

CASE-BASED CONVERSATIONS
FOR TODAY'S OSD AND
PHARMA PRESBYOPIA PATIENTS

FACULTY

Selina R. McGee, OD, FAAO

Founder & Chief Optometrist
BeSpoke Vision
Edmond, OK

Walter O. Whitley, OD, MBA, FAAO

Virginia Eye Consultants
Norfolk, VA

FINANCIAL RELATIONSHIPS DISCLOSURES

FACULTY

Selina R. McGee, OD, FAAO, has the following financial relationships— **Consultant:** Avellino, Bruder Healthcare, Carl Zeiss Meditec, Compulink, Eyevance, Harrow, Horizon, Topcon, Versant; **Speaker/Consultant:** Allergan, Bausch + Lomb, CynoSure, Dompé, Lumenis, Optovue, Osmotica, Oyster Point, Novartis, ScienceBased Health, Sun Pharma, Tarsus Pharmaceuticals.

Walter O. Whitley, OD, MBA, FAAO, has the following financial relationships—**Advisory Board:** AbbVie, Alcon, Bausch + Lomb, Bruder Healthcare, ScienceBased Health, Sun Pharma, Tarsus Pharmaceuticals, Tenpoint Therapeutics; **Co-Chief Medical Editor:** Modern Optometry; **Consultant:** AbbVie, Alcon, Epion, Glaukos, Harrow, Mediprint Pharma, Nordic Pharma, OD Immersion, Regener-Eyes, Viatris; **Contributing Editor:** Review of Optometry; **Scientific Advisory Board:** Movu; **Speaker:** Alcon, Bausch + Lomb, Dompé, Lenz, ScienceBased Health, Sun Pharma, Tarsus Pharmaceuticals.

LEARNING OBJECTIVES

- Identify the pathognomonic signs in early-stage patients with eyelid margin disease (MGD and DB) tear deficiency, and acute and chronic inflammation by incorporating consistent examination techniques
- Summarize the advantages and limitations of traditional and emerging diagnostic methods, including tear osmolarity, MMP-9, anterior segment OCT, meibography/gland expression, collarette detection, ocular nerve sensitivity, and validated symptom questionnaires based on clinical and real-world data
- Compare the latest safety and efficacy data for DB pharmaceuticals, anti-inflammatories (acute and chronic), and mechanical and pharmacological MGD treatments, and apply evidence-based selection criteria to customize treatment strategies for patients with these conditions
- Assess individual patient needs for pharmacological presbyopia correction, implement a streamlined screening process, and match patient candidates to the ideal treatment options

OSD

Walter O. Whitley, OD, MBA, FAAO

HALLMARK SIGNS

Meibomian gland disease: meibum quality and expressibility

***Demodex* blepharitis:** collarettes

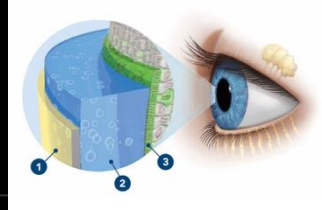
Aqueous-deficient dry eye disease: tear flow and volume

Inflammation: hyperemia, punctate epithelial erosions, tear film instability

What consistent examination techniques should we follow?

ADVANTAGES & LIMITATIONS OF DIAGNOSTIC TOOLS

Tear Osmolarity



Slit-Lamp Exam



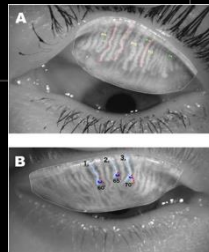
MMP-9



Vital Dyes



Meibography



DED Questionnaire

SPEED™ QUESTIONNAIRE

Name: _____ Date: ____/____/____ Sex: ☐ M ☐ F DOB: ____/____/____

For the Standardized Patient Evaluation of Dry Eye (SPEED) Questionnaire, please answer the following questions by checking the box that best represents your answer. Select only one answer per question.

1. Report the type of **SYMPTOMS** you experience and when they occur:

Symptoms	At all times	Within past 72 hours	Within past 3 months			
	Yes	No	Yes	No	Yes	No
Crusting, Grittiness or Scratchiness	☐	☐	☐	☐	☐	☐
Burning or Itching	☐	☐	☐	☐	☐	☐
Stinging or Stinging	☐	☐	☐	☐	☐	☐
Eye Fatigue	☐	☐	☐	☐	☐	☐

2. Report the **FREQUENCY** of your symptoms using the rating list below:

Symptoms	0	1	2	3
Crusting, Grittiness or Scratchiness	☐	☐	☐	☐
Burning or Itching	☐	☐	☐	☐
Stinging or Stinging	☐	☐	☐	☐
Eye Fatigue	☐	☐	☐	☐

3. Report the **SEVERITY** of your symptoms using the rating list below:

0 = None 1 = Sometimes 2 = Often 3 = Constant

CASE: THE MISSED DIAGNOSIS

- A 58-year-old woman presents with longstanding bilateral eye irritation, burning, and intermittent blurry vision.
- She has been using over-the-counter artificial tears for 2 years with minimal relief and was previously told she had “mild dry eye.”
- On slit-lamp exam, she reports she was never asked to look down.

