Improving Refractive Results With Wavefront-Guided Technology

Recently began using a new wavefront-guided system to perform laser vision correction. To date, I have seen promising results, including excellent postoperative UCVA, high refractive predictability, and exceptional cylinder correction. Additionally, patient reports have shown high overall satisfaction, with good quality-of-vision and quality-of-life responses after surgery.

In a busy clinical setting, patient flow can be challenging. The iDesign Advanced WaveScan Studio (Abbott Medical Optics Inc.) simplifies the process and maximizes throughput by taking five ocular measurements—autorefraction, wavefront aberrometry, topography, keratometry, and mesopic and photopic pupil size—in one capture sequence. Powered by a Hartmann-Shack 177-µm sensor, the system obtains four measurement frames in a 3-second acquisition sequence, providing absolute registration of eye motion and pupil shift.

The system also enhances detection of highly aberrated eyes, including higher-order aberrations. Because the iDesign captures central corneal topography at a diameter greater than 8.33 mm and incorporates this information into the treatment plan, laser spots can be placed more precisely. In our practice, these features have translated into improved results with a high degree of patient satisfaction.

STUDY AND RESULTS

A study of 262 patients (510 eyes) who had undergone LASIK, PRK, or enhancement with iDesign was recently conducted in the United Kingdom. Mean age of the patients was 36.2 years (range, 18–68), mean preoperative sphere was -1.94 ±2.44 D (range, -9.50 to 4.00; Figure 1), and mean preoperative cylinder was -0.78 D (range, -5.00 to 0.00). Patient surveys on quality of vision and quality of life after surgery are currently being evaluated in Europe and Japan, where the system is approved.

Follow-up indicates that patients have good UCVA and the procedure has a high level of refractive predictability. At 1 month, 91% of eyes were within ±0.50 D
of intended correction for mean spherical equivalent predictability, and 98% were within 1.00 D (Figure 2). The mean postoperative cylinder at 1 month was -0.16 \pm 0.25 D, with 90% of patients having 0.50 D or less cylinder (Figure 3). The mean correction ratio was 1.02 D (range, 0.14–2.28). With a correction ratio of 1 signifying that the correction achieved was equal to the attempted correction, the study results demonstrate that the correction of cylinder with the iDesign system is extremely accurate (Figure 4).

Nearly 99% of patients achieved 20/20 binocular UCVA at 1 month, and 100% achieved 20/40 (Figure 5). At this same time point, 92% achieved 20/20 monocular UCVA. Early data also showed that the iDesign could yield excellent hyperopic outcomes because it uses a high density lenslet pattern to obtain precise captures and an accurate ablation profile.

**QUALITY OF LIFE**

Ninety-seven percent of patients surveyed indicated that they were very satisfied or satisfied with their vision without the use of glasses or contact lenses, 94% noted increased satisfaction with vision compared with vision with glasses or contact lenses before surgery, 86% said their overall vision was better or much better than expected, and 11% indicated that the physician and staff delivered exactly what they expected. The majority of patients also reported little to no difficulty with starbursts, glare, halos, or driving at night.

Additionally, 97% said they had little to no difficulty performing tasks or doing hobbies that required them to see things clearly up close, such as cooking, fixing things around the house, sewing, using hand tools, reading, or computer work. Outdoor activities such as golf, swimming, and jogging posed no issues either. Overall, 97% reported that they would have laser vision correction with the system again and would recommend laser vision correction to friends and family.

**IMPROVED RESULTS**

Today’s refractive surgery patients expect vision beyond 20/20. We have found that the iDesign system is simple to use, with rapid scan acquisition and excellent results, and we now use it in 100% of our LASIK cases. It is particularly helpful in eyes with irregular corneas, as achieving a good wavefront scan is often difficult in these cases. This recent study illustrates that advanced refractive technology, such as the iDesign system as part of the iLASIK Solution, allows patients to receive a truly customized laser vision correction procedure with exceptional results.

**TAKE-HOME MESSAGE**

- iDesign software may be able to better detect highly aberrated eyes and capture scans with complex wavefronts.
- The system allows greater detection of higher-order aberrations.

David Teenan, MBChB, FRCS, FRCOphth, is in practice with Optical Express. Dr. Teenan states that he has no financial interest in the products or companies mentioned. He may be reached at tel: +44 7787786108; e-mail: DavidTeenan@opticalexpress.com.