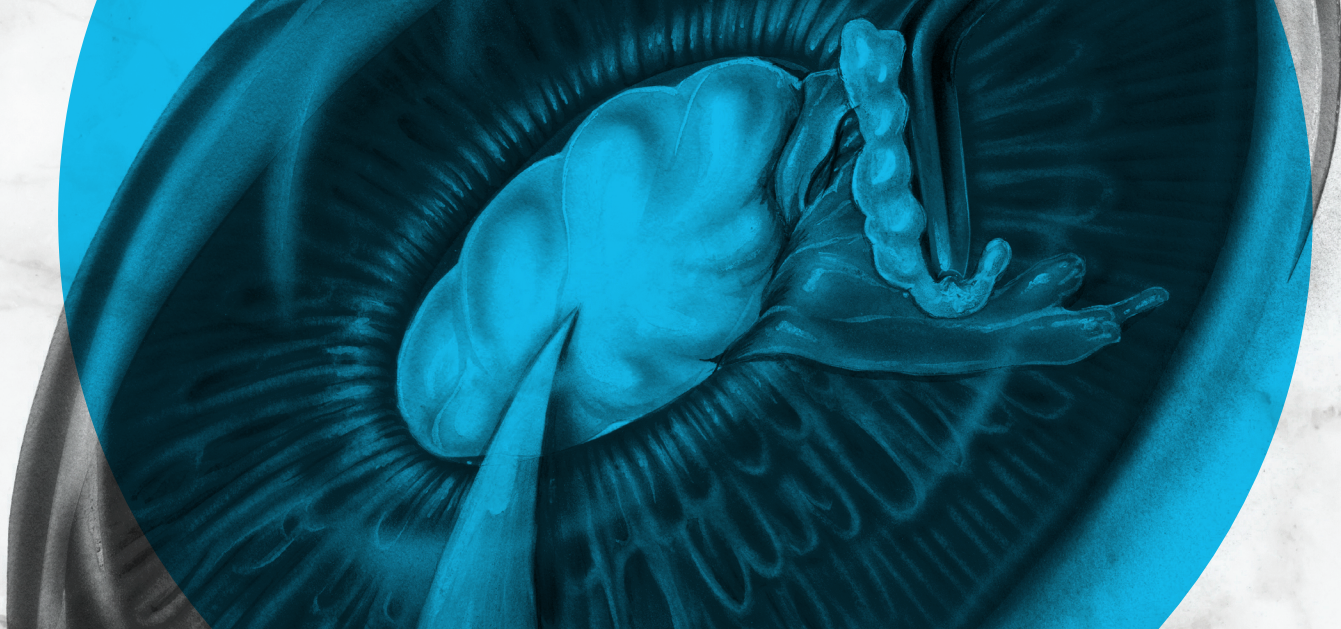




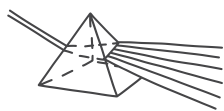
CATARACT SURGERY VS REFRACTIVE SURGERY



What's the difference?

BY NICHOLAS J. BRUNS, OD, FFAO

In the cataract refractive space, we have seen amazing advances in both surgical and IOL technologies—especially over the past decade. The target for refractive precision is smaller than ever, and with modern methods, we are better equipped to hit it. Full, uncompromised spectacle independence is the holy grail—and although it still proves elusive, we are closer than ever. So, what's the difference between cataract surgery and refractive surgery? Arguably, not much.



THE SPECTRUM OF EXPECTATIONS

The greatest difference between cataract surgery and refractive surgery is individual patient expectations. Because our patients with cataracts

already have some sort of visual deficit, our number-one goal is improvement of any kind, followed closely by refractive improvement.

Patients presenting for *elective* refractive surgery, by definition, however, have no visual deficit (at least in the eyes of third-party payers). Because these patients have functional vision with the use of contact lenses or glasses, their goal isn't to regain vision, but instead to improve their lifestyle.

I like to think of cataract refractive surgery as a spectrum of expectations. On one side, we have basic cataract surgery, with little to no refractive expectations. Improvement of any kind is the only goal. And on the other side, we have full spectacle independence and expectations of 20/20 or better uncorrected vision at distance and near. With modern

technology and techniques, our patients almost always have some sort of refractive expectation. In fact, with IOL advances over the years, most of our patients with cataracts present with a goal of partial spectacle independence at the very least; thus, our spectrum is much more tilted.



LASERS VS LENSES

In the refractive world, we are spoiled by several advanced laser- and IOL-based technologies. Determining which route to take depends mostly on the patient's age, refractive error, anatomy, and individual goals. At initial evaluations, I like to note the patient's disposition. Those who display extreme type-A personality traits may not be ideal candidates for an elective procedure.

For the Myopes

Assuming the patient has a healthy cornea of ample thickness, those with low to moderate levels of myopia are often excellent candidates for LASIK or small incision lenticule extraction (SMILE). During LASIK, the surgeon creates a flap and ablates the stromal tissue, reshaping the cornea. SMILE differs in that a surgeon "carves out" the stromal lenticule with an excimer laser and removes it through a small incision.



