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EXPANDING THE POPULATION OF HAPPY PATIENTS WITH PRESBYOPIA BY INTEGRATING THE LATEST TECHNOLOGIES


ERIC D. DONNENFELD, MD


MARJAN FARID, MD


KAROLINNE M. ROCHA, MD, PHD


VANCE THOMPSON, MD, FACS


GEORGE O. WARING IV, MD, FACS

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Faculty

Eric D. Donnenfeld, MD
Moderator
Ophthalmic Consultants of Long Island and Connecticut
Trustee, Dartmouth Medical School
Clinical Professor of Ophthalmology
New York University
New York, New York

Marjan Farid, MD
Director of Cornea, Cataract, and Refractive Surgery
Vice Chair of Ophthalmic Faculty
Clinical Professor of Ophthalmology
Gavin Herbert Eye Institute
University of California, Irvine
Irvine, California

Karolinne M. Rocha, MD, PhD
Associate Professor of Ophthalmology
Director, Cornea and Refractive Surgery
Cornea & Refractive Surgery Fellowship Director
Medical University of South Carolina
Storm Eye Institute
Charleston, South Carolina

Vance Thompson, MD, FACS
Founder, Vance Thompson Vision
Professor of Ophthalmology
University of South Dakota
Sanford School of Medicine
Sioux Falls, South Dakota

George O. Waring IV, MD, FACS
Founder and Medical Director
Waring Vision Institute
Mount Pleasant, South Carolina

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This continuing medical education (CME) activity captures content from a live satellite symposium.

Activity Description

This supplement summarizes presentations from five anterior segment specialists focused on the impact of presbyopia among their patient population and the emerging treatment options for this condition.

Target Audience

This certified CME activity is designed for ophthalmologists.

Learning Objectives

Upon completion of this activity, the participant should be able to:

- **Define** the prevalence, etiology, and key characteristics of precataract and cataract presbyopia patients
- **Outline** strategies for finding, communicating with, and educating patients about presbyopia correction clinical outcomes, costs, risks, and benefits, including quality of life and quality of vision considerations
- **Describe** how the latest presbyopia-correcting IOL technologies and pharmaceutical presbyopia treatments can create new groups of satisfied presbyopia patients, including those with comorbid conditions

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PRETEST QUESTIONS

Please complete prior to accessing the material and submit with Posttest/Activity Evaluation/Satisfaction Measures for credit.

1. Please rate your confidence in your ability to describe how the latest presbyopia-correcting IOL technologies and pharmaceutical presbyopia treatments can affect presbyopia patients, including those with comorbid conditions (based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).

a. 1
b. 2
c. 3
d. 4
e. 5

2. Presbyopia affects patients' _____.

a. Mental health
b. Productivity
c. Safety
d. All of the above

3. Presbyopia-correcting eyedrops have two approaches. One is _____.

a. Pupil modulation
b. Meibum softening
c. Lens contraction
d. None of the above

4. In phase 3 clinical trials, the FDA-approved pilocarpine hydrochloride ophthalmic solution 1.25% eyedrop was shown to have a duration of action as long as _____ without loss of distance vision.

a. 60 minutes
b. 3 hours
c. 5 hours
d. 12 hours

5. Which of the following would be considered the most likely candidate(s) for presbyopia-correcting eyedrops?

a. A 61-year-old patient with 2+ cataracts in both eyes
b. A 45-year-emmetropic presbyopic patient who needs to wear glasses for the first time
c. A 65-year-old woman with a history of previous RK and an early cataract, with worsening glare and vision
d. All of the above

6. The dysphotopsia profile of the _____ IOL is similar to that of a monofocal IOL.

a. Enhanced monofocal
b. Trifocal
c. Diffractive extended depth of focus
d. Bifocal

7. A characteristic of stage 2 dysfunctional lens syndrome is _____.

a. Severe presbyopia with manifest opacities
b. Foreign body sensation
c. Recent loss of near vision
d. Moderate presbyopia with early lens opacities

8._____ filters out midperiphery light rays and allows central light rays to focus on the retina.

a. Trifocal IOL
b. Bifocal IOL
c. Small-aperture IOL
d. Light-Adjustable Lens

9. What was considered potentially treatable among conditions that influence treatment of patients with cataracts?

a. Keratoconus
b. Postrefractive off-center cornea
c. Salzmann nodules
d. A & B

10. Which of the following is an important first step in treating patients with cataracts?

a. Prescribing presbyopia-correcting eyedrops
b. Treating dry eye and meibomian gland dysfunction
c. Selecting a presbyopia-correcting IOL
d. Using the Barrett II Universal Formula

11. What type of IOL has been potentially recommended in eyes with corneal irregularities?

a. Monofocal
b. Trifocal
c. Small-aperture (when available)
d. A & C

Meeting the Needs of Today's Presbyopic Patients

Surgeons have an ever-growing range of options to offer presbyopic patients seeking less reliance on spectacles.

BY ERIC D. DONNENFELD, MD

One hundred and twenty million Americans cope with presbyopia and its impact on their quality of life (Figure 1). Presbyopia affects how they function and how they see themselves, as well as their mental health, productivity, and safety.

We now have many options that we can offer these patients to reduce their dependence on spectacles so they can meet the demands of their busy lives.

SURVEY RESULTS

A 2020 *CRST* Clinical Survey of 450 cataract and refractive surgeons showed their top three objective outcome goals to achieve maximum satisfaction for cataract patients seeking spectacle independence with a presbyopia-correcting IOL (Figure 2).

When patients invest in a presbyopic solution, they expect to be able to read, but they demand quality distance vision. With the latest technology, we can provide good reading ability and quality of vision at distance so they can function and drive at night.

PRESBYOPIA PROFILE

Age of Onset:
- 40-45 years old

Prevalence:
- Global: 1.8 billion
- US: 120 million

Presbyopia Population Has Changed:
- Population Growing
- Incomes and Education Rising
- Life Expectancy Increasing
- Working Longer
- Importance of Near Vision

Figure 1. Current profile of patients with presbyopia.

NEW SOLUTIONS

The pilocarpine hydrochloride ophthalmic solution 1.25% prescription eyedrop is the first pharmaceutical approved by the FDA to treat presbyopia, and other formulations are in the pipeline.