What would you do differently?

DEMODEX BLEPHARITIS

56% of patients with cataracts have DB¹

57% of patients with MGD have DB¹

60% of patients treated for dry eye also have DB²

66% of blepharitis cases are associated with *Demodex* mites¹

93% of patients with soft contact lens intolerance were found to have DB³

DB, *Demodex blepharitis*

1. Trattler W, et al. *Clin Ophthalmol.* 2022;16:1153-1164. 2. O'Dell L, et al. *Clin Ophthalmol.* 2022;16:2979-2987. 3. Tarkowski W, et al. *Biomed Res Int.* 2015;2015:259109.4. Cheng AM, et al. *Cornea.* 2021;40(8):995-1001.

***DEMODEX* BLEPHARITIS**

COMMONLY USED TREATMENTS

At-Home

- Tea tree oil
- Lid wipes
- Topical ivermectin cream
- Cleansers containing hypochlorous acid
- Lid scrubs
- Antibiotics

In-Office

- Intense pulsed light therapy
- Microblepharoexfoliation

LOTILANER 0.25%

Lipophilic agent in an aqueous drop that acts specifically via mite GABA-gated chloride channels to target, paralyze, and kill *Demodex* mites

SATURN-1 AND SATURN-2 Collarette Grading Scale

Clinically meaningful cure				
Grade 0*	Grade 1*	Grade 2	Grade 3	Grade 4
				
0-2 lashes/eyelid with collarettes	3-10 lashes/eyelid with collarettes	>10 to <1/3 (~50) ¹ lashes/eyelid with collarettes	≥1/3 to <2/3 (~100) ¹ lashes/eyelid with collarettes	≥2/3 (~150) ¹ lashes/eyelid with collarettes
Complete collarette cure				

1. XDEMZY [prescribing information]. Tarsus Pharmaceuticals, Inc; 2023. 2. Toutain CE, et al. *Parasit Vectors*. 2017;10(1):522. 3. Yeu E et al. *Cornea*. 2022;42:435-443. 4. Yeu E, et al. Presented at: ARVO 2023; April 23-27, 2023; New Orleans, LA 5. Reprinted with permission from Yeu E, et al. *Cornea*. 2023;42(4):435-443. Copyright 2022 by the Authors.

LOTILANER: KEY STUDY DATA

ERSA and RHEA were two separate, randomized pilot studies evaluating the safety and efficacy of lotilaner ophthalmic solution 0.25% and vehicle for the **treatment of DB with MGD**. Eligibility criteria and endpoints for the ERSA and RHEA studies were identical.

ERSA: Collarette grade reduction and responder rate at day 43

Reduction to ≤ 2 collarettes

55%

of patients treated with
lotilaner 0.25% (n=20)

Reduction to ≤ 10 collarettes

80%

of patients treated with
lotilaner 0.25% (n=20)

RHEA: At Day 43, vehicle (n=10) did not show statistically significant improvement in mean collarette grade compared with baseline ($P > .1$)

