Guest Editorial

By Mitchell A. Jackson MD

Presbyopia correction approaches

Mitchell A. Jackson, MD, is the founder/CEO of Jacksoneye in Lake Villa, Ill.

Disclosures: Dr. Jackson is global medical director of ACE Vision Group and a consultant for Alcon, Allergan, Bausch + Lomb and Johnson & Johnson Vision.

In this special ASCRS issue of *Ophthalmology Management*, we review the quest to treat presbyopia, "the Holy Grail" of refractive surgery, by looking at past, current and future treatments.

The legend of the Holy Grail began at the Last Supper when it was used as a vessel by Christ. Later, it sustained St. Joseph's life during imprisonment and eventually ended up in the Great Castle of Corbenic in Britain, guarded by the descendants of Joseph's daughter Anna (Enygeus) and her husband Brons. Centuries later the Knights of the Round Table crossed Britain in their search for the Grail in this Great Castle. Finally, Sir Galahad succeeded, wherein he was lifted to heaven with the Grail.

Like King Arthur and his Knights, many refractive surgeons are still seeking the Holy Grail of presbyopia treatment. Despite the many advances in presbyopia correction, it was not until recent evidence from Croft and Goldberg's groups[1-3] that we gained a better understanding of the true model of what happens to the eye during presbyopia in terms of lenticular and extralenticular components. Corneal and IOL solutions have been the predominant approaches to surgical presbyopia correction, but scleral and now pharmaceutical approaches are gaining momentum.

CORNEAL APPROACHES

Other than the traditional monovision/blended vision approach with LASIK/PRK, and/or monofocal IOLs, there have been limited new options on the cornea for presbyopia correction. Multifocal ablation patterns in the past created intolerant aberrations for patients. Supracor (Bausch + Lomb) is an optimized presbyopic algorithm with minimal induced corneal aberration error, but it has CE approval only and is not available in the United States.

FDA-approved corneal inlays only include Kamra (CorneaGen), in which a femtosecond-laser lamellar pocket between 250 to 300 µm deep is created for this pinhole aperture inlay. The Flexivue Microlens (Presbia) is currently in FDA trials and may be available in the near future as well.

IOL APPROACHES

Many options abound in this arena, from approved accommodative IOLs, such as the Crystalens and Trulign (Bausch + Lomb), to low add multifocals to extended depth of focus options, such as Symfony and Symfony Toric (Johnson & Johnson Vision) to more distance-dominant ActiveFocus and ActiveFocus Toric (Alcon). Trifocals are coming soon with the PanOptix (Alcon) most likely to be first to the U.S. market. Recent Symfony Toric IOLs data presented at the ACES/SEE meeting showed best objective visual outcomes for bilateral UDVA/UIVA/UNVA with the dominant eye MRSE as -0.01±0.35 and nondominant eye MRSE as -0.16±0.45 and overall MRSE as -0.08±0.41.[4]

SCLERAL APPROACHES

The Helmholtz lenticular theory of accommodation has stood the test of time, with various technological and research advances allowing us to better understand the relationship between the ciliary body, vitreous, zonules and anterior hyaloid face as they apply to current scleral-based presbyopia surgical options.

The first of these technologies is the PresView scleral implant (ReFocus), currently still in FDA trials. The scleral implant works by vaulting the sclera over the ciliary muscle region, increasing the circumlental space and affecting zonular tension on the lens.

The second technology in this category is the Laser ACE laser microporation system (ACE Vision Group). It uses erbium-YAG laser technology to ablate 225-µm spots in the sclera to uncrosslink the sclera, reducing rigidity and resistive forces as well as facilitating ciliary muscle contraction.

Current clinical trials remain outside the United States with FDA trials soon approaching.

Continued on page 82

Guest Editorial

Continued from page 2

PHARMACOLOGIC APPROACHES

The newest players to the presbyopia treatment world include an array of pharmacologic options in FDA trials. EV06 (Novartis) is a lens-softening drop that works by breaking up the excessive disulphide bond formation in the natural lens, allowing for more accommodation capability. Liquid Vision (PRX-100, Presbyopia Therapies) works in a combination of aceclidine, a muscarinic agonist causing miosis, and short-acting cycloplegic tropicamide to blunt peak miosis. Its duration of effect lasts up to seven hours. Allergan also has a drop that causes miotic-induced accommodation in a combination of low-dose pilocarpine and oxymetazoline.

We continue to get closer to that esteemed Holy Grail known as presbyopia correction. I hope you enjoy this edition of *Ophthalmology Management* during your ASCRS meeting. **OM**

Special thanks and credit to Neda Shamie, MD, for suggesting the "Holy Grail" concept used on the cover.

REFERENCES:

1.Croft MA, McDonald JP, Nadkarmi NV, Lin TL, Kaufman PL. Age-Related changes in centripetal ciliary body movement relative to centripetal lens movement in monkeys. Exp Eye Res. 2009;89:824-832.

2. Croft MA, Nork TM, McDonald JP, et al. Accommodative movements of the vitreous membrane, choroid and sclera in young and presbyopic human and nonhuman primate eyes. IOVS. 2013:54;5049-5058.

3. Goldberg DB. Computer-animated model of accommodation and theory of reciprocal zonular action. Clin Ophthalmol. 2011;5:1-7.

4. Edmiston A, Jackson M. Refractive targets and visual outcomes in patients implanted with extended depth of focus IOLs after cataract surgery. Presentation ACES/SEE meeting Feb. 2019, Cancun, Mexico.

ADVERTISER'S INDEX

MAY 2019

Check Yearly. See Clearly.