

Poor Vision and Contact Lens Intolerance

BY LANNY B. HALE, MD; MITCHELL A. JACKSON, MD; SCOTT M. MACRAE, MD;
ROBERT K. MALONEY, MD; AND DARRELL E. WHITE, MD

CASE PRESENTATION

A 47-year-old female German national, a police officer by training, has been unable to work consistently for several years due to intermittent bouts of poor vision. Her family history is completely negative, but her medical history is significant for a thyroid condition, which she reports has been stable and for which she takes daily Levothyroid (Forest Laboratories, Inc.).

The patient states that her contact lenses are difficult to wear and cause severe ocular irritation, and she says that her glasses do not improve her vision much, all of which makes doing her job more difficult. She therefore typically functions without correction. The patient has done considerable research regarding LASIK. Over the years, two separate doctors have diagnosed her with keratoconus, and a third was undecided.

On physical examination, the patient is pleasant and somewhat overweight with blue eyes. She is eager to return to work. Her UCVA is 20/50 OU, improving to 20/30 OD with a manifest refraction of +1.75 -4.50 X 158 and to 20/40 OS with a manifest refraction of plano -2.25 X 173. A pair of spectacles that are several years old are +1.50 -4.50 X 166 OD and +0.50 -2.25 X 174 OS. IOPs are normal, and both eyes exhibit scattered superficial punctate keratitis inferiorly. Punctal plugs were placed bilaterally in the patient's lower puncta years ago and are still present. With retroillumination at the slit lamp, both corneas have diffuse gray patches (maps), tiny cysts (dots), and refractile lines (fingerprints). The rest of the examination is entirely nor-

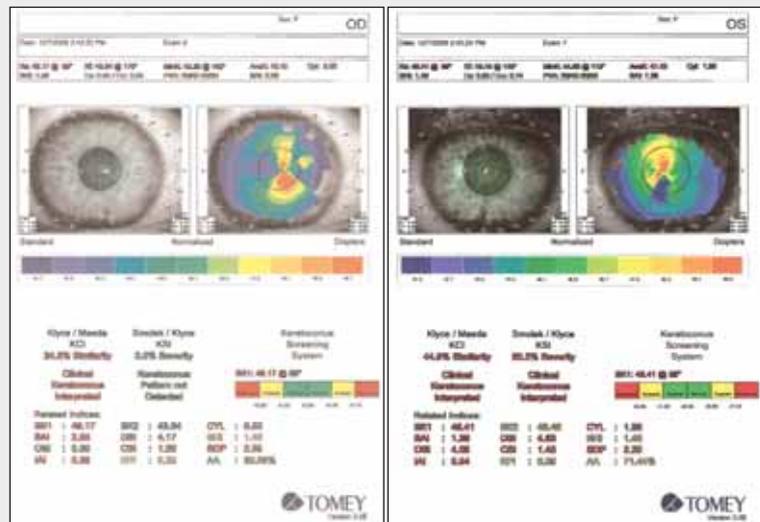


Figure 1. Topography with the TMS-4 (CBD Ophthalmics/Tomey, Phoenix, AZ).

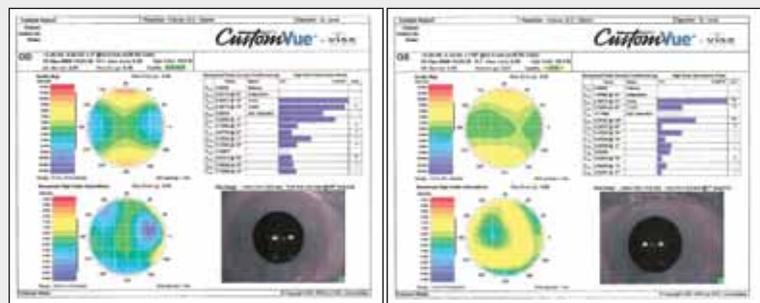


Figure 2. Visx CustomVue wavefront analysis (Abbott Medical Optics Inc., Santa Ana, CA).

mal. Central pachymetry by ultrasound is 590 µm OD and 594 µm OS (Figures 1 and 2).

How would you counsel this patient regarding options to improve her vision? What are the most significant advantages and/or disadvantages in this case?