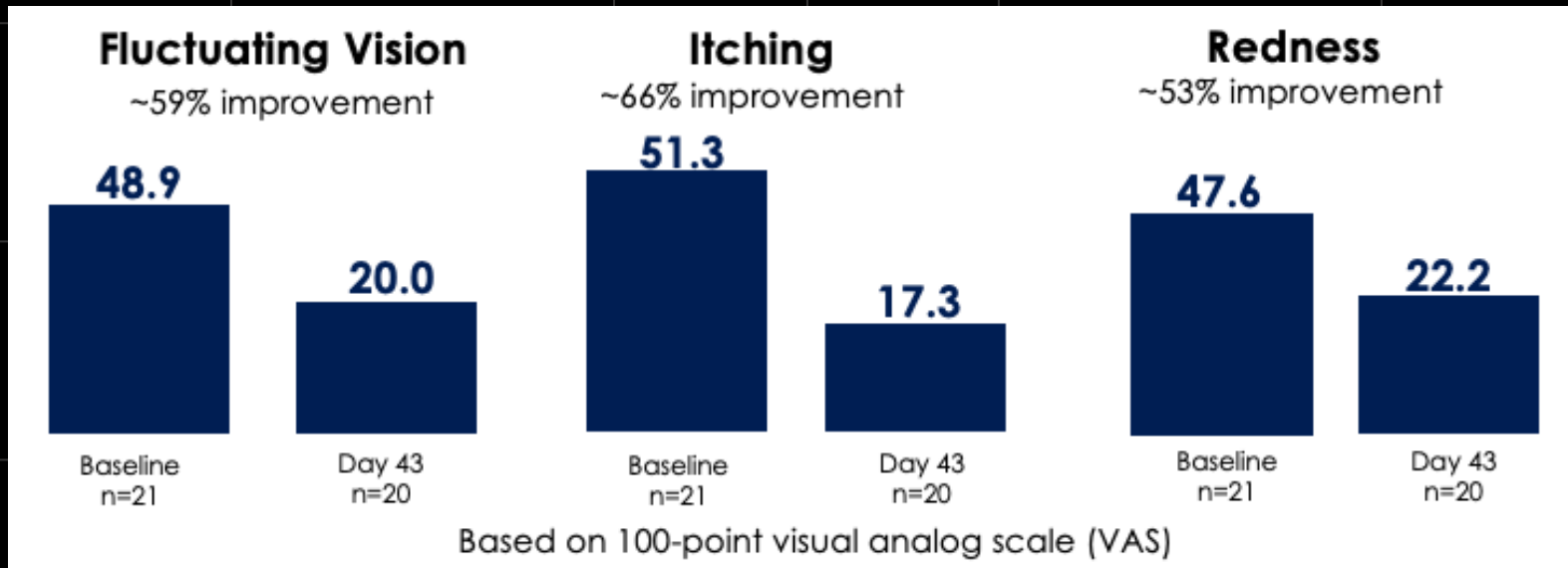
ERSA: Patients treated saw ~54% improvement in mean meibomian glands yielding liquid secretion (MGYLS) at day 43 compared with baseline

7.0

10.8

RHEA: At Day 43, vehicle (n=10) did not show statistically significant improvement in number of MGYLS compared with baseline ($P > .1$)

KEY STUDY DATA: PATIENT REPORTED OUTCOMES



RHEA: At day 43, vehicle (n=10) did not show statistically significant improvement in patient-reported fluctuating vision compared with baseline ($P>.1$)

RHEA: At day 43, vehicle (n=10) did not show statistically significant improvement in patient-reported itching compared with baseline ($P>.1$)

RHEA: At day 43, vehicle (n=10) did not show statistically significant improvement in patient-reported redness compared with baseline ($P>.1$)

CASE: THE CHRONIC INFLAMMATION PATIENT

- A 52-year-old woman with a 3-year history of diagnosed dry eye disease presents for a follow-up.
- She has been using over-the-counter lubricating drops daily and completed a 2-week course of loteprednol last year during a flare.
- Her OSDI score is 42 (severe). MMP-9 testing is positive.
- She reports her eyes feel “okay” most days but never truly comfortable, and she is frustrated that her symptoms keep returning.

What would you do differently?

PHARMACEUTICAL OPTIONS

2003 - 2025

Cyclosporine 0.05%

Lifitegrast 5%

Cyclosporine 0.09%

Cenegermin-bkbj

Loteprednol 0.25%

Varenicline 0.03 mg

Lotilaner 0.25%

Perfluorohexyloctane 100%

Cyclosporine 0.1% in perfluorobutylpentane

Acoltremon 0.003%

CYCLOSPORINE OPHTHALMIC SOLUTION 0.1%

A preservative-free solution that enhances the penetration of cyclosporine into the cornea, directly targeting inflammation

- High-concentration cyclosporine serves as both an **anti-inflammatory and immunomodulator**
- Unique semifluorinated alkane (SFA) vehicle spreads evenly across ocular surface and integrates into tear lipid layer
- Detectable in tears for up to 8 hours

