

### DISCUSSION

Pepose and colleagues proposed a paradigm shift in the evaluation of ocular dominance. Emphasizing that dominance is fluid and influenced by neural adaptation and visual demands, they argued that static tests such as the Miles or Porta may not reflect the real-world conditions under which patients use their vision. Furthermore, Pepose et al remarked, sighting dominance tests often fail to capture the sensory and cortical components relevant for surgical planning, whereas dynamic tests such as binocular rivalry

can assess ocular dominance more accurately. To address these gaps, they recommended a multimodal approach that includes trial lens testing, digital dominance assessment tools, and consideration of patients' visual habits and lifestyle.

The study also highlighted the importance of managing patients' expectations. Pepose et al encouraged refractive cataract surgeons to simulate postoperative outcomes for monovision and multifocal IOLs and integrate subjective responses into decisions.

## OCULAR DOMINANCE SHIFT IN REFRACTIVE CATARACT SURGERY: PROSPECTIVE, OBSERVATIONAL STUDY

**Song T, Nie F, Zhao Y, et al<sup>2</sup>**  
*Industry support for this study: None*

### ABSTRACT SUMMARY

This prospective observational study of 94 patients undergoing unilateral cataract surgery evaluated how

frequently ocular dominance shifted postoperatively and which factors predicted that shift. Using a combination of binocular rivalry tasks and functional visual assessments, the researchers found that 40.4% of patients exhibited a change in ocular dominance 3 months after cataract surgery. Predictive factors included the patient's age, the uncorrected distance visual acuity in their nondominant eye, the presence of

a posterior subcapsular cataract, and the amount of baseline astigmatism.

Song and colleagues concluded that ophthalmologists should be aware of these potential shifts when planning refractive cataract surgery, especially with a monovision strategy or presbyopia-correcting IOLs.

### DISCUSSION

Song and colleagues reinforced the

idea that ocular dominance is not fixed. They found a 40% postoperative shift rate that was driven by factors such as age, baseline astigmatism, and posterior subcapsular cataract. The study authors advocated for longitudinal planning—including preoperative simulations, sensory dominance testing and a postoperative reassessment—to allow strategies to be adjusted in real time. This approach would reframe surgical planning

as a continuous dialogue with the visual adaptation process of the patient's brain.

The study highlights the need for surgeons to recognize ocular dominance as a moving target, particularly when they are planning interventions that alter the binocular balance or cortical processing of visual input. Ophthalmologists must replace one-time preoperative assessments with longitudinal strategies, both before and after cataract surgery, to ensure that surgical choices remain aligned with the patient's evolving visual system. Similarly, preoperative counseling should prepare

patients for the possibility that their ocular dominance might shift after surgery. Postoperative management then becomes a continuum, where adjustments are expected and welcomed rather than viewed as a sign of surgical failure. ■

1. Pepose JS, Thompson V, Hoopes P, et al. Assessing ocular dominance: rethinking the current paradigm. *J Cataract Refract Surg*. 2025;51(7):592-599.
2. Song T, Nie F, Zhao Y, et al. Ocular dominance shift in refractive cataract surgery: prospective, observational study. *J Cataract Refract Surg*. 2024;50(11):1135-1142.

## STUDY IN BRIEF

- ▶ A prospective observational study of patients undergoing unilateral cataract surgery evaluated the frequency of postoperative shifts in ocular dominance and the factors predicting those changes. The results confirmed that shifts in ocular dominance following cataract surgery are frequent and clinically meaningful.

## WHY IT MATTERS

Modern ophthalmology must operate at the intersection of neuroscience, surgery, and patient experience. Only by appreciating the brain-eye connection and the fluidity of neural adaptation can refractive cataract surgeons deliver on the patient-centered outcomes that advanced technologies promise.

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