LANNY B. HALE, MD

To my mind, the first thing to deal with is the previous diagnosis of keratoconus. It appears the patient's refraction is relatively stable based on her glasses. The examination is normal, except for evidence of epithelial basement membrane dystrophy (EBMD). Her decreased vision is potentially explained by the distorted ring images on topography, which are consistent with the EBMD. While abnormal, the topography does not reflect the diagnosis of keratoconus. Although I imagine that images obtained with the Orbscan (Bausch + Lomb, Rochester, NY) or Pentacam Comprehensive Eye Scanner (Oculus, Inc., Lynnwood, WA) were used, they are not available here.

If the tomographic analysis pointed to keratoconus, then phototherapeutic keratectomy (PTK), followed by corneal collagen cross-linking and perhaps surface ablation a year later, could be an appropriate sequence if the patient were sufficiently motivated. If the tomographic analysis verified the absence of keratoconus, then aggressive treatment of the tear film in preparation for laser surface ablation would be reasonable. A Visx PreVue lens (Abbott Medical Optics, Inc.) could be used to demonstrate to the patient and surgeon the potential for improvement.

Some ophthalmologists would perform PTK prior to PRK, whereas others would use the PRK as the PTK. Because WaveScans (Abbott Medical Optics Inc.) are available in this case, and because the treatment for mixed astigmatism would cover the full cylinder, I would prefer to use the excimer laser to treat the patient's astigmatism rather than a limbal relaxing incision (LRI) before laser ablation. After years of performing incisional keratotomy, it is clear to me that the excimer laser is both more accurate and stable in a case like this. If the patient were highly motivated and keratoconus had been ruled out, I would consider an off-label customized PRK procedure.

MITCHELL A. JACKSON, MD

This patient has dry eye syndrome, most likely an immune component associated with her thyroid history. Prior to any surgical treatment, the health of the ocular surface needs to be maximized. She already has punctal plugs, so the addition of Restasis (Allergan, Inc.) should be quite beneficial; there have been many anecdotal reports in which Restasis has prevented haze after PRK. Another issue is that this patient has EBMD (also known as map-dot-fingerprint dystrophy), which is contributing to the microerosion. Even more problematic is the cause: an irregular pseudo-keratoconic corneal surface, as evident on topography. Corneal thickness is adequate for excimer laser ablation.

After managing the ocular surface, my preference in this case would be to perform PRK/surface ablation with

the Visx CustomVue platform due to the high mixed astigmatism in the patient's right eye. The surface irregularity will improve, with PRK's helping the irregular component of the astigmatism, and the main refractive treatment will fix most of the regular astigmatism. I would treat only +1.50 -3.00 X 158 OD and plano -1.50 X 173 OS. I would also administer mitomycin C 0.02% for 20 seconds after the laser ablation to help prevent corneal haze.

**"Prior to any surgical treatment,
the health of the ocular surface
needs to be maximized."**

—*Mitchell A. Jackson, MD*

In my experience, addressing the entire refractive error in EBMD cases typically results in overcorrections, so I prefer to decrease the correction entered into the excimer laser. I can always return to the laser suite for further treatment if need be and/or perform LRIs, if the postoperative refraction allows, to treat any remaining astigmatism.

SCOTT M. MACRAE, MD

I would first treat the patient's dry eye disease with oral omega-3 supplementation and Restasis b.i.d. OU. After the dry eye syndrome stabilized, I would consider PTK to smooth the ocular surface. I would treat any meibomitis and blepharitis as well. After the PTK, I would be wary of performing further laser treatment if the corneal irregularity persisted. Keratoconus is unlikely in this case because of the thick corneas, but forme fruste keratoconus can exist with thick corneas and is often revealed by the measurement of an elevated posterior float.

Regardless, it would be helpful to obtain a full-thickness corneal scan with the Pentacam, Galilei Dual Scheimpflug Analyzer (Zeimer Ophthalmic Systems AG, Port, Switzerland), or Orbscan after the PTK. If the topography were relatively normal, treatment with PRK or thin-flap LASIK would be reasonable. If the patient had evidence of keratoconus, I would not be in favor of treating the mixed astigmatism after cross-linking, because there are no long-term studies demonstrating the safety and stability of this strategy.

ROBERT K. MALONEY, MD

While the Klyce indices suggest keratoconus, the topographies are not typical for the condition. Despite central steepening in the patient's right eye, there is an

“I believe the optimal ‘refractive’ procedure here would be to debride the corneal epithelium.”