Advantages of SMILE include less postoperative dryness and no flap-related complications.¹ Both corneal-based procedures are reliable and safe for the right patient. Poor candidates include those with corneal pathologies or opacities, moderate-to-severe dry eye, or extreme refractive errors. In patients of a certain age, we lean towards lens-based procedures for a few reasons. First, preserving the natural corneal architecture is advantageous as patients approach cataract age.² If cataract development is imminent, LASIK results would be short-lived. Second, lens-based procedures provide better options for patients with presbyopia looking for independence from reading glasses.

For the Hyperopes

Hyperopes are notoriously tricky when it comes to corneal laser vision correction. Low amounts of hyperopia can be treated with LASIK or SMILE; however, moderate to high hyperopes are much better candidates for a lens-based procedure. This is because of the ablation pattern required to steepen the cornea. There is a higher risk of induced higher-order aberrations and treatment regression compared with myopes.

Refractive lens exchange (RLE) involves removing the crystalline lens in the same fashion as cataract

surgery and replacing it with an IOL. RLE allows a wider range of correction, and compared with LASIK, induces fewer higher-order aberrations.^{3,4} Because the cornea is bypassed, patients are less susceptible to dry eye, glare, and/or halos. One key point that must be well outlined, especially to younger patients, is that RLE completely eliminates accommodation. Several advanced lenses, such as the Clareon PanOptix Lens (Alcon), Tecnis Odyssey IOL (Johnson & Johnson), the Light Adjustable Lens (RxSight), have built-in extended depth of focus, or multifocality, providing “pseudo-accommodation”; however, it must be stressed to patients that reading glasses will be a part of their lives on some level.

RLE and cataract surgery are essentially the same procedure with a few key differences. Usually, RLE patients are younger, therefore the nucleus is often softer and more pliable, whereas the nucleus of a cataract patient is typically dense, which may prove more challenging to remove. Additionally, patients who are candidates for RLE often have long or short axial lengths, which may create problems with higher risk potential intraoperatively.

For both RLE and premium cataract cases, it's not necessarily laser *or* lens, but rather laser *and* lens. We routinely use a femtosecond laser to perform

key parts of the procedure (eg, making the main incision, performing lens fragmentation, performing capsulorhexis, and placing corneal arcuate incisions). Arcuate incisions are placed near the limbus at a calculated depth and arc length at the steep corneal axis. This flattens the axis, reducing overall corneal astigmatism. The strategy here is debulking astigmatism at the cornea to allow more range at the lenticular plane for toric or adjustable IOLs. With multifocal or extended depth-of-focus IOLs especially, a centered optic is imperative. This is highly dependent on the regularity of the capsulorhexis and can greatly influence final visual outcome.⁵ These lenses rely on higher-order aberrations to stretch visual range and increase depth of focus. Lens decentration or tilt can further induce undesirable aberrations, negatively affecting final visual outcomes. Furthermore, capsulorhexes that are too large or irregular have shown a higher incidence of posterior capsular opacification.⁶

For the High Myopes

On the other end of the refractive spectrum, high myopes may also be good candidates for RLE. However, a phakic IOL, such as the Evo ICL (Staar Surgical) or the Verisyse (Ophtec), is often a better option.

Implantation of a phakic IOL leaves the accommodative system intact, allowing patients to enjoy excellent distance vision while retaining the near vision they are used to. A major advantage of the ICL is that it bypasses the cornea, significantly reducing dry eye symptoms (compared with LASIK). An added benefit to bypassing the cornea is that it reduces the chance of inducing higher-order aberrations, making advanced IOLs a more viable option when a patient approaches cataract age. Additionally, the ICL is completely reversible, so when the time for cataract surgery comes, the ICL is removed before the crystalline lens.

Phakic IOLs are not a new concept. Early generations (1980s - 1990s)

AT A GLANCE

- **The greatest difference between cataract surgery and refractive surgery is individual patient expectations, with the number-one goal of cataract surgery being improvement of any kind and the goal of elective refractive surgery being improvement in lifestyle.**
- **Determining which route to take depends mostly on the patient's age, refractive error, anatomy, and individual goals.**
- **Unlike elective refractive procedures, cataract surgery is at least somewhat covered by insurance.**

carried relatively high complication rates, most notably corneal decompensation, premature cataract, and pupillary block. However, since the introduction of the EVO ICL in 2022, complications with phakic ICLs have plummeted.⁷



HAPPINESS = EXPECTATION – REALITY

Unlike elective refractive procedures, cataract surgery is at least somewhat covered by insurance.

Refractive upgrades, such as astigmatic correction or an advanced IOL, have out-of-pocket expenses. Naturally, with a higher price point comes higher expectations. There is no magic procedure. Nothing is one-size-fits-all.

With modern advanced technology, the target for perfection is smaller than ever. However, we must remember that the word “perfect” is subjective; its value lies with the patient. If surgery was performed flawlessly and post-operative metrics were met but our patient’s expectations were not, then the surgery was not a success. Thus, setting proper expectations is the most important step in surgical planning.

It’s truly an exciting time in cataract and refractive surgery; with new technology continually being introduced and both laser- and lens-based procedures proving to be safe and predictable, we have the ability to cover a growing range of refractive error. ■

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