However, according to the 2020 *CRST* Clinical Survey, 57% of cataract and refractive surgeons are not confident

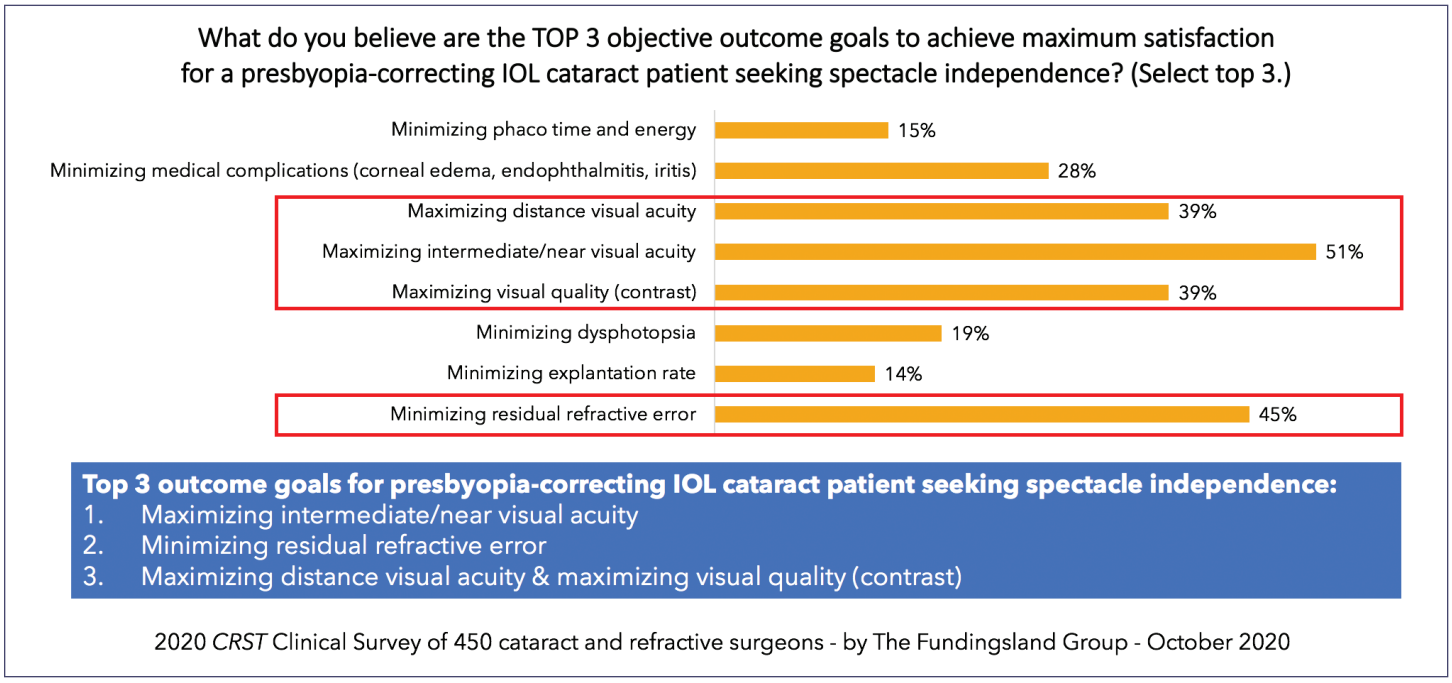

Figure 2. The 2020 *CRST* Clinical Survey shows respondents' top three outcome goals to achieve maximum satisfaction after implantation of a presbyopia-correcting IOL in patients with cataracts seeking spectacle independence.

"When patients invest in a presbyopic solution, they expect to be able to read, but they demand quality distance vision."

—Eric D. Donnenfeld, MD

in their understanding of pharmaceutical treatments to address presbyopia.

In this supplement, our expert faculty not only will cover the capabilities of pharmaceutical options, but also new lens technologies and other topics cataract and refractive surgeons should understand to meet the needs of today's presbyopic patients and improve their quality of life.

The Early Presbyope: Pharmaceutical Presbyopia Treatments

Pharmaceutical presbyopia treatments provide a temporary topical solution to presbyopia.

BY VANCE THOMPSON, MD, FACS

Although we have had major advances in presbyopia-correcting IOLs, there is a gap in options for the large population of early- to mid-presbyopes.

Many of our current optical and surgical presbyopia solutions have drawbacks, particularly for early presbyopes. They are not ready for cataract surgery with presbyopia-correcting IOLs. However, they also may not want other surgical options such as refractive lens exchange, monovision laser vision correction, or corneal inlays. Or they may not want to depend on glasses or contact lenses, especially emmetropes who did not need glasses for a long time. They want good-quality balanced distance, intermediate, and near vision while maintaining contrast sensitivity.

PHARMACEUTICAL SOLUTIONS

Pharmaceutical solutions offer a new option that may be especially suited to new presbyopes, but there are key considerations (Figure 1). Presbyopic patients want fast-acting solutions with a long duration of effect so they fit conveniently into their lives. They also want to limit distance or night vision issues, minimize adverse effects, and not experience adverse ocular surface effects or discomfort. The chemical composition of presbyopia-correcting eyedrops is very important. They need to be well tolerated and safe for the long run.

Multiple companies are producing formulations in this field, which are in various stages in the regulatory journey (Figure 2). They have two approaches. Pupil-modulating alternatives constrict the pupil to improve depth of focus, and some options combine pupil contraction and ciliary body contraction. There is also lens-softening technology.

The FDA approved the prescription eyedrop pilocarpine hydrochloride ophthalmic solution 1.25% in October 2021. In the phase 3 clinical trials, it was used bilaterally once daily for 30 days.[1] The onset of action is 15 minutes, with a duration as long as 5 hours without loss of distance vision. There was a statistically significant gain of at least 3 lines. It improved distance-corrected intermediate vision for as long as 10 hours. Seventy-five percent of patients achieved at least a 2-line improvement in their mesopic distance-corrected near visual acuity (DCNVA), and 93% achieved 20/40 or better photopic DCNVA.

Other drops are in phase 2 and 3 clinical trials. CSF-1 (Orasis) is a preservative-free low-dose pilocarpine drop in a multifaceted proprietary vehicle. In phase 2b trials, it was administered twice a day for 2 weeks; 47% of patients gained at least 3 lines of near vision vs. baseline and 80% gained at least 2 lines of near vision.[2] There was no reduction in distance or night or low-light vision, and adverse effects were mild and temporary. Patients' comfort levels were high. Phase 3 trials are being conducted.

