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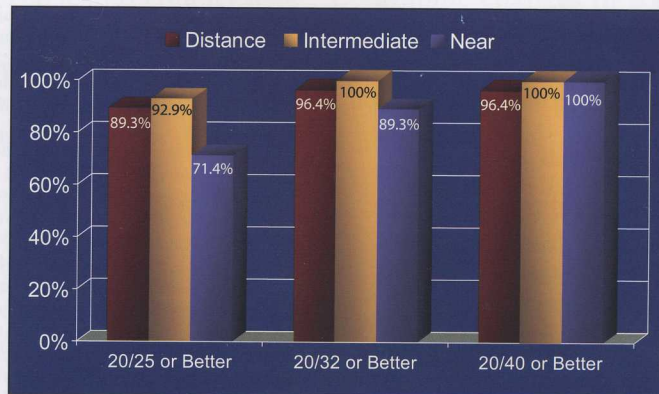
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Refractive Lens Exchange

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Refractive Lens Exchange

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Learning Objectives

Upon completion of the module, the reader should be able to:

- Identify suitable candidates for refractive lens exchange
- Perform appropriate, accurate preoperative evaluation
- Compare monofocal, multifocal, and accommodative intraocular lenses
- Summarize proper surgical technique to minimize complications and improve outcomes

Key words: accommodative intraocular lens, axial length biometry, keratometry, multifocal intraocular lens, refractive lens exchange

Introduction

Refractive surgeons have historically offered procedures for patients desiring spectacle and contact lens independence. 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. 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, neural, and psychological 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 candle light or navigate a web page without reliance on progressive or trifocal spectacles. Our goal as refractive surgeons has become crisp, clear, and colorful uncorrected 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 success and popularity of LASIK, refractive surgeons have focused on the cornea as the optical element of choice for refractive correction. Excimer laser ablations, with wavefront guidance or prolate optimization, can achieve excellent results with great accuracy and permanence. However, while the cornea remains relatively stable, the human lens changes throughout life. All young candidates for corneal refractive surgery must be advised that they will eventually succumb to presbyopia and the need for reading glasses due to changes occurring in the crystalline lens and the

associated ciliary-zonular apparatus. 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. Therefore, any refractive correction of the cornea will be overwhelmed by aging changes in the lens. Finally, and in ever-increasing numbers, those who have had corneal refractive surgery will require cataract extraction and intraocular lens (IOL) implantation. So far, the accuracy of IOL power calculation for these patients has remained troubling.

Presbyopia, increasing spherical aberration, and the development of cataracts represent persuasive arguments that prompt the refractive surgeon to look beyond the cornea to the lens. Most commonly, however, the reason to consider refractive lens surgery remains the physical and biological 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 a partial solution to a patient's problem.

Science and industry are responding to the demographic changes in society with the development of improved technology for biometry, IOL power calculation, and lens extraction, as well as a wide array of innovative pseudophakic IOL designs. The future holds multiple opportunities for lens-focused refractive surgery. Candidates for surgery will be offered a predictable refractive procedure with a low complication rate and a rapid recovery that addresses most refractive errors, including presbyopia. Surgeons will provide these procedures without the intrusion of third-party payers and re-establish an undisrupted physician-patient relationship; and society as a whole will enjoy the decreased taxation burden from the declining expense of medically necessary cataract surgery for the growing ranks of baby boomers who will have opted for refractive lens surgery and ultimately reach the age of government health coverage as pseudophakes. This combination of benefits represents a driving force that will keep refractive lens procedures at the forefront of ophthalmic medical technology.

Patient Selection Criteria

Age

Age represents the primary criterion for patient selection for refractive lens exchange (RLE). Younger individuals with intact accommodation cannot understand the frustration of the bifocal decades; even at the age