PFBP Vehicle Impact on Cyclosporine Treatment

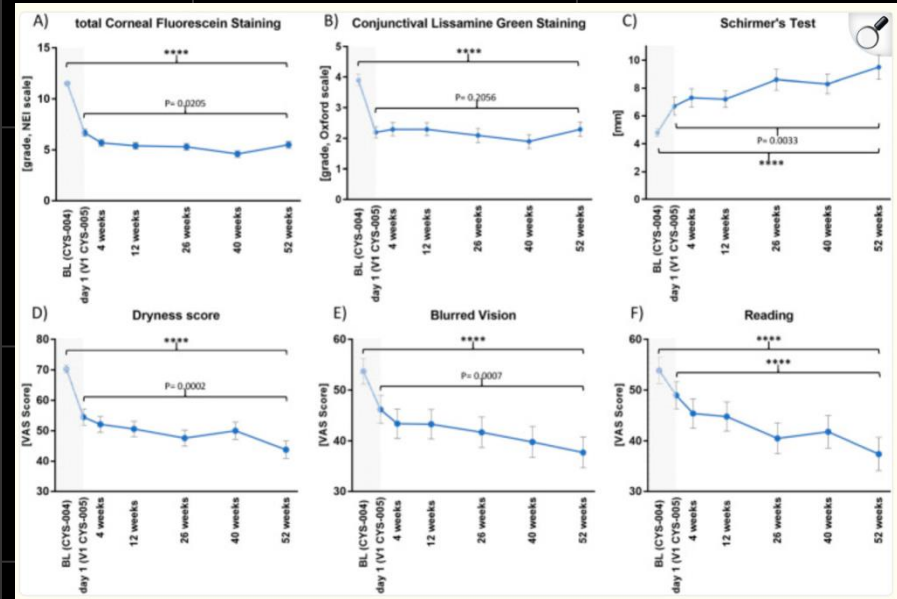
- Perfluorobutylpentane (PFBP) improves lipid layer grading, which may play a role in reducing tear evaporation
 - *TFOS DEWS III Management and Therapy Report*
- PFBP improves tear fluid lipid layer thickness within minutes after instillation and may reduce tear evaporation in DED patients with a compromised tear fluid lipid layer

DED, dry eye disease

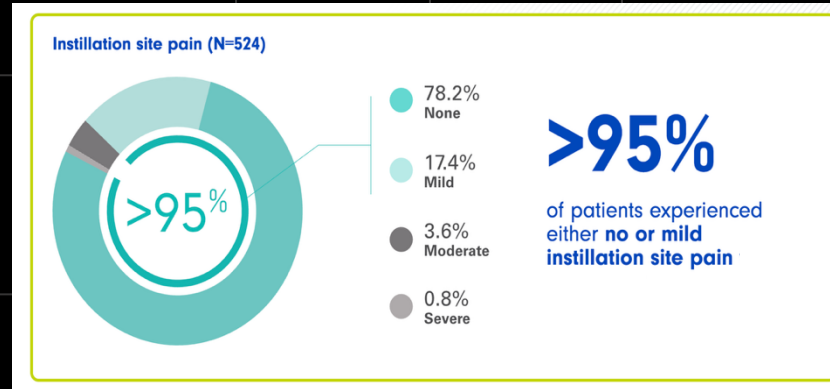
1. Akpek EK, et al. *JAMA Ophthalmol.* 2023;141(5):459-466. 2. Agarwal P, et al. *Expert Opin Drug Deliv.* 2025;1-16. 3. Jones L, et al. *Am J Ophthalmol.* 2025;279:289-386.

CYCLOSPORINE 0.1% ESSENCE-2 OPEN-LABEL EXTENSION (OLE)

- Mild instillation site pain (6.5%) most common adverse event
- Statistically significant improvements in all prespecified efficacy end points compared with baseline
- Corneal staining improvements occurred early and stabilized over time; tear production improved continuously
- Symptomatology improvement followed these effects with scores reaching a minimum after 1 year of treatment



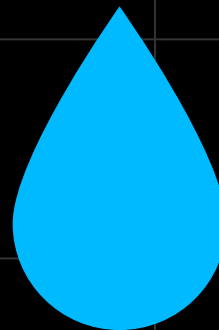
CYCLOSPORINE OPHTHALMIC SOLUTION 0.09%



- A calcineurin inhibitor immunosuppressant indicated to increase tear production in patients with DED
- Nanomicellar formulation encapsulates hydrophobic cyclosporine molecules for improved solubility and penetration through the tear film into ocular tissues
- Addresses cause of tear deficiency, not just symptoms
- Supports corneal and conjunctival epithelial integrity
- May improve visual quality in symptomatic dry eye patients
- Most clinical trials patients found cyclosporine 0.09% to be comfortable right from the start
 - 9 of 10 patients reported no or mild discomfort after 3 minutes

CYCLOSPORINE OPHTHALMIC SOLUTION 0.09% REDUCTION IN INSTILLATION SITE DISCOMFORT

- 2025 report found that up to 60% of participants (n=24) had less discomfort with cold instillation of 0.09% cyclosporine compared with warm instillation
- Effect lasted up to 9 minutes postinstillation
- Remaining participants experienced minimal difference (n=10) or increased cumulative discomfort (n=6)