Brimochol (Visus) is a combination of carbachol 3%, which is miotic, and brimonidine titrate 0.2%, which helps prevent pupil dilation, inhibits ciliary body contraction, increases the

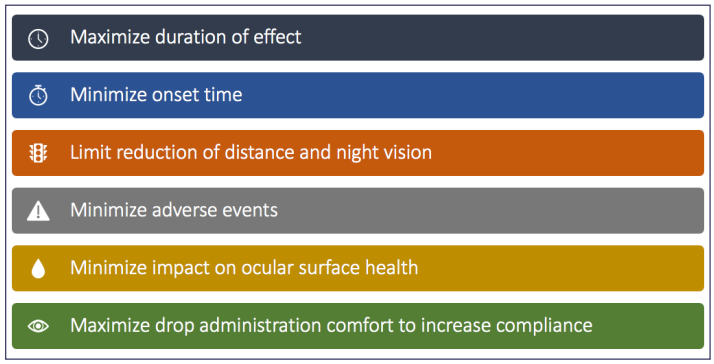

Image courtesy of Vance Thompson, MDm FACS

Figure 1. Key considerations for pharmaceutical presbyopia treatments.

"Presbyopic patients want fast-acting solutions with a long duration of effect so they fit conveniently into their lives."

—Vance Thompson, MD, FACS

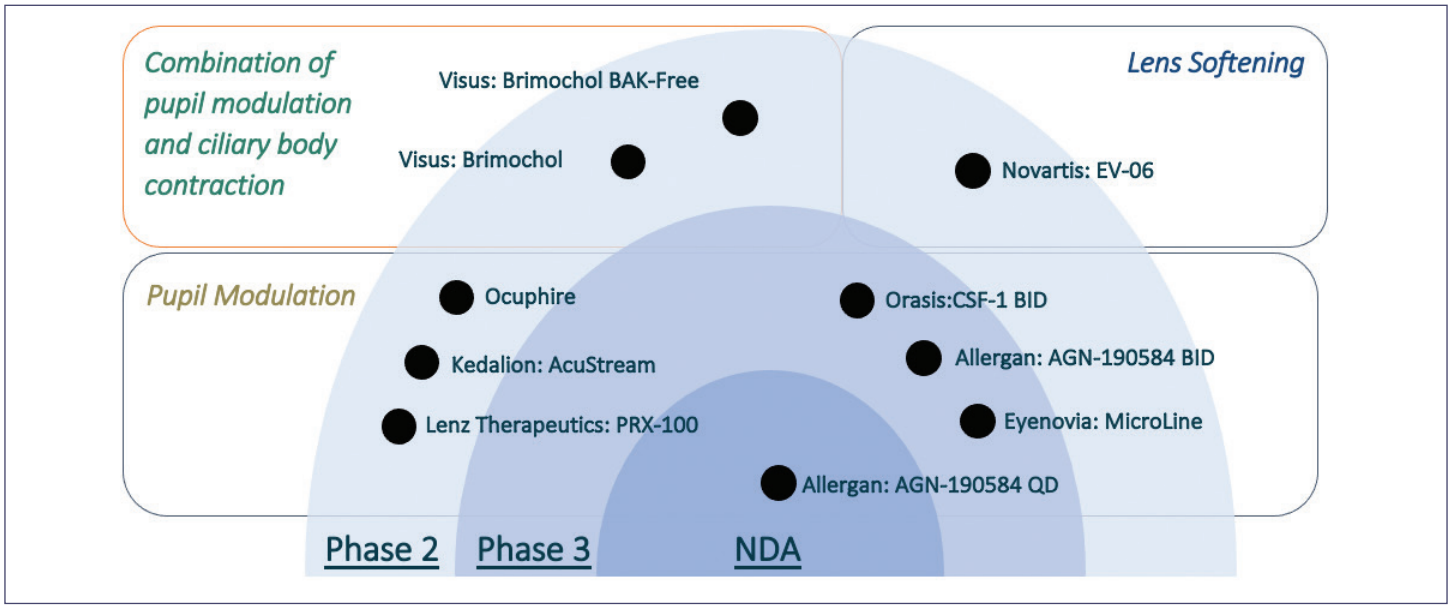

Figure 2. Presbyopia treatment approaches.

CASES: THE PENDING EMERGENCE OF REFRACTIVE LENS EXCHANGE

Case examples demonstrate potential approaches to treating early presbyopes.

BY ERIC D. DONNENFELD, MD

The following are hypothetical early presbyopia cases in which we consider potential solutions:

▸ **CASE 1: 45-year-old emmetropic presbyopic patient needs to wear glasses for the first time.**
Potential Solution: This is the perfect patient for a presbyopia pharmaceutical solution. Pilocarpine HCl ophthalmic solution 1.25% has been approved by the FDA, and several additional presbyopia pharmaceuticals will soon be available.

▸ **CASE 2: 45-year-old patient with +3.00 D hyperopia is very unhappy with their vision.**
Potential Solutions: Presbyopic eyedrops may be a first option. However, hyperopic patients may have narrow angles and may benefit from a refractive lens exchange. We should check for lens scatter. If the patient is not ready for a lens exchange, we can try a contact lens trial. If the patient is pleased, we can continue with contact lenses. If not, we can discuss surgical options. We have not been happy with LASIK in these patients as the results tend to degrade.

▸ **CASE 3: A 55-year-old postmyopic patient who had monovision LASIK loved monovision but lost the ability to read and does not want to wear glasses.**
Potential Solutions: A first option is presbyopia eyedrops. The patient may try a contact lens for monovision. The surgeon needs to consider whether to increase the monovision with laser vision correction or whether the patient is ready for refractive lens replacement. However, we need to think about the risk of retinal detachment because the patient was myopic.