—Robert K. Maloney, MD

adjacent area of flattening in the horizontal meridian that is atypical of keratoconus. Similarly, her left eye has an area of inferior flattening that is irregular in shape and adjacent to the central steepening; this type of irregular shape would also be atypical of keratoconus. The marked central irregularity of the keratoscopic mires is greater than is usual for what would otherwise be relatively mild keratoconus. A corneal thickness of more than 590 μm also is not typical for keratoconus. Along with the clinical findings of EBMD on the slit-lamp examination, these results suggest that the topographic abnormalities are due to EBMD rather than keratoconus. It is possible that the patient’s loss of BCVA is largely owing to the pathologic condition.

If one attempted a refractive correction with either PRK or LASIK in this case, removal or sloughing of the epithelium could lead to significant refractive shifts that would be unanticipated by the laser treatment. I believe the optimal “refractive” procedure here would be to debride the corneal epithelium in both eyes out to a 7-mm zone. Once the epithelium healed, the surgeon could reevaluate the patient. If she were left with simple, regular, with-the-rule astigmatism and excellent BCVA, PRK would be indicated. If keratoconus were evident, the surgeon could cautiously perform PRK on a 47-year-old, but a more vigorous informed consent would be appropriate.

DARRELL E. WHITE, MD

Who knew there were direct flights from Germany to New Mexico? The presence of EBMD makes this case a little more straightforward than it otherwise would be, because it takes LASIK off the list of options. The topographic irregularities are undoubtedly caused by the EBMD, as is the BCVA of less than 20/20. I would do all I could to maximize the health of the patient’s ocular surface and tear film, after which I think she could have refractive surgery.

Surface ablation is indicated, and two questions arise. Should PTK precede PRK, and should the surgeon consider “debulking” the cylinder in the patient’s right eye with an LRI prior to laser treatment? I tend to be a minimalist and attempt to do as little surgery as possible,

especially with PRK. Amazingly, a Visx CustomVue prescription can be obtained for both of her eyes, albeit of higher quality in the right than left eye. I would perform PRK with the Visx CustomVue system using alcohol-assisted epithelial removal in her left eye.

I think debulking the cylinder in the patient’s right eye would be beneficial. A moderately aggressive LRI driven by the topography could be followed by repeat measurements for a CustomVue treatment. Again, PRK with alcohol-assisted epithelial removal would not only improve the corneal health by treating the EBMD, but it would also likely produce an excellent visual result. ■

Section editor Stephen Coleman, MD, is the director of Coleman Vision in Albuquerque, New Mexico. Parag A. Majmudar, MD, is an associate professor, Cornea Service, Rush University Medical Center, Chicago Cornea Consultants, Ltd. Karl G. Stonecipher, MD, is the director of refractive surgery at TLC in Greensboro, North Carolina. Dr. Coleman may be reached at (505) 821-8880; stephen@colemanvision.com.

Lanny B. Hale, MD, is an associate clinical professor of ophthalmology at The Medical College of Wisconsin and is in private practice at the Hale Vision Laser & Implant Center in Brookfield, Wisconsin. He is a consultant to Abbott Medical Optics Inc. only as a Visx trainer, who certifies physicians on the use of the Visx laser and WaveScan, and receives compensation for the time spent. Dr. Hale may be reached at (262) 789-9029; lbhalemd@gmail.com.

Mitchell A. Jackson, MD, is the founder and medical director of Jacksoneye in Lake Villa, Illinois. He is on the speakers’ bureau for Allergan, Inc. Dr. Jackson may be reached at (847) 356-0700; mjlaserdoc@msn.com.

Scott M. MacRae, MD, is a professor of ophthalmology and professor of visual science at the University of Rochester Medical Center in Rochester, New York. He is a consultant to Bausch + Lomb and Zeimer Ophthalmic Systems AG. Dr. MacRae may be reached at (585) 273-2020; scott_macrae@urmc.rochester.edu.

Robert K. Maloney, MD, is the director of the Maloney Vision Institute in Los Angeles. Dr. Maloney may be reached at (310) 208-3937; info@maloneyvision.com.

Darrell E. White, MD, is the president and CEO of Sky Vision Center in Cleveland. He acknowledged no financial interest in the products or company he mentioned. Dr. White may be reached at (440) 892-3931; they@skyvisioncenters.com.

