

**HYPEROPIC CORRECTION ACROSS LASER PLATFORMS**

**By Conni Bergmann Koury, Executive Editor**

The published literature and the FDA's postmarketing approval studies have shown essentially equivalent outcomes for treating hyperopia with the available platforms, said Steven Schallhorn, MD, in an interview with *Cataract & Refractive Surgery Today*.<sup>1-9</sup>

"My group performed a detailed literature analysis looking at this issue and found that the outcomes were quite similar," Dr. Schallhorn said. "We looked at the WaveLight Allegretto Q400 [Alcon Laboratories, Inc., Fort Worth, TX], Visx Star S4 [Abbott Medical Optics Inc., Santa Ana, CA], and other platforms as well. Although none of the studies had a truly robust sample size, all showed relatively similar outcomes as far as the percentage of patients who achieved a visual acuity of 20/20 and 20/40, refractive predictability, and the percentage of patients who experienced a loss of BCVA."

Table 1 shows a comparison of the FDA study results for hyperopic LASIK, comparing the Visx Star S4 and the WaveLight Allegretto Q400 laser platforms.

"While one laser might be slightly better in one category and vice versa, the differences were not significant," Dr. Schallhorn said. "All of the lasers were essentially equivalent in terms of treating low-to-moderate hyperopia (< +4.50 D)." He added that, today, the upper limit of hyperopic laser treatment is +5.00 D, and many surgeons treat patients who have less than this amount.

With the exception of treating higher-order aberrations in a wavefront-guided treatment, the basic correction of hyperopia is similar between laser platforms, Dr. Schallhorn stated. "The ablation profile is, of course, the opposite of correcting myopia," he explained. "Instead of flattening the cornea for myopia, the cornea is steepened to correct hyperopia. This is

a more complex treatment pattern because of the need to precisely remove an annulus of stromal tissue to form a centered optical zone as well as an appropriate transition zone. In addition, there is a different healing response and a greater tendency to regress compared to myopia. This can affect the predictability of the procedure and the refractive outcome."

Dr. Schallhorn emphasized that the cornea of a hyperopic patient responds differently to laser treatment than that of a myopic patient. "A +2.00 D treatment can heal fundamentally differently from -2.00 D," he stated. "Diopter for diopter, hyperopic corrections are not as predictable compared with myopia."

*Captain (Ret.) Steven C. Schallhorn, MD, is in private practice in San Diego and is chief medical director of Optical Express. He is a consultant to Abbott Medical Optics Inc. and Acufocus, Inc. Dr. Schallhorn may be reached at steveschallhorn@opticalexpress.com.*



1. US FDA. Technolas 217A Excimer Laser System. P990027/S004. February 25, 2003. <http://www.fda.gov/cdrh/pdf/p990027S004.html>. Accessed November 11, 2005.
2. US FDA. Visx Star S2 and S3 Excimer Laser Systems. P930016/S012. April 27, 2001. <http://www.fda.gov/cdrh/pdf/p930016s012.html>. Accessed November 11, 2005.
3. US FDA. WaveLight ALLEGRETTO WAVE™ Excimer Laser System. P030008. October 10, 2003. <http://www.fda.gov/cdrh/PDF3/p030008.html>. Accessed November 11, 2005.
4. US FDA. Star S4 Excimer Laser System with Variable Spot Scanning (VSS) and WaveScan WaveFront System. P930016/S017. December 14, 2004. <http://www.fda.gov/cdrh/pdf/p930016s017.html>. Accessed November 11, 2005.
5. Esquenazi S. Five-year follow-up of laser in situ keratomileusis for hyperopia using the Technolas Keracor 117C excimer laser. *J Refract Surg.* 2004;20:356-363.
6. Varley GA, Huang D, Rapuano CJ, et al. LASIK for hyperopia, hyperopic astigmatism, and mixed astigmatism: a report by the American Academy of Ophthalmology. *Ophthalmology.* 2004;111:1604-1617.
7. Salz JJ, Stevens CA. LASIK correction of spherical hyperopia, hyperopic astigmatism, and mixed astigmatism with the LADARVision excimer laser system. *Ophthalmology.* 2002;109:1647-1658.
8. Rashad KM. Laser in situ keratomileusis for the correction of hyperopia from +1.25 to +5.00 diopters with the Technolas Keracor 117C laser. *J Refract Surg.* 2001;17:113-122.
9. Cobo-Soriano R, Llovet F, Gonzalez-Lopez F, et al. Factors that influence outcomes of hyperopic laser in situ keratomileusis. *J Cataract Refract Surg.* 2002;28:1530-1538.

**TABLE 1. SUMMARY OF HYPEROPIC LASIK FDA TRIALS (WAVELENGTH AND VISX WAVEFRONT GUIDED)**

	N	±1.00 D (%)	20/40 UCVA (%)	20/20 UCVA (%)	Loss >2 Lines BCVA (%)
WaveLight (all)	212	90.4	95.3	67.5	1.5
0 to 1.0 D	27	97.3	96.3	77.8	0
>1.0 to 2.0 D	76	95.8	97.4	79.0	0
>2.0 to 3.0 D	60	83.6	95.0	63.3	0
>3.0 to 4.0 D	24	85.7	91.7	37.5	0
>4.0 to 5.0 D	16	100	93.8	50.0	6.3
>5.0 to 6.0 D	7	75.0	85.7	71.4	12.5
Visx WFG (all)	131	90.8	95.4	61.8	—
0 to 1.0 D	19	94.7	100	78.9	0
>1.0 to 2.0 D	63	92.1	95.2	65.1	0
>2.0 to 3.0 D	30	93.3	93.3	53.3	0
>3.0 to 4.0 D	9	88.9	100	66.7	0
>4.0 to 5.0 D	10	70.0	90.0	30.0	0

Abbreviation: WFG, wavefront guided