

Blue-Violet Subjective Color Changes After Crystalens Implantation

Counseling patients prior to implantation is crucial.

BY PETER J. CORNELL, MD

Why does tree bark have a purple tinge? Why do my black socks look deep navy blue? If you listen carefully to patients who have had the Crystalens accommodating lens (Bausch + Lomb, Rochester, New York) implanted, you will likely find a small percentage of patients who ask these types of questions. Fortunately, most patients who experience this phenomenon after surgery are accepting of the subjective change in color perception, particularly if they have been counseled about the possible risk as part of the preoperative informed consent process. Unfortunately, there will be an occasional patient who cannot cope with this change in color perception, and these patients can be difficult to manage.

The most important thing a surgeon can do is to let patients know before surgery that change in color perception is a possible reaction and to be particularly cautious implanting these lenses in patients who are color sensitive, such as artists, interior designers, and people who identify themselves as color sensitive.

SIMILAR COMPLAINTS

Color discrimination is a subjective phenomenon. Many patients experience a change in color awareness following cataract surgery with any IOL; however, some Crystalens patients demonstrate a consistent symptom that appears different in character from the usual color changes after cataract surgery. These patients typically have remarkably similar complaints: black appears deep navy, browns and taupes appear purple, and deep reds appear magenta. It is possible that the increased spectrum of light introduced to the retina after Crystalens implantation—due to the lens' absorption spectrum—may contribute to these symptoms in certain patients. If symptoms are severe, some patients may elect IOL exchange or secondary piggy-back implantation of a blue-blocking IOL.

A few case examples may be illustrative of ways to manage this complaint.

Case No. 1. The first patient I saw with this condition identified herself as color sensitive. Prior to surgery, we had many lengthy discussions about implant lens choices and their optical side effects, with specific discussions about color perception issues from different IOL materials that she had researched. She elected a Crystalens AT 50SE, which was implanted in her left eye. The patient's vision was good immediately after surgery, but later that day she called complaining that there was a purple cast to all colors, especially black. Options were discussed at length, including IOL removal and exchange and possible piggy-back IOL placement, but the patient elected to have no further surgery on that eye.

This patient continued to lose visual function from the cataract in her second eye. After she did extensive research regarding different IOL spectral blocking, she asked me to implant a Tecnis 1-Piece IOL (Abbott Medical Optics Inc., Santa Ana, California) in her right eye. Although her vision was 20/20 uncorrected after this surgery, she felt that the color problem was now also present in the second eye, with objects appearing purple in both eyes. She continues to have these symptoms but does not want additional surgery.

FM-100 color testing showed total error scores of 20 for the right eye and 32 for the left. According to the norms described by Verriest et al,¹ these scores are, respectively, 4.4 and 3.8 standard deviations better than mean normal for this age group.

Case No. 2. The second patient in my practice to experience this phenomenon had uncomplicated cataract surgery and received a Crystalens HD 520. At the day 1 post-operative evaluation, she achieved 20/20 distance UCVA and J5 and J3 intermediate and near vision, respectively. She was happy with her vision when she left our office but

called the next day with two complaints: (1) she had difficulty differentiating black from blue and (2) browns appeared purple. She also wrote a letter explaining her symptoms: "The color distortions that I experienced with the Crystalens became immediately apparent in daylight, especially under morning or afternoon light, and to a lesser extent, under fluorescent light. Blacks registered as navy, taupes became purple, and deep reds were magenta. Moreover, grasses, trees and shrubs were washed out."

One week after surgery, this patient was happy with her vision, but the color perception symptoms were unchanged. I offered her the options of undergoing a lens exchange or piggyback lens implantation or proceeding with the other eye as scheduled and hoping that the symptom would resolve. After extensive discussion, she elected Crystalens implantation in the second eye. Color perception had not improved 1 week after surgery in the second eye. One of the options I suggested was IOL exchange in either or both eyes, and she elected replacing the Crystalens in the left eye with a blue-blocking acrylic IOL. The color symptoms were immediately and completely resolved in the left eye.

The patient continued to struggle with color perception in the right eye and elected to try piggyback

TAKE-HOME MESSAGE

- Patients should be informed prior to surgery that change in color perception is a possible reaction to Crystalens implantation.
- If a patient is unhappy with color perception after surgery, possible resolutions include IOL exchange and secondary piggyback implantation of a blue-blocking IOL.
- In this author's practice, up to 3% of patients implanted with any generation of the Crystalens experience changes to color perception.

implantation with a blue-blocking IOL. A three-piece blue-blocking IOL with plano power was placed in the sulcus of the right eye. On the first postoperative day, the patient noted complete resolution of the color symptoms and 20/20 distance UCVA but experienced an immediate compromise in her near (J8 vs J3) and intermediate (J8 vs J5) vision.