MGD: In-Office Management



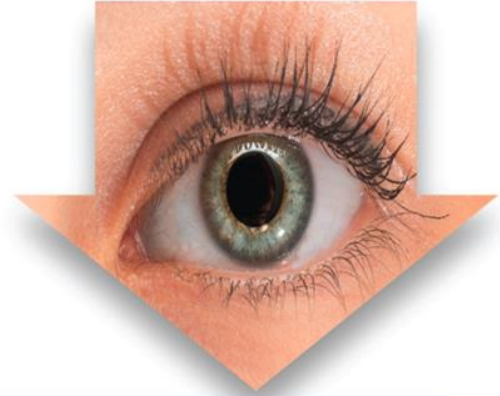
- Systems that warm the lids so unhealthy oils can be expressed
- Hovanesian et al found that localized heat therapy with manual expression is an effective treatment for MGD, providing durable relief from DED signs and symptoms.
- Treatment twice per year can provide meaningful improvement and symptomatic relief for patients with moderate-to-severe DED

PHARMA PRESBYOPIA

Selina R. McGee, OD, FAAO

**PRESBYOPIA
PHARMACEUTICAL
TREATMENTS
TEMPORARILY
REDUCE PUPIL SIZE**

If the pupil is not small enough, near vision is not sufficiently improved.



If the pupil size is too small, distance vision quality is compromised, especially in low light.

SCREENING FRAMEWORK

Refractive
error

Pupil size

Concurrent
eye disease

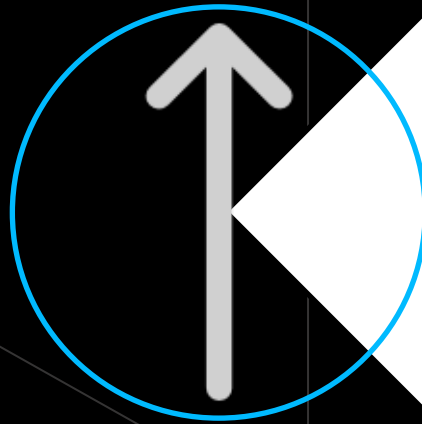
Prior eye
surgeries

Occupation

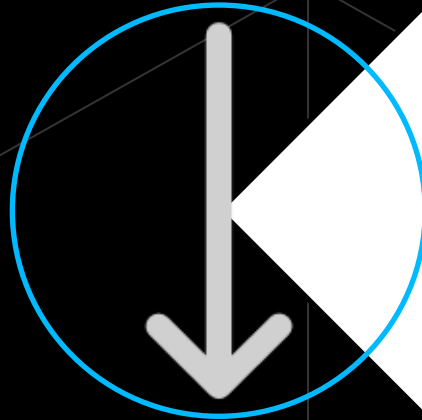
Lifestyle

Patient Expectations

MANAGING PATIENT EXPECTATIONS



- Maximize duration of effect
- Maximize drop administration comfort to increase compliance



- Minimize onset time
- Limit reduction of distance and night vision
- Minimize adverse events
- Minimize impact on ocular surface health

CASE: THE ACTIVE 48-YEAR-OLD EMMETROPE

- A 48-year-old kindergarten teacher with no prior glasses presents frustrated that she “can't read the whiteboard and her phone at the same time.”
- She is emmetropic, holds text at arm's length, and is resistant to readers — “I don't want to be fishing in my purse for glasses all day.”
- She asks if there's anything besides glasses.

What would you offer?

PHARMACOLOGICAL TREATMENTS

Agent	Composition	MOA	Dosing	Onset; Duration	Preservative	Status
Vuity	1.25% pilocarpine	Pupil modulation	Once or twice daily, with second dose after 3-6 hours	15 min; 6-9 hrs	BAK	FDA approved 2021
Qlosi	0.4% pilocarpine	Pupil modulation	Once or twice daily, with second dose after 2-3 hours	20-30 min; 8 hrs	PF	FDA approved 2023; commercially available April 2025
Vizz	1.44% aceclidine	Pupil modulation	Once daily	30 min; 10 hrs	PF	FDA approved July 2025
Yuvezzi	2.75% carbachol + 0.1% brimonidine	Combination of pupil modulation and ciliary body contraction	Once daily	30 min; 8-10 hrs	PF	FDA approved January 2026
MR-141	0.75% phentolamine	Combination of pupil modulation and ciliary body contraction	Once daily		PF	FDA accepted supplemental application with target review date of Oct 17, 2026

BAK, benzalkonium chloride; MOA, mechanism of action; PF, preservative free

Table adapted from: Dell SJ. (2024). Pharmacologic treatments for presbyopia. (2024). Cataract & Refractive Surgery Today. Retrieved from <https://crstoday.com/articles/july-2024/pharmacologic-treatments-for-presbyopia>