An enhanced monofocal IOL (Johnson & Johnson Vision) provides a little less than 0.50 D of extended depth of focus without degrading distance vision. Mini-monovision targeted to plano in the dominant eye and possibly - 0.75 or -1.00 D in the nondominant eye will provide -1.5 effective reading. The patient probably will not wear glasses except possibly to drive at night. This lens has become the sweet spot for me in such difficult cases.

bioavailability of carbachol, and decreases redness.[3] In the clinical trial, using a once-daily drop, there was a statistically significant improvement in near visual acuity of 5 Jaeger lines for an average duration of 8 to 12 hours, and it was well tolerated, with no reports of headache or brow ache.[4]

With the MicroLine system, a microdose of 8 µL pilocarpine 1% or 2% is instilled with a proprietary delivery system.[5]

Ocuphire Pharma's formulation combines Nyxol (preservative-free 0.75% phentolamine) to restrict pupil size by blocking the iris dilator with 0.4% pilocarpine, which constricts the pupils.

Topical lipoic acid choline ester (EV06/UNR844, 1.5%) is a lens-softening technology placed on the eye that breaks down to naturally occurring ingredients that break the disulfide bonds in the lens and increase the lens fluidics.[6]

IMPACT OF PHARMACEUTICALS

I believe these formulations will bring many more presbyopic patients into our practices, and we will be able to market directly to consumers. Patient education is key through newsletters and other means of communication.

We need to manage expectations and understand how often patients will be willing to instill their drops and how well they will tolerate the cost and impact on their quality of life.

A comprehensive eye examination is essential before prescribing the drops. In our surgical practice of ophthalmologists working with optometrists, we plan to educate area doctors, patients, and the community about these drops.

We will begin with a refractive workup, analyzing eye health, tear health, image quality, and optical scatter. We will begin this journey together and offer a consistent office and web experience.

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The Cataract Patient: Addressing Patient Needs With Next-Generation Presbyopia-Correcting IOLs

An array of IOLs is available to individualize treatment to patients' needs.

BY KAROLINNE M. ROCHA, MD, PHD

Presbyopia is becoming a subspecialty where we can offer our patients so many options.[1] To make the best choices, we need to ask patients about their individual visual needs, lifestyle, daily activities, and whether there are concerns about dysphotopsia or comorbidities.

ENHANCED MONOFOCAL IOLS

An enhanced monofocal (Tecnis Eyhance, Johnson & Johnson Vision) has no rings, and the power changes continuously from the center to the periphery of the lens. The power profile is created with a higher-order asphere that creates a slightly extended depth of focus. Because it is a monofocal lens, the distance vision is high quality and pupil independent. The lens has a larger landing zone than a standard aspheric monofocal IOL and is more tolerant to residual refractive error.

The dysphotopsia profile is similar to that of a monofocal IOL, so it is a good choice for patients such as pilots or drivers who are very concerned about halos and glare. It is suited for active patients who would benefit from a slightly extended depth of focus, using computers, tablets, and cell phones or participating in sports, as well as patients who are not candidates for diffractive technology, such as those with dry eye or retinal diseases.

We can use it to offer premium monovision, targeting the dominant eye for distance and the nondominant eye for -0.75 D. Patients have 20/25 and 20/30 distance vision in the nondominant eye.

EXTENDED DEPTH OF FOCUS IOLS

The AcrySof IQ Vivity (Alcon), a beam-shaping extended depth of focus (EDOF) IOL, provides a continuous range of vision for distance to intermediate. If we target plano in both eyes with this IOL, patients probably still need reading glasses in some cases for close vision, but we can target one eye for distance vision and mini-monovision in the nondominant eye.

In clinical trials, the monocular data showed a slight decrease in contrast, especially at higher spatial frequencies.[2] However, there were no clinically relevant differences in binocular mesopic contrast sensitivity between the beam-shaping EDOF and monofocal IOLs.

Patients concerned about dysphotopsia are good candidates for the beam-shaping IOL, as well as patients who participate in active pursuits like golf and those who need intermediate vision. We should use caution in patients with severe dry eye or irregular astigmatism and rule out eye diseases, including severe glaucoma.

SMALL-APERTURE IOL

A small-aperture IOL (AcuFocus) is designed to filter out mid-periphery light rays and allow central light rays to focus on

"Choosing IOLs is a science and art of matching technology to our patients' needs."

–Karolinne M. Rocha, MD, PhD

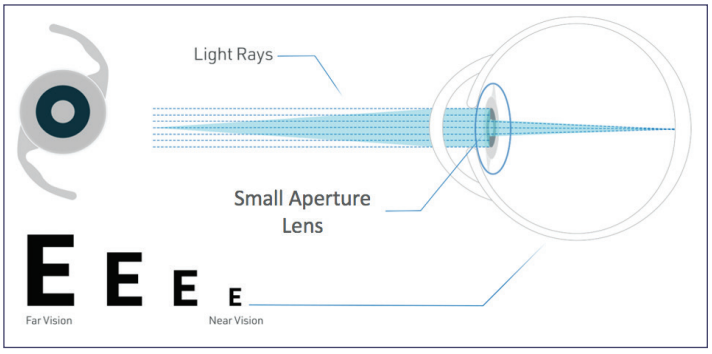

Image courtesy of Karolinne M. Rocha, MD PhD

Figure 1. The small-aperture IOL filters out unfocused and aberrated peripheral light and allows central light rays to focus on the retina.