Case No. 3. The next patient was a 74-year-old male who worked as a professional color matcher. Cataract surgery was performed in his left eye, and a Crystalens AT-50SE was implanted. The patient was initially happy, but at 6 weeks he returned with symptoms of difficulty discrimi-

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nating black from blue and brown objects appearing purple. This patient also wrote a letter describing his symptoms and complaints: "I also noticed from the first day after the eye patch removal, colors are very difficult to distinguish. Need wife to advise me on getting dressed."

The patient elected a blue-blocking IOL for the second eye. Color discrimination improved binocularly, as he had no color distortion with the second eye. He still notices color distortion with right eye when the left eye is closed; however, he has elected to have no further procedures at this time and is happy with his binocular visual function.

Case No. 4. After these three patients with notable changes in color perception, I began counseling patients about the possibility of this condition. In this case, after counseling, the patient elected Crystalens AO implants. At 1 week, she complained that colors had a purple cast and plants and trees looked washed out. She also had trouble distinguishing black from blue. She elected to receive a blue-blocking IOL in her second eye and noticed that color looked normal with this implant. However, she decided that the color problem in her first eye was a trade-off for the excellent range of vision with the Crystalens AO. She asked me to exchange the IOL in her left eye for a Crystalens. This patient now has bilateral Crystalens implants with excellent vision. She continues to be bothered by colors not appearing true but feels that the color problem is not very significant.

Case No. 5. A 63-year-old female interior designer was specifically counseled about the possibility of color discrimination problems. She still elected the Crystalens HD. After implantation, she complained of a light purple iridescent haze to all colors but felt that the overall visual quality was good enough that she wanted to go ahead and have the same lens put in the second eye. She continues to report color differences, with more lavender and purple in colors, but has learned to live with it. During a postoperative exam, she said, "I would rather not still have it if I had a choice."

FM-100 color testing in this patient showed total error scores of 76 for the right eye and 92 for the left. These scores are 0.85 and 0.52 standard deviations better than mean normal for this age group for the right and left eyes, respectively.

LEVEL OF UV BLOCK

I continue to counsel patients about the risk of changes in color perception with this lens, and I continue to have patients who report these symptoms. Within the past month, an artist who received a Crystalens AO noted that a cotton weave red sweater that had previously matched a pair of red wool pants appeared more pink/violet than preoperatively; another patient stated that a previously color-matched black cotton-weave jacket and black polished cotton pants no longer appeared to match, with the

pants appearing deep navy and the jacket black.

My experience has been that 3% of patients implanted with any generation of the Crystalens IOL experience this subjectively abnormal color perception. I was unable to identify other similar characteristics among these patients, although there was a tendency for them to be more discriminating about color in their day-to-day lives. Two patients showed better-than-average color discrimination with FM-100 testing.

All implant lenses have some degree of ultraviolet (UV) block, and the Crystalens has less than most (to about 355 nm). My initial theory that the level of UV block was the cause of the symptoms led me to offer a lens exchange or a piggyback option to resolve the symptoms. A blue-blocking IOL relieved the color symptoms in all patients in whom this option was elected. Unfortunately, a piggyback also apparently decreased the accommodative benefit of the Crystalens in one patient; I cannot explain this phenomenon. The only piggyback IOL with a blue-blocker that I know of is the MN60MA (Alcon Laboratories, Inc., Fort Worth, Texas), which is a three-piece lens that is not designed as a sulcus lens. Thus, this approach should only be used if there is no other option.

CONCLUSION

Color distortion from implantation of the Crystalens, although apparently uncommon, has been a major problem for some patients. If a patient develops changes in color perception that are intolerable, a different lens can be placed in the second eye with some binocular adaptive success. Alternatively, the lenses can be exchanged for a blue-blocking IOL, or a blue-blocking piggyback IOL can be placed; however, there was some loss of accommodation in the one patient who had a piggyback IOL placed.

I recommend that surgeons implanting these lenses inform their patients about the possibility of subjective color discrimination symptoms, especially if the patient has specific color vision needs or color sensitivity. Patients who have been advised about the possibility of having these symptoms before surgery seem better able to cope with the symptoms after surgery or might elect a different implant option. ■

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