Clinical and economic benefits justify routine use of wavefront-guided LASIK

Cheryl Gutman
in Lisbon

WAVEFRONT-GUIDED LASIK reduces enhancement rates compared to conventional LASIK, and that difference has significant economic implications for a busy refractive practice, said Richard L. Lindstrom MD, University of Minnesota, Minneapolis, US, in a presentation at the XXIII Congress of the European Society of Cataract & Refractive Surgeons.

Dr Lindstrom presented an analysis to determine the clinical and economic impact of switching from conventional to wavefront-guided LASIK in his group practice. He compared outcomes from two cohorts of patients treated over a 12-month period. The conventional LASIK group consisted of patients undergoing treatment with a Star laser (AMO) between August 2001 and July 2002. The wavefront LASIK group comprised eyes treated with the CustomVue® system (AMO) from August 2003 to July 2004.

The analyses showed the wavefront procedure was associated with better visual outcomes and a reduced enhancement rate. Uncorrected VA of 20/20 or better was achieved in 62% of eyes in the conventional LASIK group compared with 91% of eyes that had a customised procedure. The enhancement rate was 9.8% in the conventional LASIK group compared with only 5.2% in the customised group.

Complications more common during enhancement procedures

In addition, among patients needing an enhancement, complications were more common compared with the rate seen in a primary treatment population. Epithelial ingrowth was the most common complication observed, with the incidence rate eightfold higher after flap lift enhancements compared with the primary LASIK, 4% vs. 0.5%, Dr Lindstrom reported.

New technology may further reduce enhancement rates

Dr Lindstrom also observed that analysis of data from a more contemporary series of wavefront-treated patients is likely to yield an even lower enhancement rate due to several recent developments that would be expected to further improve outcomes. Those changes include the introduction of iris registration that adjusts for cyclorotational movement and pupil centroid shift, use of Fourier analysis-based algorithms, and further refinements in the surgery custom nomogram, as well as the new indications for custom treatment that include hyperopia, mixed astigmatism, and higher levels of myopia.

To optimise outcomes of wavefront-based procedures, Dr Lindstrom emphasised the value of cyclorotational registration, especially for astigmatic control, along with verifying the accuracy of the wavefront readings. That can be done by being certain that the aberrometer-measured cylinder and sphere values are within 0.5 D of the data obtained by refraction and that there is a good match in the cylinder axis values as well, he said.

“If there is a significant difference, repeat the measurements to check for errors,” Dr Lindstrom cautioned.

Richard Lindstrom

While switching to customised ablation has been an important factor in reducing enhancement rates, Dr Lindstrom also mentioned other keys for minimising the need for retreatment even when performing a conventional procedure.

First, it is worthwhile to avoid operating on patients who are demanding total spectacle independence and those with other unrealistic expectations. In addition, he recommended that surgery be performed only in individuals who have confirmed stable refraction and who have discontinued contact lens wear for a sufficient period of time.

He also encouraged surgeons to collect and analyse their surgical outcomes in order to adjust their personalised nomograms, noting that in initial experience with wavefront-guided LASIK in 2003, 80% of patients were achieving 20/20 UCVA. Following a 2004 nomogram adjustment, that rate increased to 90%.

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Comparison to Other Series

Based on the premise that cost is lost revenue of one new patient with no or minimal return and assuming the average reimbursement per eye was US$2,000, Dr Lindstrom calculated the reduced need for enhancement would result in an approximate US$100,000 annual savings per 1,000 cases performed.

“Methods for reducing enhancement rates are important because these retreatments are expensive for patients and the practice. Patients are unhappy if they need an enhancement and are also at increased risk for complications. For the practice, these patients take up chair time and operating room slots that could be filled by new, revenue-generating patients, and they can also reduce potential new revenue by negative word-of-mouth effects,” noted Dr Lindstrom.

“Our experience shows that wavefront-guided LASIK is cost-effective and provides better visual acuity and quality of vision results than conventional treatment. Based on that profile, we have essentially become a 100% custom practice and perform a wavefront-guided procedure for any patient who is qualified for it.”

Customised LASIK may achieve best results in highly aberrated eyes

Roibeard O’Hineachain
in Lisbon

CUSTOMISED aspheric myopic LASIK using the Nidek Navex System appears to achieve its best results in highly aberrated eyes, according to Jan Venter MD, Croydon, Surrey, UK.

Speaking at the XXIII Congress of the ESCRS, Dr Venter said that wavefront-guided customised aspheric LASIK with the Nidek EC-5000 laser produces very good results in terms of refractive results and visual outcomes. However, while the treatment reduces higher-order aberrations in highly aberrated eyes, it increases the aberrations in eyes with more regular corneas.

“Custom wavefront works, it just doesn’t work perfectly yet in every case,” said Dr Venter.

To support his assertion, Dr Venter presented the six-month results from 93 myopic eyes of 50 patients who underwent myopic LASIK between September and December 2004, with the Nidek Navex platform using the OPD-Guided Customised Aspheric Treatment (OPDCAT) algorithm.

“The Navex Platform has two components designed to improve the eye’s optical properties. It has an aspheric ablation profile to preserve the prolate shape of the cornea and multipoint ablation using a 1.0 mm spot to treat the cornea’s irregular component as determined by aberrometry,” Dr Venter said.

“The patients in the study ranged in age from 24 to 61 years (mean 36 years) and had a mean preoperative spherical equivalent of -4.09 D equivalent: (range -0.38 D to -9.50 D). Preoperative assessment included: OPD-scan aberrometry, autorefraction and keratometry.

After a follow-up of at least three months, 100% of eyes were within 1.0 D of emmetropia and 95% of eyes were within 0.5 D. In addition, 89% of eyes achieved uncorrected visual acuity of 1.0 or better, with 38% achieving 1.2 or better.

No eyes lost two or more lines of best-corrected acuity, although 12% lost one line. However, 25% gained one line, and four percent gained two or more lines. The mean postoperative spherical equivalent was -0.08 D, ranging from -1.25 D to + 0.88 D.

Increased aberrations in normal eyes

Higher-order aberrations, expressed as RMS, increased by 19%. However, in eyes with a preoperative higher order aberration, RMS error less than 0.3 microns, the RMS error increased by 40%. In contrast, in eyes with a preoperative RMS error higher than 0.5 microns, RMS decreased by 18 %.

In addition, there was a 53% increase of coma in eyes with lower preoperative coma. But there was a 40 % decrease of coma in eyes with higher amount of preoperative coma. Spherical aberration increased by 60% in eyes with lower preoperative spherical aberration and decreased by 28% in eyes with higher spherical preoperative aberration.

“Based on the results of this study, surgeons may consider relaxing wavefront ablations for patients with significant higher order RMS (> 0.3 microns).”

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