Image courtesy of Karolinne M. Rocha MD, PhD

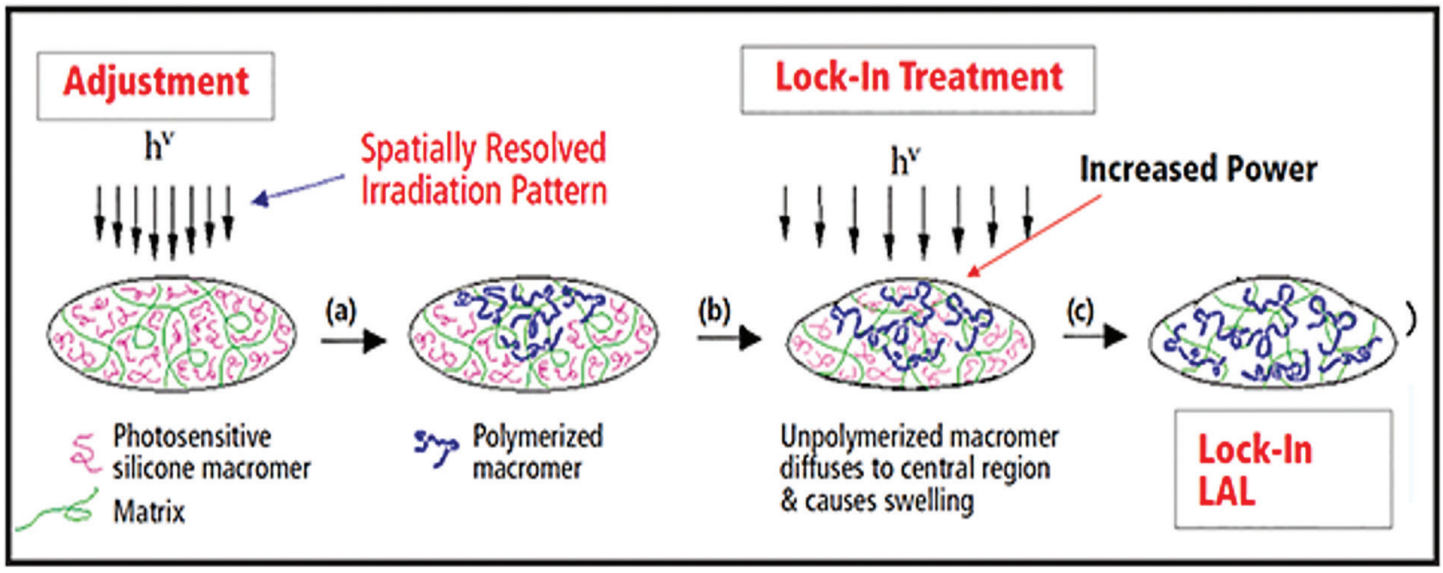

Figure 2. The light-adjustable lens works on the polymerization of a photosensitive silicone macromer.

the retina (Figure 1). It extends the depth of focus, and there are therapeutic benefits.

In a European postmarket study at 12 sites, a distance target monofocal lens with negative spherical aberration was implanted in the dominant eye.[3] The nondominant eye was implanted with the small-aperture IOL targeted for -0.75 D. It showed a 3.00-D increase in functional range of vision. Binocular distance and intermediate vision were 20/25 or better, and near vision was better than 20/30. The lens can tolerate as much as 1.50 D of astigmatism.[4] Patients reported a low level of visual symptoms with very mild glare and halos.

Good candidates for this lens are seeking a continuous range of vision with a high quality of vision. It is a very forgiving IOL, and it may be a great option for patients with irregular astigmatism and aberrated corneas.

HYBRID MULTIFOCAL IOL

The Tecnis Synergy (Johnson & Johnson Vision) combines diffractive multifocal and EDOF technology with an echelette surface and achromatic technology. It provides negative spherical aberration correction and a violet filter that enhances contrast. It offers a broad defocus range with excellent near vision, with higher contrast under lower light conditions.

In a study comparing this IOL with a +3.25-D low-add multifocal IOL (ZLB00), the Synergy showed a 1.5-line increase in vision compared with the multifocal.[5]

Patients seeking spectacle independence for distance, intermediate, and near vision are good candidates for this lens, which provides the widest range of vision with the best near vision. However, we need to rule out irregular astigmatism or higher-order aberrations, retinal disease, and severe dry eye. Accurate biometry and correction of any residual astigmatism are important to achieve best outcomes.

LIGHT-ADJUSTABLE LENS

RxSight's Light-Adjustable Lens is the only FDA-approved IOL that can be adjusted, allowing surgeons to fine-tune treatment after surgery (Figure 2). We can retreat the patient three times before locking in the final treatment. It is an especially good option for patients seeking monovision.

We can customize the distance eye for the best uncorrected visual acuity possible, correcting down to a final cylinder less than 0.5 D.[6] The lens uses built-in UV protection to reduce patient compliance concerns. It provides customized blended vision with no increase in glare and halos. It is suited for any patient having cataract surgery, including post-refractive surgery eyes, customized monovision, and others, because we can adjust the IOL.

CONCLUSION

Choosing IOLs is a science and art of matching technology to our patients' needs. We need to optimize the ocular surface, rule out eye disease, ensure accurate biometry, and treat residual error.

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Addressing Progressive Stages of Presbyopia With New Lens Technologies

Cases illustrate lens options based on presbyopia stage.

BY GEORGE O. WARING IV, MD, FACS

Dysfunctional lens syndrome (DLS), the process of aging of the crystalline lens, occurs in three stages. The first stage is the onset of presbyopia, the second stage is moderate presbyopia with early lens opacities, and the third stage is severe presbyopia with manifest opacities (cataract) that adversely affect the patient's quality of life.

The DLS staging system guides our approach to treatment, as shown in the following cases, and it helps us educate our patients.

CASE 1: STAGE 1 DLS

A 49-year-old moderately hyperopic patient was interested in LASIK (UCDVA 20/60; UCNVA J12 OU; +3.25 -1.50 x 82 OD; +3.50 -1.00 x 100 OS). The patient began wearing reading glasses full time several years previously and recently started wearing bifocals but experienced eye fatigue when reading. The patient did not have good distance vision and could not read up close.

We performed corneal topography and examined the architecture of the angles (Figure 1). Hyperopic patients often have narrow angles.

If the patient has a shallow anterior chamber with narrow angles, the potential risk for increasing narrowing of the angles in time also exists, so an earlier lens exchange or cataract surgery is also therapeutic. We have demonstrated in the past, as have others, that lens replacement can significantly increase the anterior chamber angle.[1,2]

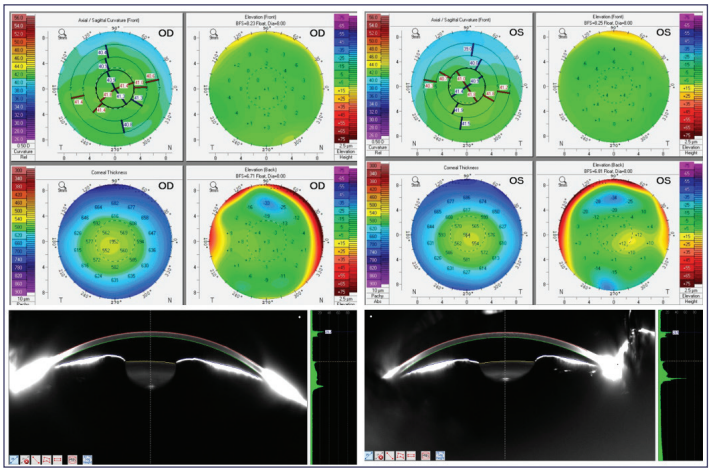

Image courtesy of George O. Waring, IV, MD, FACS

Figure 1. Corneal tomography and Scheimpflug image of the crystalline lens and anterior chamber angles.

