Refractive Outcomes Following Treatment with Wavefront-Guided Laser In-Situ Keratomileusis Using VISX CustomVue™

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Purpose

To determine the refractive and clinical outcomes of wavefront-guided Laser In Situ Keratomileusis using the VISX CustomVue system to treat myopic astigmatism, and to determine if a surgeon-added correction factor is needed.

Method

Thirty-five eyes in eighteen patients, who had CustomVue™ treatment performed between November 2003 and January 2004, were chosen at random for a three-month post-operative examination including manifest refraction. All procedures were performed by the same surgeon using a WaveScan Wavefront Analyzer and VISX Star4 Excimer laser, with 6.5mm treatment zone and 8mm blend zone. Post-operative refractive state was compared to pre-operative data and target refraction (emmetropia) to assess the need for correction factors when performing CustomVue™ procedures.

Results

At three months follow-up, manifest refraction was –0.632D ± 0.535, failing to reach the target refraction of emmetropia ($p<0.0001$, 95% confidence interval –0.816 to –0.449). A significant difference existed between the treatment parameters derived from wavefront analysis compared to those derived from a standard nomogram (average difference -0.180D ± 0.431, $p=0.03$).

Seven of the eighteen patients requested to have an enhancement procedure performed on at least one eye. When compared to the non-enhancement group, no significant difference between preoperative refraction, postoperative refraction, or initial uncorrected visual acuity was noted ($p=0.163$, 0.163, and 0.129, respectively). However, the difference between wavefront-derived treatment parameters and those derived from a standard LASIK nomogram for the enhancement group was significantly different from the non-enhancement group (0.363 ± 0.258 D vs. 0.050 ± 0.464 D, $p=0.015$).

Post-operative uncorrected visual acuity ranged from 20/20 to 20/50, with no change in best-corrected visual acuity. No complications occurred during or after the procedures.

Conclusion

A significant difference exists between the achieved post-operative refraction and emmetropia using CustomVue™. A correction factor needs to be added by the surgeon to the Wavefront-derived treatment protocol in order to achieve the desired outcome. This has been addressed recently in several publications, and has been addressed in the VISX Fourier Wavefront Software Upgrade. Use of a corrective nomogram is recommended to account for patient variations, especially in the presence of a significant difference between wavefront-derived and standard LASIK treatment parameters.

18 Patients (35 Eyes)

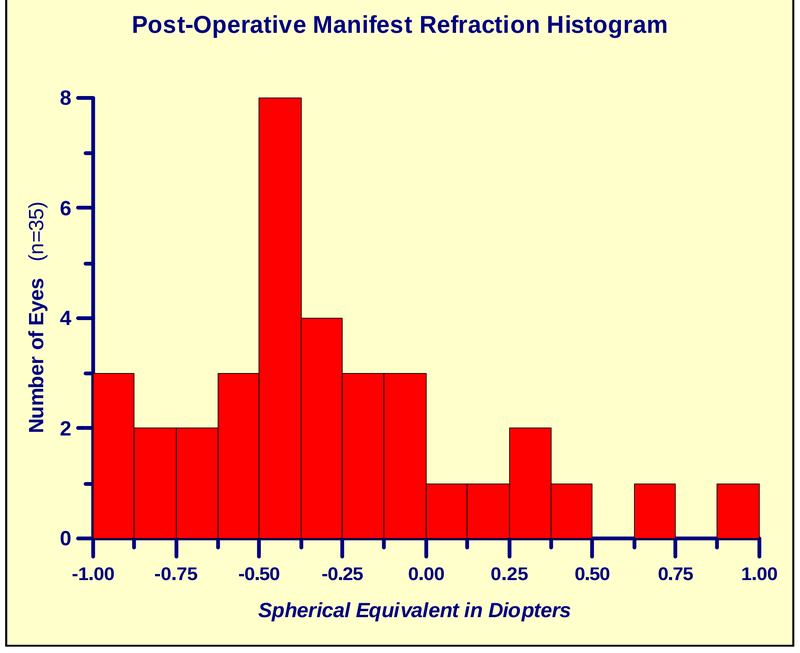
7 Male (14 Eyes)
11 Female (21 Eyes)

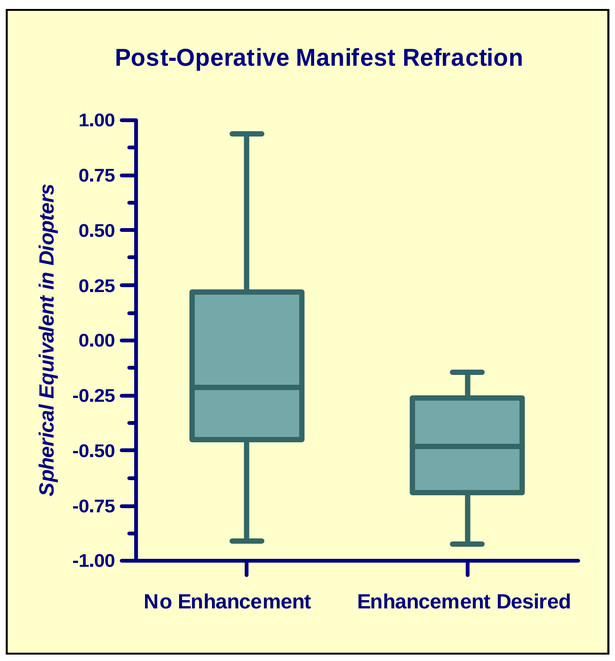
Average age was 39.3 years (Range 21 to 67 years)

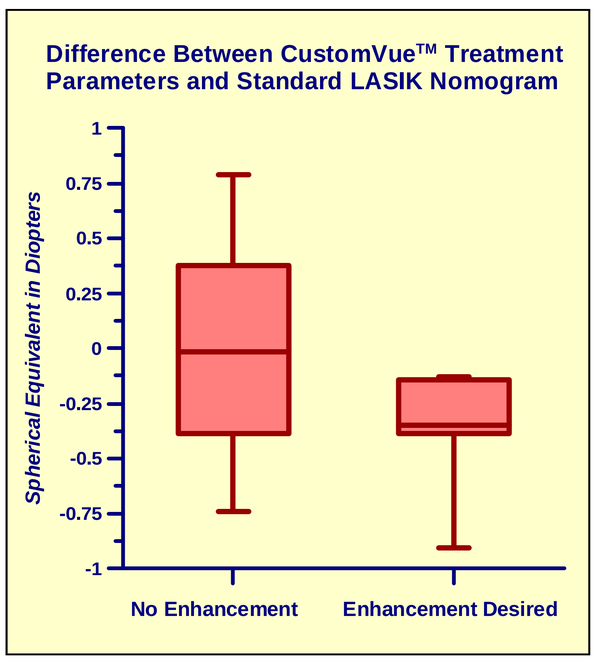
All procedures performed on a VISX Star4 Excimer laser with:
- **6.5 mm treatment zone**
- **8.0 mm blend zone**

Six patients reported dry eye symptoms.

All achieved 20/50 or better uncorrected visual acuity with no change in best-corrected visual acuity.







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