

Table 1: Refractive indications for myopic refractive surgery

| 0 | -10 | -2 | -30 D |
|---|-----|----|-------|
| Advanced surface ablation = mitomycin C | | | |
| LASIK | | | |
| Phakic IOL | | | |
| Refractive lens exchange | | | |

adjunctive medications (eg, topical Mitomycin C⁶ and oral Vitamin C⁷) that decrease corneal haze.

An epi-LASIK technique is being developed that uses a microkeratome with a blunted blade to create an epithelial flap.⁸ The flap is lifted, the laser ablation performed, and the flap repositioned. This technique avoids the potential flap complications of LASIK (eg, button-holes, incomplete flaps, and diffuse lamellar keratitis). Early clinical results have demonstrated that visual recovery is more rapid when compared to ASA.

Improvements in microkeratome technology for LASIK have resulted in enhanced safety and predictability of flap thickness. The femtosecond laser is now an option for cutting a flap.⁹ Although clinical results with the laser have improved, there are conflicting reports about which technology is superior: mechanical microkeratome or laser keratome.^{9,10} The laser is capable of cutting thin flaps in thin corneas with enhanced safety. The question is whether this offers better results than performing ASA.

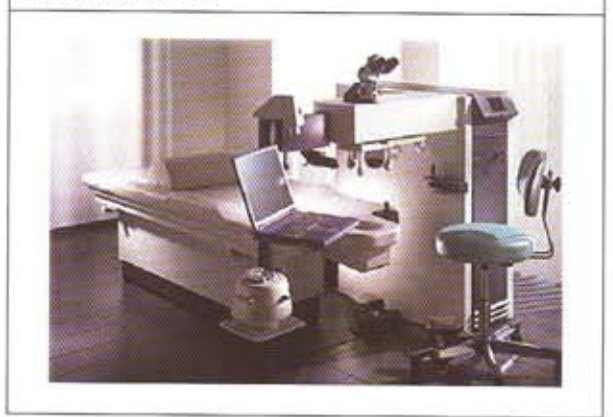
Phakic IOL and refractive lens exchange

For higher degrees of myopia (greater than -10 D) or hyperopia (greater than +5 D), an intraocular procedure should be considered (eg, phakic IOL or refractive lens exchange).¹¹ The phakic IOL is inserted in the anterior chamber and attached to the iris (eg, Verisyse lens, Figure 3) or behind the iris and in front of the crystalline lens (eg, Implantable Contact Lens [ICL], Figure 4).¹² The advantages of a phakic IOL are reversibility and retention of accommodation. Contraindications are large pupils >7 mm and an anterior chamber depth <3.2 mm.¹³ Many high hyperopes do not qualify for a phakic IOL because of a shallow anterior chamber. The surgeon orders the phakic implant (spherical power, astigmatism, axis, and diameter) based on refraction, anterior chamber depth, and the horizontal corneal diameter.

Table 2: Refractive indications for hyperopic refractive surgery

| 0 | +5 | +10 | +20 D |
|---------------------------|----|-----|-------|
| Collagen shrinkage | | | |
| Advanced surface ablation | | | |
| LASIK | | | |
| Phakic IOL | | | |
| Refractive lens exchange | | | |

Figure 1: Laser vision correction provides patients the option of decreasing their dependence on glasses or contact lenses



A refractive lens exchange is simply a lens extraction and the insertion of an IOL. The procedure is typically performed under topical anesthesia with a clear corneal incision. Neither sutures, nor a patch are required. Astigmatism can be treated by inserting a toric implant and/or limbal relaxing incisions. In addition to correcting high myopia or hyperopia, another case to consider is the patient >60-years-old who has lost most accommodative ability. If there are signs of early cataract, it is best for the patient to have a lens extraction and an implant, instead of laser vision correction. Wavefront-imaging is being developed that will differentiate between higher-order aberrations of the cornea and those of the lens. If the aberrations are high and primarily from the lens, a refractive lens exchange is the preferred procedure.

Innovations in intraocular implants provide more options for refractive lens exchange patients. Pseudo-accommodative or multifocal implants are now available. The lens that has been on the market for the longest is the Array implant with a series of zonal rings (Advanced Medical Optics). It is capable of providing distance and near vision. Although halos around lights are a common postoperative complaint, they generally diminish with time.¹⁴ The Restor lens (Alcon) utilizes a different principle that incorporates both a refractive and diffractive optic (Figure 5).¹⁵ The central 3.6 mm of the optic is the diffractive portion; it consists of a series of rings whose step heights decrease peripherally by 1.3 microns to 0.4 microns. At night, when the pupils are large, most of the light energy goes for distance focus and, therefore, the incidence of glare and halos is low (approximately 15%) and generally mild in severity. Patient selection and expectations are critical to the acceptance of multifocal lenses. In addition, exact biometric

Figure 2: Rotary brush used in advanced surface ablation to remove the corneal epithelium

