Refractive surgery options for patients with large refractive error

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Many patients with large refractive errors want freedom from glasses or contacts, but not all are good candidates for refractive error surgeries. Let’s take a look at the options.

- **Photorefractive keratectomy (PRK)** was developed in the late 1980s as the first laser vision correction procedure, and it became the first FDA-approved laser treatment for the correction of myopia and myopic astigmatism.\(^1\)\(^-\)\(^4\) PRK involves the removal of epithelium, and then treating Bowman’s layer directly with the laser.\(^2\)\(^-\)\(^4\) PRK is approved for the treatment of myopia up to -13.0 D and astigmatism up to -4.5 D.\(^4\) PRK is more predictable in patients with a lower degree of myopia (<6.0 D).\(^3\)\(^-\)\(^4\) Patients with a higher degree of myopia who are treated with PRK tend to have more regression and increased risk of corneal haze.\(^2\)\(^-\)\(^4\)

- **Laser in situ keratomileusis (LASIK)** was introduced in 1990 and involves creating a flap, treating a portion of the corneal stroma with the laser, then replacing the flap for expedited healing time.\(^5\)\(^-\)\(^6\) Depending on the laser used, LASIK is approved by the FDA for treatments of myopia up to -15.0 D and astigmatism up to -5.0 D, however higher refractive errors have less predictable results. Long-term refractive outcomes of PRK and LASIK are similar.\(^3\)\(^,\)\(^5\)\(^-\)\(^6\)

- **Astigmatic keratotomy (AK)** is an incisional method of reducing corneal astigmatism, where cuts are made with a diamond blade directly on the cornea. AK is a good option for patients with 1.5 to 3.0 D of astigmatism.\(^7\)\(^-\)\(^8\)

- **Phakic intraocular lenses (IOLs)** are a fairly new technology for the correction of high refractive errors. Anterior and posterior chamber varieties exist. The Implantable Contact Lens (ICL) is very thin, permeable, and hydrophilic.\(^9\) It is placed between the iris and the natural crystalline lens. The myopic powers range from -3.0 D to -20.0 D.\(^9\)\(^-\)\(^10\)

- **Clear Lens Exchange** should be considered for a patient who is considering LASIK or other refractive surgery, but are over the age of 40. Like cataract surgery, this procedure involves removing the natural lens of the eye and replacing it with an intraocular lens (IOL), a multifocal IOL implant, a phakic IOL, or an accommodating IOL.\(^11\)\(^-\)\(^12\)

Patients with high refractive errors have a variety of refractive surgery options but are also faced with increased risks. Given the elective nature of such surgeries, it is important these patients fully understand the risks involved so they can make a well-informed decision.

References:

Dr. Woo graduated from the Southern California College of Optometry and completed a Cornea and Contact Lens Residency at the University of Missouri - St. Louis. She is a Fellow of the American Academy of Optometry and a Fellow of the Scleral Lens Education Society. She currently practices at Havasu Eye Center in Lake Havasu, Ariz.

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