1. Optometry 411. <https://optometry.industry411.com/a-practical-guide-to-presbyopia-drops-from-vuity-to-whats-next/>. Updated Feb 10, 2026. Accessed August 21, 2026. 2. Opus Genetics. <https://ir.opusgtx.com/press-releases/detail/519/opus-genetics-announces-fda-acceptance-of-supplemental-new-drug-application-for-phentolamine-ophthalmic-solution-0-75-for-the-treatment-of-presbyopia>. Updated Feb 26, 2026. Accessed August 21, 2026.

PILOCARPINE 1.25%: SAFETY

GEMINI 1; GEMINI 2; VIRGO

Treatment-Related Adverse Events	GEMINI 1		GEMINI 2		VIRGO	
	Pilocarpine 1.25% group - 163, n (%)	Vehicle group - 159, n (%)	Pilocarpine 1.25% group - 212, n (%)	Vehicle group - 215, n (%)	Pilocarpine 1.25% group - 114, n (%)	Vehicle group - 116, n (%)
Headache	23 (14.11)	15 (9.43)	33 (15.57)	11 (5.12)	10 (8.77)	4 (3.45)
Blurring of vision	4 (2.5)	1 (0.6)	13 (6.13)	1 (0.47)		
Conjunctival hyperemia	4 (2.5)	4 (2.5)	15 (7.08)	11 (5.12)		
Eye irritation	4 (2.5)	1 (0.6)			114 (6.14)	0
Eye pain	4 (2.5)	1 (0.6)	12 (5.66)	3 (1.40)		

PILOCARPINE 1.25%: EFFICACY

- 1.25% of pilocarpine was used either once (in the GEMINI 1 and GEMINI 2 trial) or twice daily (VIRGO trial).
- A significantly higher proportion of patients reported improvement of DCIVA and gain of ≥ 3 lines in binocular DCNVA in the pilocarpine group than the vehicle group ($P<.01$).

Why wasn't this treatment more widely adopted?

PILOCARPINE 0.4%: SAFETY

NEAR-1 and NEAR-2 trials (N = 613)

Treatment-Related Adverse Events	CSF-1 n = 308; n (%)	Vehicle n = 305; n (%)
Non-Ocular		
Headache	21 (6.8%)	2 (0.7%)
Eye/facial pain	6 (1.9%)	1 (0.3%)
Nausea	4 (1.3%)	
Ocular		
Instillation site pain	18 (5.8%)	1 (0.3%)
Vision blurred	11 (3.6%)	2 (0.7%)
Conjunctival hyperemia	5 (1.6%)	1 (0.3%)
Instillation site pruritus	3 (1.0%)	1 (0.3%)
Visual impairment	3 (1.0%)	