"The DLS staging system guides our approach to treatment…and it helps us educate our patients."

—George O. Waring IV, MD, FACS

In our practice, hyperopic LASIK would not be recommended in this patient. A hyperopic ablation would result in significant negative spherical aberration and coma over time. Hyperopic LASIK would not only likely regress in this patient, compounded by increasing presbyopia, it will impact lens options for subsequent cataract surgery. The patient would not be a candidate for multifocal IOLs, although we may be able to use an aberration-free monofocal lens such as the enVista lens (Bausch + Lomb), an enhanced monofocal IOL, or small-aperture lens (IC-8, AcuFocus), when it becomes available.

Lens replacement preserves depth perception, leading to a greater wow factor as opposed to blended vision, where depth perception may be impacted. It prevents cataracts, improves uncorrected distance and near vision, and can improve vision quality. In addition, it opens the angle.

I performed same-day sequential bilateral custom lens extraction and replacement (CLEAR) using a femtosecond laser and implanted hybrid EDOF multifocal IOLs (Tecnis Synergy toric IOLs, Johnson & Johnson Vision), targeting first plus closest to plano OU.

CASE 2: STAGE 2 DLS

A 60-year-old patient with low myopia with J1 reading vision was interested in LASIK. The patient had mild nuclear sclerosis, a normal axial length, and normal angle architecture (-1.25 -0.75 x 80; -1.50 -0.50 x 84; SLE 1+ NS; axial length 24.5).

Our potential options include LASIK in the dominant eye only for distance, lens replacement in the dominant eye only with a monofocal IOL, EDOF IOL in the dominant eye only, bilateral surgery with an EDOF multifocal hybrid or trifocal IOL, blended vision with a Light-Adjustable Lens (RxSight), and personalized vision with an EDOF IOL in the dominant eye and hybrid EDOF multifocal IOL in the nondominant eye. Any of these provide appropriate solutions, fixing distance and near vision and maintaining stereopsis. They will improve quality of vision potentially by addressing the patient's early lens opacities, which define the second stage of DLS, and prevent cataracts.

CASE 3: STAGE 3 DLS

A 70-year-old patient with cataracts and moderate myopia was referred for glare (-4.00 – 0.75 x 175; BCVA 20/25 OD, 20/30 OS)

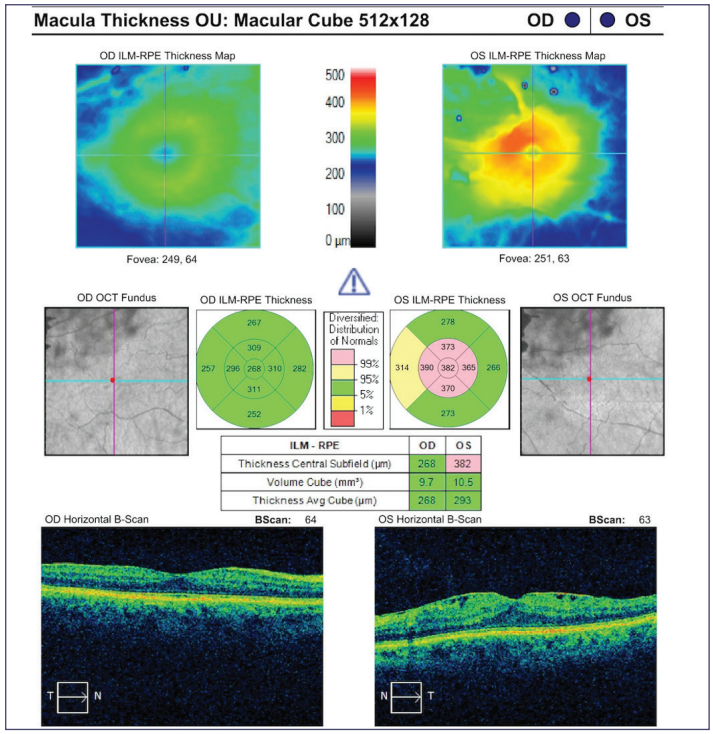

Image courtesy of George O. Waring, IV, MD, FACS

Figure 2. Patient's dominant eye shows 2+ epiretinal membrane.

(Figure 2). The patient wanted spectacle independence.

The patient had a 2 to 3+ NS cataract and 2+ epiretinal membrane in the dominant eye (OS) (Figure 2). Otherwise, corneal topography was normal.

An enhanced monofocal with an offset or a nondiffractive EDOF lens may be appropriate. A small-aperture IOL also could be used when it is available in the United States, offset slightly to increase range in the nondominant eye. We need to obtain informed consent because the patient will not have their previous -4.00-D reading distance unless we perform monovision, which may impact their depth perception.

For patients who are highly motivated to reduce their dependence on spectacles, an EDOF IOL may be implanted in the eye with a mild to moderate epiretinal membrane. Proper informed consent is critical because of the increased risk of cystoid macular edema, they may not achieve the full potential of the IOL, and other reasons.

CONCLUSION

Customizing presbyopia-correcting IOLs to the individual patient is key to successful outcomes. Considering the stage of DLS helps guide us in educating our patients and making surgical choices. ■

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Managing Comorbid Presbyopia Cataract Patients: Prevalence, Diagnosis, and Unique Patient Needs

Cases demonstrate IOL decisions in patients with corneal irregularities.

BY MARJAN FARID, MD

Two types of corneal irregularities and abnormalities—treatable and untreatable conditions—influence treatment of patients with cataracts. Potentially treatable abnormalities include pterygia, basement membrane dystrophies, and Salzmann nodules, and untreatable conditions include ectasia, keratoconus, and postrefractive off-center corneas.

According to the 2020 Global Consensus on Corneal Irregularity, slit lamp examinations and corneal topography should be performed at the point of care for all preoperative examinations for patients having cataract surgery to identify subtle irregularities.[1] The panel also recommended monofocal IOLs in eyes with corneal irregularities, and small-aperture IOLs were preferred when available in the United States. IC-8 (AcuFocus) small-aperture IOLs use pinhole optics to provide extended depth of focus and enhanced adaptability through a wavefront-filtering technology.

The following cases illustrate lens selection in patients with corneal abnormalities.

