Why I Prefer the Tecnis IOL

This lens optimizes cataract surgery patients’ postoperative vision and may even improve their safety.

BY Y. RALPH CHU, MD

Patients’ rising expectations for improved quality of vision are driving surgical and technological innovation and blurring the traditional lines between cataract and refractive surgery. We surgeons are also becoming aware that our conventional measurements of visual acuity do not always correlate with how well patients can see to perform their daily activities. We use the term *functional vision*, defined as the ability to see clearly while performing daily activities in varying levels of light, to provide a basic foundation from which to address this issue.

The Tecnis IOL (Advanced Medical Optics, Inc., Santa Ana, CA) was designed to improve patients’ quality of vision as well as their Snellen visual acuity. It was the first IOL to incorporate a modified anterior prolate surface to reduce the spherical aberration of the eye after cataract surgery.1 This article describes why it is my aspheric IOL of choice and why I offer this lens to the majority of my patients receiving a standard monofocal IOL.

**BACKGROUND**

People’s contrast sensitivity declines with age2 (Figure 1). Guirao et al3 and Glasser and Campbell4 have shown that the decrease is due to an increase in the spherical aberration of the eye and a resultant loss of balance between the spherical aberration in the cornea versus the crystalline lens. In the youthful eye, the crystalline lens’ negative spherical aberration balances the positive spherical aberration of the cornea to produce a sharp focal point inside the eye. In the aging eye, the corneal spherical aberration remains positive, but that of the crystalline lens becomes increasingly positive. As a result, the quality of vision decreases.3,4

**COMPARISONS AND FDA DATA**

Traditional spherical IOLs provide clear optical media improving a patient’s Snellen acuity, but they do not address spherical aberration (Figure 2). Postoperatively, patients have residual spherical aberration that reduces their contrast sensitivity and quality of vision. The Tecnis IOL, however, decreases the spherical aberration present in the optical system.1

Unlike the Acrysof IQ lens (Alcon Laboratories, Inc., Fort Worth, TX) and the Sofport AO lens (Bausch & Lomb, Rochester, NY), the Tecnis IOL was designed based on data on corneal spherical aberration taken from the general population. Developers used wavefront information from this general population when designing the lens’ modified aspheric IOL to improve patients’ Snellen acuity and functional vision.
anterior prolate surface. Data from the controlled, multi-
center, intraindividual, FDA clinical investigation showed
that postoperative spherical aberration was significantly
less with the Tecnis compared with a spherical acrylic lens.
This benefit was independent of age. One reason I favor
this lens is that it is the only aspheric IOL to have under-
gone FDA clinical trials. My patients derive confidence
from knowing that rigorous FDA trials support the claims
that the Tecnis lens improves recipients’ quality of vision
and visual acuity at night5 (Figure 3).

The data from the FDA trial also showed that the Tecnis
lens improved subjects’ brake-reaction time by 0.5 seconds.
This change gave them a 45-foot advantage (approximately
four to five car lengths) in identifying and avoiding obsta-
cles when driving at 55mph. Based on these data, the FDA
approved labeling on the package insert that Tecnis lenses
are likely to contribute meaningfully to the safety of the
elderly drivers who receive them as well as to that of other
drivers and pedestrians. The insert also states that these
IOLs improve recipients’ functional vision and thus may
make these individuals safer in low-visibility conditions5
(also D. K. McBride and W. Matson, unpublished data on
file with the Potomac Institute for Policy Studies, 2003).

Figure 3. In a controlled, multicenter, intraindividual clinical
investigation, spherical aberrations were significantly less
with the Tecnis versus a spherical acrylic lens. This benefit
was independent of age.5

The relevance of these substantiated
claims is evident in the results of a sur-
vey of adults aged 55 to 75 years in
which participants answered questions
about common visual concerns and the
treatment of visual loss (A. C. Nielsen,
unpublished data on file with Advanced
Medical Optics, Inc., 2004). Eighty-eight
percent stated that they were “extreme-
lv” or “very” concerned about not being
able to drive, especially at night. In a
similar vein, 91% said it was “extremely”
or “very” important to have a lens im-
plant that made driving safer, especially
at night. Finally, 89% of respondents stated that it was
“extremely” or “very” important to receive the lens im-
plant that restores the eye’s function to that of a healthy
young adult rather than a healthy older one.

DETAILS ON THE TECNIS LENS

The Platform

The Tecnis IOL is available on both a silicone and an
acrylic platform. Both are three-piece foldable lens plat-
forms that can be injected into the eye by means of the
Unfolder series of lens implanters (Advanced Medical
Optics, Inc.). The acrylic model features the company’s
Optiedge design to minimize potential dysphotopsia and
posterior capsular opacification. It has an overall length
of 13mm, which I have found to allow easy, stable, well-
centered implantation, even in the ciliary sulcus. The new
silicone model’s features will be identical to those of the
acrylic model.

Patient Selection

Based on research by P. A. Piers, MSc (unpublished data
on file with Advanced Medical Optics, Inc., 2004), 96% of
the population should achieve their best possible vision
with the Tecnis instead of a spherical IOL (Figure 4). I still
prefer spherical lenses, however, for patients who have un-
dergone hyperopic LASIK or PRK for greater than +2.00D,
because these treatments result in negative spherical aber-
ration that the Tecnis IOL would exacerbate.

CONCLUSION

The Tecnis IOL optimizes patients’ vision after cataract
surgery and may meaningfully improve their safety postop-
eratively. Moreover, offering this technology helped my staff
and me begin to think in terms of refractive IOLs. We start-
ed evaluating cataract patients preoperatively as potential
candidates for refractive surgery. The workup included a
topographical examination and immersion A-scan biome-
try, an approach that later helped my staff to incorporate
presbyopia-correcting IOLs into our practice.

With continued advances in the understanding of spherical aberration and the instruments for its measurement, surgeons may become capable of choosing IOLs customized to patients’ axial lengths and their preoperative level of corneal spherical aberration.

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Figure 4. Ninety-six percent of the general population would achieve their best possible vision with the Tecnis versus a spherical lens (P.A. Piers, MSc, unpublished data on file with Advanced Medical Optics, Inc., 2004).