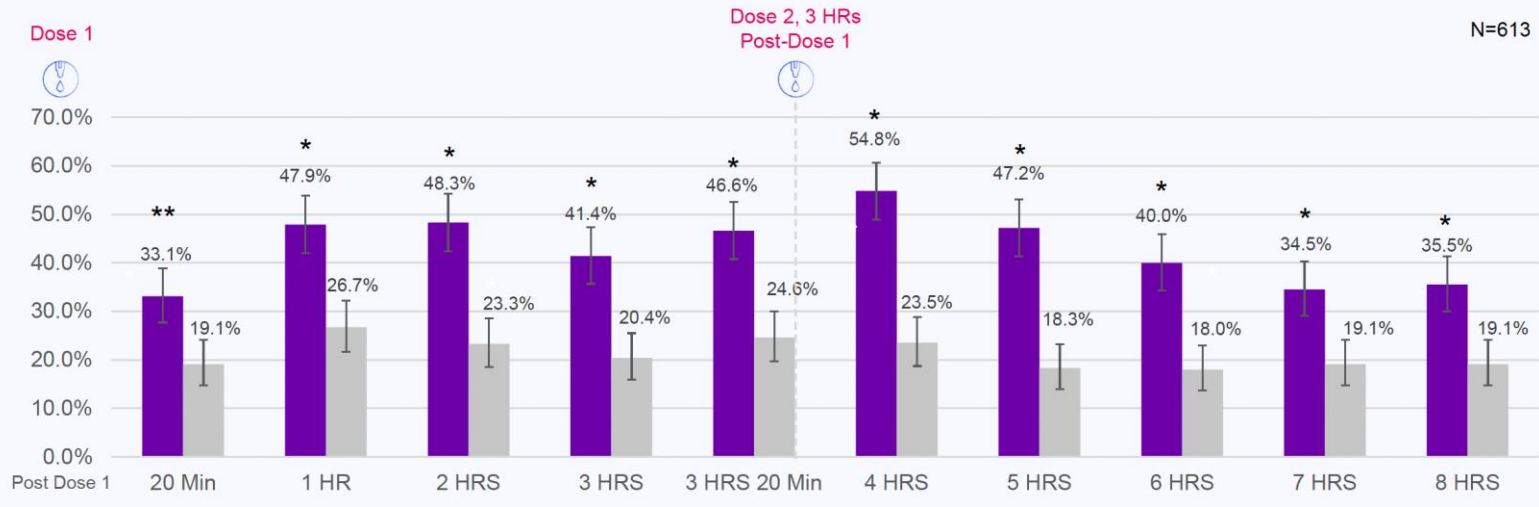
PILOCARPINE 0.4%: EFFICACY

Pooled Results of NEAR-3 Phase 3 Trial

- The 2-dose regimen evaluated twice-daily drop during a 2-week period
- 40% achieved the FDA endpoint of a 3-line gain on day 8 at 1 hour post dose compared with 19% of the vehicle group, with similar results out to 4 hours
- Among those who could not achieve 20/40 near at baseline, approximately 80% had functional (20/40) near vision on day 15, with efficacy out to 8 hours
- Lowest effective concentration of any miotic
- Effective at a minimum effective dose, possibly because of its near-neutral pH among other factors, which increases bioavailability
- Includes sodium hyaluronate and hydroxypropyl methylcellulose (lubricants for comfort)

PILOCARPINE 0.4%: EFFICACY

POOLED DAY 15 – Proportion of participants achieving ≥ 3 -line improvement DCNVA and no loss of 1-line or more in distance visual acuity (study eye)



Error bars are 95% confidence interval

* $P < 0.0001$ for CSF-1vs. Vehicle

** $P = 0.0002$ for CSF-1vs. Vehicle

Pilocarpine 0.4%

vehicle

DCNVA, distance-corrected near visual acuity

1. Holland E, et al. *Clin Ther.* 2024;46(2):104-113.

ACECLIDINE: SAFETY

CLARITY-1 and CLARITY-2 Trials (N = 466); CLARITY 3 (N = 217)

Treatment-Related Adverse Events	Aceclidine 1.44%*
Instillation site irritation	20%
Dim vision	16%
Conjunctival hyperemia	8%
Ocular hyperemia	7%
Headache	13%

**Vehicle comparisons have not been shared*

ACECLIDINE: EFFICACY

- The company reported that 71%, 71%, and 40% of participants in the phase 3 trials achieved the FDA endpoint at 0.5 hours, 3, and 10 hours on day 1, with higher percentages achieving 2-line gains
- The drug was studied out to 6 months

CARBACHOL AND BRIMONIDINE SAFETY

BRIO-I and BRIO-II Trials: two pivotal phase 3 trials (N = 811)

System Organ Class Preferred Term	Carbachol + Brimonidine (N=358)	Carbachol (N=121)	Vehicle (N=159)
Eye irritation	50 (14.0)	22 (18.2)	1 (0.6)
Eye pain	24 (6.7)	5 (4.1)	0
Visual impairment	23 (6.4)	3 (2.5)	1 (0.6)
Headache	56 (15.6)	8 (6.6)	1 (0.6)

CARBACHOL AND BRIMONIDINE PHASE 3 CLINICAL TRIAL HIGHLIGHTS

- Mesopic lighting conditions used to isolate pharmacodynamic effect from lighting and minimize visibility

