

EDITORIAL OVERVIEW

The age of refractive lens surgery

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Refractive surgeons have historically offered procedures for clients or patients desiring independence from spectacles and contact lenses. With the availability of new technology, however, surgeons are now finding a competitive advantage among their increasingly well-educated clientele by offering improved functional vision as well [1]. Measured by techniques such as wavefront aberrometry, contrast sensitivity, night driving simulation, reading speed, and quality of life questionnaires, functional vision represents not only the optical and neural capability to see to drive at night or walk safely down a poorly illuminated flight of stairs, but also the ability to read a restaurant menu by candlelight or navigate a web page without reliance on glasses. The goal of refractive surgeons has become crisp, clear, and colorful naked vision at all distances under all conditions of luminance and glare, much like the vision enjoyed by young emmetropes.

In large part because of the immense popularity of LASIK, refractive surgeons have focused on the cornea as the tissue of choice for refractive correction. Excimer laser ablations, with wavefront guidance or prolate optimization, can achieve excellent results with great accuracy and permanence [2]. However, although the corrected cornea remains stable, the human lens changes. All young candidates for corneal refractive surgery must be advised that they will eventually succumb to presbyopia and the need for reading glasses as a result of changes occurring primarily in the crystalline lens [3]. In a more subtle but nevertheless significant change, lenticular spherical aberration dramatically reverses from negative to positive as we age and causes substantial loss of image quality [4]. Therefore, any refractive correction of spherical aberration in the cornea will be overwhelmed by aging changes in the lens. Finally, and in ever-increasing numbers, those who have undergone corneal refractive surgery will require cataract extraction and intraocular lens implantation. So far, the accuracy of intraocular lens

power calculation for these patients has remained troubling [5].

Presbyopia, increasing spherical aberration, and the development of cataracts represent three factors that should prompt the refractive surgeon to look behind the cornea to the lens. Most commonly, however, the reason to consider refractive lens surgery remains the physical and biologic limits of LASIK. In younger patients, with intact accommodation, the insertion of a phakic refractive lens offers a compelling alternative. Beyond the age of 45, any refractive surgical modality that does not address presbyopia offers only half a loaf to the most demanding and wealthiest generation ever to grace this planet: the venerable baby boomers [6].

Science and industry are responding to the demographic changes in society with the development of improved technology for biometry, intraocular lens power calculation, and lens extraction, as well as a wide array of innovative pseudophakic intraocular lens designs.

The future of refractive surgery lies in the lens. Candidates for surgery can enjoy a predictable refractive procedure with rapid recovery that addresses all refractive errors, including presbyopia, and never experience cataracts; surgeons can offer these procedures without the intrusion of third-party payers and reestablish an undisrupted physician-patient relation; and society as a whole can enjoy the decreased taxation burden from the declining expense of cataract surgery for the growing ranks of baby boomers who opt for refractive lens surgery and ultimately reach the age of government health coverage as pseudophakes. This combination of benefits represents an irresistible driving force that will keep refractive lens procedures at the forefront of ophthalmic medical technology.

References

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