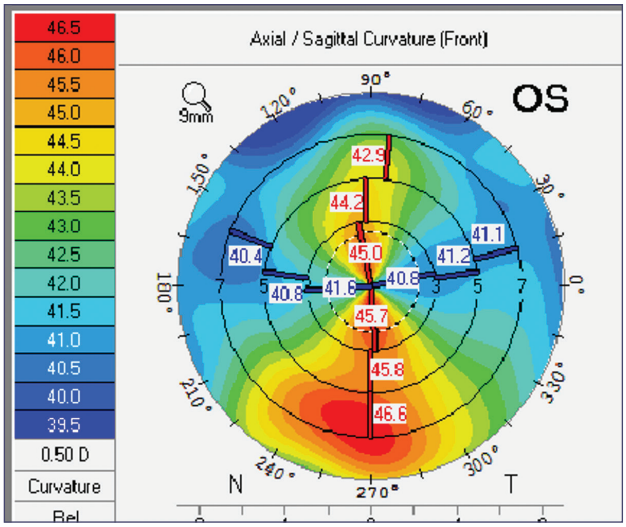

Image courtesyof Marjan Farid, MD

Figure 1. Corneal topography after superficial keratectomy.

CASE 1

A 61-year-old patient with 2+ cataracts in both eyes wanted to be spectacle independent. This patient had a Salzmann nodule on corneal topography. At the slit lamp, we need to look under the eyelids because the nodules may be hidden on the superior cornea.

We performed a superficial keratectomy to reverse the pathology. Before IOL planning, we reevaluated the corneal topography and cornea, and the eye looked significantly more regular centrally (Figure 1).

I implanted a Tecnis Synergy toric IOL (Johnson & Johnson Vision), and the patient was very pleased with the results.

CASE 2

A 76-year-old man had mild glaucoma and wanted some spectacle independence at least for distance. The initial biometry showed approximately 2.50 D with-the-rule astigmatism. Corneal topography showed keratoconus that had never been diagnosed. He had relatively good vision with spectacle correction. The patient did not qualify for a trifocal IOL.

When treating such patients, we need to look at their history. If the patient's astigmatism was treated with glasses and he had good quality vision, there was enough central regularity and neurotolerability to that astigmatism, so the patient would be a good candidate for a toric monofocal. However, if the patient previously had a rigid gas-permeable IOL or had poor spectacle correction of his astigmatism, he would not be happy with a toric IOL. When available, a small-aperture IOL may be appropriate.

Because this patient had good quality corrected vision, we were able to implant a toric IOL and he did very well.

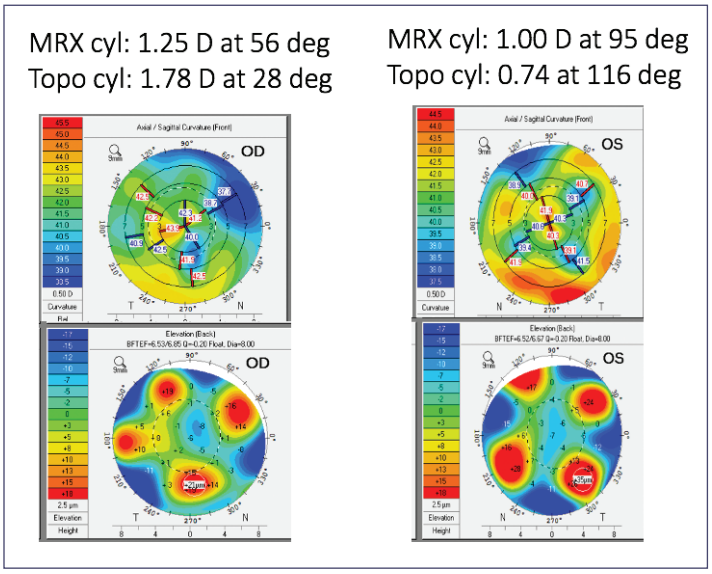

Image courtesy of Marjan Farid, MD

Figure 2. A 65-year-old woman with a history of RK 30 years previously with an early cataract, with worsening glare and vision.

"We have an excellent armamentarium of IOLs that can provide effective options for patients with irregular corneas."

–Marjan Farid, MD

CASE 3

A 65-year-old woman had a history of radial keratotomy 30 years ago and had an early cataract, with worsening glare and vision (Figure 2).

Some surgeons have had good success with EDOF IOLs in patients who have diurnal fluctuation shown to occur after RK.[2] An IOL with a fixed focal point does not make sense in these cases, however, an EDOF IOL can tolerate corneal fluctuations. In addition, surgeons are less likely to hit their refractive target in these patients, so the EDOF IOL is more forgiving.

When available, the small-aperture IOL will be a great solution for patients with irregular corneas.[3] There is a larger landing zone. The real axis does not matter as much when we implant this IOL because it can tolerate as much as 1.50 D of corneal astigmatism.

CASE 4

A 61-year-old woman had a history of myopic LASIK 20 years previously and had 2+ meibomian gland dysfunction (MGD) and 1+ punctate epithelial erosions. Her eyes were tired by midday. She wanted cataract surgery and spectacle independence.

It is important to first treat MGD to optimize her corneas and ask her to return for another examination. Dry eye impacts keratometry, IOL power prediction, and other measurements when there is significant punctuate staining and MGD.[4] The ASCRS algorithm recommends aggressive treatment—improving the tear film, optimizing the lipid layer, decreasing inflammation, and healing punctate keratitis and epithelial irregularities—so patients can schedule their surgery promptly.[5]

We also needed to quantify her corneal higher-order aberrations to determine which lens to use. The patient's corneal topography showed an off-center treatment in the left eye, which was a concern.

We treated the patient with loteprednol (1-month taper), lifitegrast, and thermal pulsation and monitored her treatment response. When she returned in 4 to 6 weeks, her corneal topography improved, but she still had the decentered LASIK pattern. For this type of case, I prefer the enhanced monofocal (Tecnis Eyhance, Johnson & Johnson Vision). The patient would still have some depth when I offset the lens by approximately 0.50 to -0.75 D, as well as good functional reading. Other options included a nondiffractive EDOF IOL or Light-Adjustable

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Lens (RxSight). When available, the small-aperture IOL, offset approximately -0.75 D, will provide enhanced depth to patients with corneal abnormalities that are irreversible.

