

Super Vision Baloney

Recognizing real accomplishment and unsupported claims.

BY LEE T. NORDAN, MD



Through the years, the annual ASCRS meeting has blossomed into a wonderful conference. For an ophthalmic surgeon, it offers focused and clinically useful material. The ASCRS leadership deserves great praise for presenting cataract/IOL and refractive surgery as equals.

On various levels, the 2004 ASCRS annual meeting was very important to me. I'd therefore like to discuss three topics based upon this conference: the Nordan Achievement Awards; the relative equality between cataract/IOL and refractive surgery; and the concept of *super vision*.

THE NORDAN ACHIEVEMENT AWARDS IN REFRACTIVE AND CATARACT SURGERY

On a personal level, the creation of the Nordan Achievement Awards in Refractive and Cataract Surgery was extremely fulfilling. My immense thanks to John Doane, MD, David Cox, and the rest of the *Cataract & Refractive Surgery Today* gang for supporting this award. Its intention is to honor contemporary surgeons who have made great contributions to refractive surgery, either through lifetime achievement or the creation of new surgical techniques that have affected refractive and/or cataract/IOL surgery.

At the premier awards ceremony, Stephen Slade, MD, of Houston received the award for Lifetime Achievement. Ioannis Pallikaris, MD, of Crete, Greece, was recognized with the award for Major Contribution in Refractive Surgery for helping to develop LASIK. Robert Osher, MD, of Cincinnati received the award for Major Contribution to Cataract/IOL Surgery for being the first cataract/IOL surgeon to provide a systematic approach for correcting astigmatism by astigmatic keratotomy. All of us at *CRSToday* hope that the Nordan Achievement Awards will not only recognize contributions to anterior segment surgery but also demonstrate the equal importance of cataract/IOL and refractive surgery.

My presentation during the awards ceremony dealt with the symmetry of developments in cataract/IOL and refractive surgery from 1970 to 1990 under the guidance of the respective giants of each specialty, Charles Kelman, MD, and José Barraquer, MD (Figure 1). Today, it is apparent that a highly skilled anterior segment surgeon must understand and practice aspects of both types of surgery. Refractive surgery is moving toward the use of phakic IOLs, and the correction of astigmatism for cataract/IOL patients is mandatory in order to achieve best UCVA.

Phaco surgeons must stop considering only their phaco technique and focus on helping patients achieve best UCVA, a refractive surgery goal. Refractive surgeons must understand the function and choices offered by numerous types of IOLs, refractive lensectomy, and various approaches for presbyopic correction. Surely, refractive and cataract/IOL surgery have merged into a new classification: quality anterior segment surgery. The artificial division between cataract/IOL and refractive surgery has vanished for the complete anterior segment surgeon.

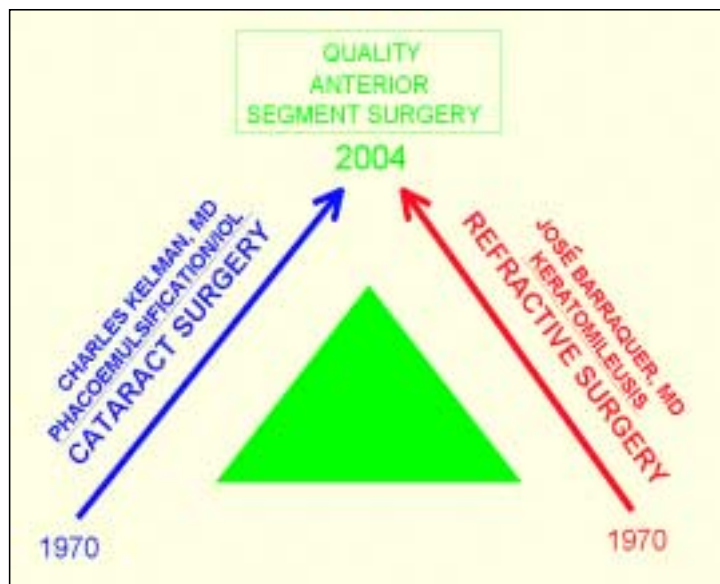


Figure 1. In 2004, quality anterior segment surgery requires a confluence of phacoemulsification/IOL and refractive surgery techniques.