Key Outcomes

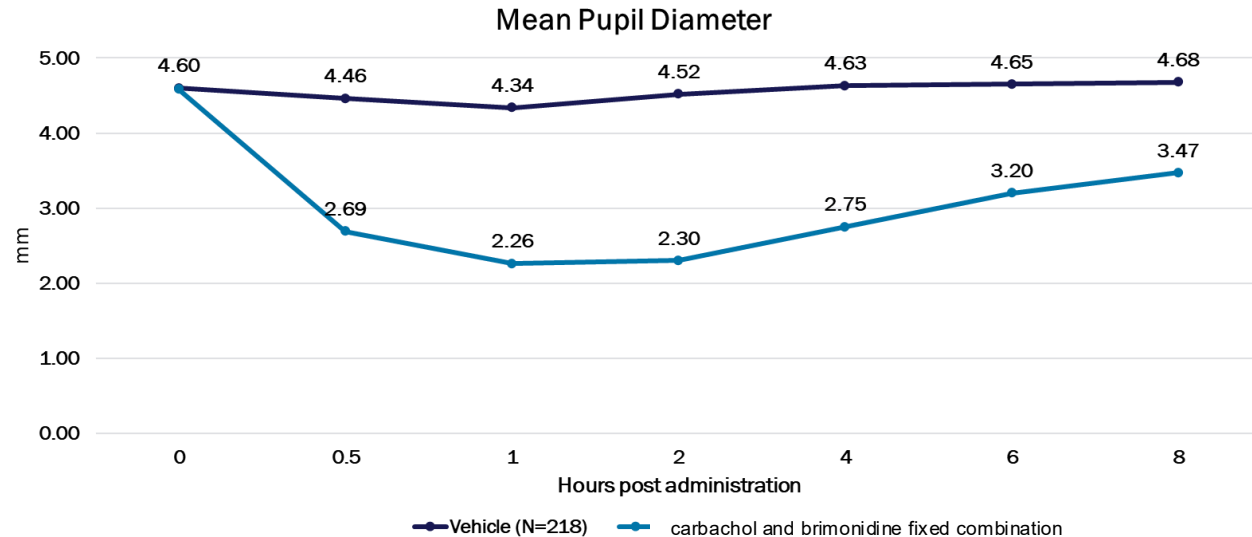
- Patients had clinically and statistically significant improvement in near visual acuity across several endpoints
- 6x greater improvement in reading performance
- Vision increased by 1 to 3 letters
- 83% rate effectiveness as “good/excellent”
- 72% rate duration as “just right”
- Well-tolerated

CARBACHOL AND BRIMONIDINE EFFICACY

- ~85% of subjects had functional near vision of 20/40 or better at 1 hour, with ~ 50% still 20/40 or better at 10 hours
- The combination demonstrated an increase in peak effect and duration over carbachol alone
- The pupil constricts within 30 minutes and then gradually returns to normal throughout the day, with no tachyphylaxis in pupil response or near vision over the 12-month study
- ***This is believed to be the only company to have measured reading speed using a validated scale in its clinical trials, reporting a 39% improvement, reflecting functional gains rather than simply improvements in visual acuity***

CARBACHOL AND BRIMONIDINE EFFICACY

- Differences between carbachol and brimonidine fixed combination and vehicle highly significant ($P<0.001$) at all timepoints
- Within optimum pupil range for mesopic and low light conditions at most timepoints through 8 hours



CASE: THE COMPLEX CANDIDATE

- A 54-year-old high myope (-7.00 OU) with a history of LASIK 12 years ago presents interested in presbyopia drops after seeing an ad.
- She also reports longstanding dry eye managed with cyclosporine.
- She asks, “Can I use the same drops my friend uses?”

What would you offer?

PHARMACOLOGICAL TREATMENTS

Agent	Composition	MOA	Dosing	Onset; Duration	Preservative	Status
Vuity	1.25% pilocarpine	Pupil modulation	Once or twice daily, with second dose after 3-6 hours	15 min; 6-9 hrs	BAK	FDA approved 2021
Qlosi	0.4% pilocarpine	Pupil modulation	Once or twice daily, with second dose after 2-3 hours	20-30 min; 8 hrs	PF	FDA approved 2023; commercially available April 2025
Vizz	1.44% aceclidine	Pupil modulation	Once daily	30 min; 10 hrs	PF	FDA approved July 2025
Yuvezzi	2.75% carbachol + 0.1% brimonidine	Combination of pupil modulation and ciliary body contraction	Once daily	30 min; 8-10 hrs	PF	FDA approved January 2026
MR-141	0.75% phentolamine	Combination of pupil modulation and ciliary body contraction	Once daily		PF	FDA accepted supplemental application with target review date of Oct 17, 2026

BAK, benzalkonium chloride; MOA, mechanism of action; PF, preservative free

Table adapted from: Dell SJ. (2 Pharmacologic treatments for presbyopia. (2024). Cataract & Refractive Surgery Today. Retrieved from <https://crstoday.com/articles/july-2024/pharmacologic-treatments-for-presbyopia>

1. Optometry 411. <https://optometry.industry411.com/a-practical-guide-to-presbyopia-drops-from-vuity-to-whats-next/>. Updated Feb 10, 2026. Accessed August 21, 2026. 2. Opus Genetics. <https://ir.opusgtx.com/press-releases/detail/519/opus-genetics-announces-fda-acceptance-of-supplemental-new-drug-application-for-phentolamine-ophthalmic-solution-0-75-for-the-treatment-of-presbyopia>. Updated Feb 26, 2026. Accessed August 21, 2026.

THANK YOU!
