As all of us who perform laser refractive corneal surgery know, it is imperative to establish a nomogram that achieves the most accurate results possible. Such a nomogram helps reduce the rate of over- and undercorrections and leads to decreased need for retreatments. The Advanced Personalized Technology nomogram (APT; Technolas Perfect Vision, Munich, Germany), in my experience, achieves this goal.

With the advent of wavefront technology, there was an increase in the number of patients who were overcorrected, with nearly one in four ending up hyperopic (defined as more than 1.00 D).1 After Scott MacRae, MD, of Rochester New York, improved the wavefront nomogram for the Zyoptix z100 platform (Technolas Perfect Vision), it began to prevent the overcorrection that many surgeons had seen as a result of the wavefront treatment. The APT nomogram, also known as the Rochester nomogram, has resulted in improvements in accuracy and postoperative UCVA.

The APT nomogram incorporates an offset in the spherical treatment for cylinder and higher-order aberrations (HOAs). This is comparable to the coupling effect in the treatment of spherocylindrical refractions, in which the treatment of the cylinder affects the amount of sphere that is to be treated. Without this adjustment, the treatment of the full wavefront may result in hyperopic overcorrection.

In early 2007, we installed the APT nomogram on our Zyoptix z100 excimer laser and prospectively followed our surgical results. After treating 100 eyes, we analyzed the outcomes, which were subsequently published.2

In our study, 64 eyes had LASIK and 36 eyes had LASEK. Preoperatively, the mean spherical equivalent refraction in the LASIK group was -3.03 ± 1.47 D, with myopia up to -6.00 D. In the LASEK group, the mean spherical equivalent refraction was -3.77 ± 1.56 D, with -7.88 D the maximum myopia treated.

Postoperatively, 95% of LASIK patients had a UCVA of 20/20 or better, 65% had a UCVA of 20/15 or better, and 6% had a UCVA of 20/8 or better (efficacy, 1.19; safety, 1.13). All but 3% of patients were within ±1.00 D of target refraction, and 90.9% were within 0.25 D of target refraction. In the LASEK group, 97% had a UCVA of 20/20 or better, 87% had a UCVA of 20/15 or better, and 16% had a UCVA of 20/8 or better (efficacy, 1.27; safety 1.26). The mean postoperative spherical equivalent was 0.04 ±0.36 D and 0.03 ±0.16 D in the LASIK and LASEK groups, respectively.

Although outcomes were statistically better for the LASEK group, a mean difference of 0.01 D is not clinically significant. We postulate that LASEK was somewhat better than LASIK because it involves no flap lifting and repositioning to induce HOAs. However, this effect was not studied.

In both groups, more than half of patients gained at least one line of UCVA, with one in five gaining two lines. Approximately 3% of patients lost two lines, which was due to overcorrection and residual refractive error. All patients who needed an enhancement (4.1%) were satisfied following their second procedure.

Follow-up was completed in 97% of eyes. Any patient who was not accounted for received a telephone call to schedule a visit; however, these patients declined follow-up because
they were satisfied with their results. Patient satisfaction was compared using our customary patient satisfaction questionnaires. However, because participation was voluntary there could be a bias. For the APT-treated patients, satisfaction was 9.52 on a scale of 10 (best grade). For the other treatments, including Planoscan (Technolas Perfect Vision nomogram for spherocylindrical treatments), aspheric, and tissue-saving treatments, the mean grade was 9.01.

**DISCUSSION**

Excimer laser treatments have shown increasingly accurate results and, as a result, patient expectations have risen. A refractive result that deviates from the preoperative target, without the presence of complications, is a result that needs careful attention in terms of patient care and enhancement procedures. Patients who require enhancements are usually unhappy. They need to return for check-ups until a stable refraction is recorded and the okay for enhancement is given. These patients require more attention and more chair time. In the past year, our enhancement rate has decreased to less than 3% for myopic treatments using the APT platform.

**CONCLUSION**

The US Food and Drug Administration (FDA) clinical trial for the Zyoptix platform showed that up to 22.8% of patients had a hyperopic overcorrection using the full wavefront treatment. However, with the APT nomogram, the rate of hyperopic overcorrection was only 2.8%.7

The bottom line is that newer nomograms present a more customized approach to myopic treatments. When customization is incorporated into the nomogram, postoperative results are excellent. At our clinic, we are now surprised when we do not reach the target refraction. Even though more than 50% of patients gain at least one line of vision, we still adhere to the policy of underpromise and over-deliver. This is good news for both patient and surgeon.

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