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Beware of binocular vision problems in refractive surgery

Perform appropriate testing before refractive surgery, and follow your patient longer than the normal postoperative period.

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Refractive surgery has seen fantastic developments over the past few years. However, there is simply no substitute for fundamental eye and vision care before and after surgery. I want to draw particular attention to the role of binocular vision and binocular vision disorders in refractive surgery, because as we advance technologically, we cannot forget clinical and vision science basics.

Ample evidence indicates that binocular refraction is more accurate and simply better than monocular refraction, although the overwhelming majority of clinicians still perform monocular refractions, including all refractions performed to determine refractive surgery treatment. Perhaps at some future point, we will clear the hurdle of monocular to binocular refraction and treatment, but for now, we need to review binocular vision basics before and after refractive surgery.

I will use three cases to make the points outlined in the accompanying chart.

Case 1: At least do a cover test

A 31-year-old man had a manifest refraction of OD -1.75-1.00 x 175 and OS -2.00-1.25 x 005 for 20/20 best corrected distance visual acuity with either eye. The patient wanted refractive surgery because he does not want to wear eyeglasses, and he cannot tolerate wearing contact lenses. He said wearing eyeglasses is very uncomfortable. This history colors the fact that he does not use eyeglasses for distance vision correction now, even though he works, lives and drives in a major metropolitan city.

The patient underwent a completely uneventful LASIK surgery for each eye, but afterwards he had significant asthenopia and complained bitterly about his vision. He had 20/20 distance uncorrected visual acuity with either eye. A simple cover test revealed he has a 3 PD vertical phoria, which was more than likely present before surgery. There was no cover test or other basic binocular vision testing performed before surgery.

It is, of course, possible to correct vertical phoria with eyeglasses, but the patient refused to wear eyeglasses as he wanted to have surgery to avoid wearing them. The doctors and patient struggled to find a meaningful relationship, and soon the patient was nearly inconsolable with frustration and misery. The doctors were confused and stunned that they could have missed something as straightforward as a vertical phoria.

Of course, the patient did not wear eyeglasses previously because clear and strained binocular vision with a vertical phoria was likely worse than blurry vision with little or no asthenopia. However, this case represents a hard lesson for all of us.

Case 2: Complex binocular vision patients

A 40-year-old man had a manifest refraction of OD +1.75-0.75 x 090 and OS +1.50-0.50 x 095. The right eye had 20/20 best corrected distance visual acuity, while the left eye was 20/25 best corrected. The

Take-home pearls

patient wanted to have refractive surgery because he does not want to wear eyeglasses for outdoor activities. He tried contact lens care several times and does not want to try anymore.

The patient's ocular and physical histories were unremarkable, save for several surgeries he underwent as a child to correct a binocular vision disorder, which was unspecified before surgery. As noted in his record, the physician assessed his binocular vision status before surgery, and these notes suggested a competent and thorough evaluation.

The patient underwent an uneventful LASIK surgery for each eye. Shortly after surgery, he already had 20/20 and 20/25 uncorrected distance visual acuity with the right and left eyes, respectively. However, within a week of surgery he began to complain of various vision problems that perplexed his doctors. He could barely function at work because he felt "his eyes didn't work right," and he could not stand to be in a crowded room because he "felt like the room was closing in on him." In addition, driving was difficult, and when he would move from a parking lot into a busy building, such as a shopping center or a sports arena, his vision "became too difficult" for him to be comfortable. Covering one eye was helpful but very disturbing to the patient. All in all, he was miserable.

Soon, the patient could think of nothing else but his vision. He called his doctors almost daily complaining of vision problems. His doctors struggled to determine what they might be able to do to help the patient. After exhausting refractive surgery solutions and considering several different options, his physicians decided to obtain a binocular vision consultation with a binocular vision function expert as a last resort.

The expert completed a thorough evaluation and found that the refractive surgery had switched eye dominance for this patient, who had a childhood binocular vision disorder. Follow-up muscle surgery returned the dominance to its original configuration, and the patient's symptoms were reduced dramatically.

I am aware of other patients with similar histories. I recommend that prospective refractive surgery patients who have a complex history of binocular vision problems or numerous surgeries for binocular vision problems should not have refractive surgery unless the physician and the patient have carefully weighed the risks and benefits. In addition, a consultation with an expert in binocular vision is often useful and frequently indicated to help the physician and the patient make the best decision.

Case 3: Knowledge levels vary

A 25-year-old man had a manifest refraction of OD -2.25-1.50 x 150 for 20/25 best corrected distance visual acuity, and OS -1.25-1.00 x 050 for 20/30 best corrected distance visual acuity. His history revealed no binocular vision disorders or previous eye muscle surgeries, and the record reflected no binocular vision testing before surgery.

The patient underwent a successful LASIK surgery with each eye. His postoperative distance uncorrected visual acuity was 20/25 in the right eye and 20/30- in the left eye. After 1 year of postoperative care, the patient was discharged and was subsequently lost to follow-up.

Gradually, the patient became ectatic. His distance and near vision deteriorated and it became difficult for him to pursue his normal activities. His best corrected visual acuities were 20/40 in the right eye and 20/60 in the left. He elected to see an expert in binocular vision who determined the patient has Duane's retraction syndrome and that additional surgery would help him see better. In fact, the patient was aware he had this disorder from childhood and had several surgeries to correct the condition when he was younger.

Additional eye muscle surgery only made things worse for the patient. The binocular vision expert had limited experience in refractive surgery and did not have diagnostic testing available in his practice to determine cornea shape and integrity. According to the record, the physician did not seem aware that vision could be complicated by ectasia rather than a worsening of Duane's retraction syndrome.

The patient became apoplectic. He could not function at work, and he was nearly incapacitated for months following his eye muscle surgery. Although additional corneal surgery was required, the patient was reluctant to do anything more. His experience left him with little confidence in physicians. After several months, he saw a cornea surgeon because he was considering additional corneal surgery. However, because of his complicated history, the cornea surgeon deferred additional surgery. The patient was able to return to work eventually, but he continues to have vision problems.

For more information:

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