I managed expectations by explaining that I would provide as much spectacle independence as possible, but because of the previous LASIK procedure, she may still need reading glasses for very fine print.

CONCLUSION

The IOL decision tree for abnormal corneas begins with treating abnormal corneas when possible. If they are not treatable, we need to consider other options. We have an excellent armamentarium of IOLs that can provide effective options for patients with irregular corneas. ■

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EXPANDING THE POPULATION OF HAPPY PATIENTS WITH PRESBYOPIA BY INTEGRATING THE LATEST TECHNOLOGIES

Release Date: March 2022
Expiration Date: April 2023

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DEMOGRAPHIC INFORMATION

Profession
___ MD/DO
___ OD
___ NP
___ Nurse/APN
___ PA
___ Other

Years in Practice
___ >20
___ 11-20
___ 6-10
___ 1-5
___ <1

Patients Seen Per Week
(with the disease targeted
in this educational activity)
___ 0
___ 1-15
___ 16-30
___ 31-50
_____ >50

Region
___ Northeast
___ Northwest
___ Midwest
___ Southeast
___ Southwest

LEARNING OBJECTIVES

Did the program meet the following educational objectives?	Agree	Neutral	Disagree
Define the prevalence, etiology, and key characteristics of precataract and cataract presbyopia patients	_____	_____	_____
Outline strategies for finding, communicating with, and educating patients about presbyopia correction clinical outcomes, costs, risks, and benefits, including quality of life and quality of vision considerations	_____	_____	_____
Describe how the latest presbyopia-correcting IOL technologies and pharmaceutical presbyopia treatments can create new groups of satisfied presbyopia patients, including those with comorbid conditions	_____	_____	_____

POSTTEST QUESTIONS

Please complete at the conclusion of the program.

1. Based on this activity, please rate your confidence in your ability to describe how the latest presbyopia-correcting IOL technologies and pharmaceutical presbyopia treatments can affect presbyopia patients, including those with comorbid conditions (based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).

a. 1
b. 2
c. 3
d. 4
e. 5

2. Presbyopia affects patients' _____.

a. Mental health
b. Productivity
c. Safety
d. All of the above

3. Presbyopia-correcting eyedrops have two approaches. One is _____.

a. Pupil modulation
b. Meibum softening
c. Lens contraction
d. None of the above

4. In phase 3 clinical trials, the FDA-approved pilocarpine hydrochloride ophthalmic solution 1.25% eyedrop was shown to have a duration of action as long as _____ without loss of distance vision.

a. 60 minutes
b. 3 hours
c. 5 hours
d. 12 hours

5. Which of the following would be considered the most likely candidate(s) for presbyopia-correcting eyedrops?

a. A 61-year-old patient with 2+ cataracts in both eyes
b. A 45-year-emmetropic presbyopic patient who needs to wear glasses for the first time
c. A 65-year-old woman with a history of previous RK and an early cataract, with worsening glare and vision
d. All of the above

6. The dysphotopsia profile of the _____ IOL is similar to that of a monofocal IOL.

a. Enhanced monofocal
b. Trifocal
c. Diffractive extended depth of focus
d. Bifocal

7. A characteristic of stage 2 dysfunctional lens syndrome is _____.

a. Severe presbyopia with manifest opacities
b. Foreign body sensation
c. Recent loss of near vision
d. Moderate presbyopia with early lens opacities

8._____ filters out midperiphery light rays and allows central light rays to focus on the retina.

a. Trifocal IOL
b. Bifocal IOL
c. Small-aperture IOL
d. Light-Adjustable Lens

9. What was considered potentially treatable among conditions that influence treatment of patients with cataracts?

a. Keratoconus
b. Postrefractive off-center cornea
c. Salzmann nodules
d. A & B

10. Which of the following is an important first step in treating patients with cataracts?

a. Prescribing presbyopia-correcting eyedrops
b. Treating dry eye and meibomian gland dysfunction
c. Selecting a presbyopia-correcting IOL
d. Using the Barrett II Universal Formula

11. What type of IOL has been potentially recommended in eyes with corneal irregularities?

a. Monofocal
b. Trifocal
c. Small-aperture (when available)
d. A & C

ACTIVITY EVALUATION

Your responses to the questions below will help us evaluate this activity. They will provide us with evidence that improvements were made in patient care as a result of this activity.

Rate your knowledge/skill level prior to participating in this course: 5 = High, 1 = Low____

Rate your knowledge/skill level after participating in this course: 5 = High, 1 = Low____

This activity improved my competence in managing patients with this disease/condition/symptom. _____ Yes _____No

Probability of changing practice behavior based on this activity: _____High _____ Low _____No change needed

If you plan to change your practice behavior, what type of changes do you plan to implement? (check all that apply)

Change in pharmaceutical therapy _____

Change in diagnostic testing _____

Change in current practice for referral _____

My practice has been reinforced _____

Change in nonpharmaceutical therapy _____

Choice of treatment/management approach _____

Change in differential diagnosis _____

I do not plan to implement any new changes in practice _____

Please identify any barriers to change (check all that apply):

_____ Cost

_____ Lack of administrative support

_____ Lack of time to assess/counsel patients

_____ Reimbursement/insurance issues

_____ Patient compliance issues

_____ Lack of consensus or professional guidelines

_____Lack of experience

_____ Lack of opportunity (patients)

_____ Lack of resources (equipment)

_____ No barriers

_____ Other. Please specify: _____

The design of the program was effective for the content conveyed	___ Yes	___ No
The content supported the identified learning objectives	___ Yes	___ No
The content was free of commercial bias	___ Yes	___ No
The content was relative to your practice	___ Yes	___ No
The faculty was effective	___ Yes	___ No
You were satisfied overall with the activity	___ Yes	___ No
Would you recommend this program to your colleagues?	___ Yes	___ No

Please check the Core Competencies (as defined by the Accreditation Council for Graduate Medical Education) that were enhanced through your participation in this activity:

_____ Patient Care

_____ Practice-Based Learning and Improvement

_____ Professionalism

_____ Medical Knowledge

_____ Interpersonal and Communication Skills

_____ System-Based Practice

Additional comments:

_____

_____ I certify that I have participated in this entire activity.

This information will help evaluate this activity; may we contact you by email in 3 months to inquire if you have made changes to your practice based on this activity? If so, please provide your email address below.

_____

_____