Figure 2. Baloney, whether sliced or whole, is still baloney. Citing unrelated facts to prove super vision is, in the author's view, slices of baloney.

SUPER VISION

One topic seemed omnipresent at this year's ASCRS meeting: super vision. It seems to me that, although super vision as a goal is a wonderful concept, promoting super vision as attainable with current corneal surgical techniques is preposterous and should cease immediately.

Changing the cornea in order to alter the refractive error of an eye involves either flattening or steepening the central cornea. The junction between the cornea that has changed shape and the untouched midperipheral cornea *always* adds a tremendous amount of aberration (directly proportional to the amount of correction) to the optical system that *cannot* be removed. Altering ablation patterns to reduce the amount of higher-order aberrations in treatments that add 100 times more aberration to the system cannot possibly improve the quality of the patient's optical system to super vision levels.

In addition, I have heard the argument that we can create a corneal surface that can provide super vision because (1) we surgeons can now make excellent corneal flaps, (2) the excimer laser removes stromal tissue with an accuracy of $\pm 0.25 \mu\text{m}$ per pulse, and (3) we can measure refractive error to $\pm 0.05 \text{ D}$ by wavefront analysis. This argument is baloney. What about the epithelium that facets in and covers any changes in the cornea up to approximately 8 to 10 μm ? Why fail to consider the corneal aberrations induced by ablations as mentioned earlier? How about the fact that the average decentration of an ablation is approximately 0.25 mm (250 μm) with respect to the center of the pupil? Do we expect to make 4- μm changes on the surface of the cornea as dictated by wavefront analysis when our ablation is decentered by 250 μm

with respect to the optical stop of the system, the pupil (Figure 2)?

Further, we as surgeons must consider whether we can truly measure contrast sensitivity in an objective manner when both the patient and investigator are prone to the power of suggestion. Did the patient preoperatively have reduced contrast sensitivity while wearing soft contact lenses, and has his postoperative contrast sensitivity therefore improved? Can an aspheric correcting lens (corneal inlay, contact lens, or IOL) improve quality of vision when the patient's pupil is 3.5 mm or smaller? The answer to this question is, I believe, a clear "no." An aspheric lens can improve the depth of field but not the quality of vision. In addition, can the ganglion cell level of the retina and its inherent process of summation respond to any input by sending a "super message" to the brain that it can interpret as better than the patient's best previous vision? I don't know the answer to this question.

So, what is happening? I believe that today's ablation patterns represent improvements over those of the past and that the results of LASIK, PRK, and LASEK are also generally better. These advancements do not justify the ideas that super vision is a reality or that it can be attained. The ability to measure a refractive error to $\pm 0.05 \text{ D}$ and to ablate with an accuracy of up to 0.25 μm has nothing to do with creating super vision. Let's not forget about corneal physiology and the reality of optics.

I truly believe that refractive surgeons should have hard, reproducible, scientific data about super vision before promoting the concept. Otherwise, once again, our profession will value marketing and hype over reality. If we live by hype, we will overpromise and underdeliver, and then we will "die" due to our lack of credibility. Whom should we believe about the results and value of various modalities—not just for customized ablations but also for presbyopic correction? The answer is a surgeon with scientific proof, honesty, a defensible position, a proven track record, and that magical quality of credibility.

Next month's column will be dedicated solely to the issue of super vision. The article will discuss the difference between optimization and super vision, the biological Planck's Constant discussed by Ming Wang, MD, PhD, of Nashville, Tennessee, and several other factors. I encourage any colleagues who wish to voice a differing view of super vision to contact me via e-mail. I will ensure that all sides of the debate are represented. ■

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