Heart *of* America
Eye Care Congress

Evidence-Based Presbyopia: Treatment Options and Clinical Decision-Making

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Course Description

An evidence-based review of presbyopia management comparing optical, pharmacologic, and surgical treatments, with practical strategies for patient selection, expectation management, and clinical decision-making across early, moderate, and advanced stages of presbyopia.

Learning Objectives

At the conclusion of this lecture, the attendee will be able to:

1. Differentiate true presbyopia from other causes of near-vision blur and explain its underlying pathophysiology.
2. Compare mechanisms, efficacy, safety, and limitations of optical, pharmacologic, and surgical presbyopia treatments.
3. Apply evidence-based criteria to guide individualized treatment selection.
4. Incorporate patient education and expectation management strategies to improve satisfaction and long-term adherence.

Course Outline

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1. Understanding Presbyopia: Pathophysiology and Clinical Differentiation
    a. Review of accommodative decline
        i. Progressive increase in crystalline lens stiffness and reduced elasticity
        ii. Changes in lens curvature, capsule biomechanics, and disulfide bonding
        iii. Distinction between loss of accommodation vs pseudo-accommodation

b. Differentiating true presbyopia from other causes of near blur
    i. Latent hyperopia
    ii. Accommodative insufficiency
    iii. Early lenticular changes
    iv. Uncorrected refractive error
    v. Pseudophakia and post-refractive surgery patients
    vi. Ocular surface disease and fluctuating near vision
    vii. Digital eye strain and accommodative fatigue
    viii. Medication-induced accommodative changes
    ix. Early dysfunctional lens syndrome

c. Epidemiology and functional impact
    i. Global prevalence trends
    ii. Digital device dependency and intermediate vision demands
    iii. Psychosocial and productivity implications
    iv. Earlier symptom awareness in digital-device users
    v. Increased intermediate vision demands in modern workplaces
    vi. Impact on quality of life and visual wellness expectations

d. Patient communication strategies
    i. Explaining progression as a physiologic process
    ii. Setting expectations for staged treatment approaches
    iii. Addressing emotional resistance to aging-related vision changes
    iv. Counseling patients on staged and evolving treatment strategies
    v. Shared decision-making and lifestyle-centered care

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2. Optical Treatment Strategies: Benefits and Trade-Offs

a. Spectacle Correction
    i. Single-vision readers vs bifocal vs progressive addition lenses (PALs)
    ii. Optical compromises: peripheral distortion, swim effect, reduced depth perception
    iii. Evidence linking multifocal spectacles to fall risk in elderly populations
    iv. Quality-of-vision advantages at fixed focal distances
    v. Occupational PAL customization and task-specific prescribing
    vi. Adaptation challenges and counseling strategies

b. Contact Lens Correction
    i. Monovision and modified monovision
    ii. Mechanism of binocular blur suppression,
        - Impact on stereopsis and contrast sensitivity
    iii. Simultaneous vision multifocal designs
        - Center-near vs center-distance optics
        - Role of pupil size and ocular aberrations
    iv. Causes of dissatisfaction
        - Halos glare, reduced contrast
        - Dry eye and ocular surface disease impact
    v. Recent advances in lens materials and design
    vi. Neural adaptation and binocular visual processing
    vii. Factors predicting multifocal contact lens success
    viii. Impact of pupil dynamics on simultaneous vision performance
    ix. Dry eye optimization prior to multifocal fitting
    x. Real-world causes of multifocal contact lens dropout

c. Clinical decision-making in optical prescribing
    i. Early vs moderate presbyopes
    ii. Occupational and lifestyle considerations
    iii. Trial framing to improve adaptation success
    iv. Personality type and patient tolerance for visual compromise
    v. Matching modality to occupational demands and hobbies
    vi. Trial lens strategies and expectation management pearls

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3. Pharmacologic Agents

a. Mechanisms of action
    i. Miotic pupil modulation to increase depth of focus
    ii. Differences between symptomatic improvement vs accommodation restoration
    iii. Pinhole optics and increased depth of focus
    iv. Limitations of pharmacologic treatment in restoring true accommodation

b. Currently approved miotic therapies
    i. Low dose pilocarpine formulations
        - Onset within 15–30 minutes
        - Duration 6–8 hours
        - Common adverse events: headache, brow ache, dim vision

    ii. Lower-concentration and novel-vehicle agents
        - Designed to improve tolerability
        - Reduced ocular surface stress

    iii. Real-world patient satisfaction and discontinuation trends
    iv. Impact on night driving and low-light visual function

c. Emerging pharmacologic classes
    i. Direct muscarinic agonists with reduced accommodative spasm
    ii. Combination therapies targeting multiple receptor pathways
    iii. Lens-softening investigational therapies targeting disulfide bond modulation
    iv. Combination miotic and anti-inflammatory formulations
    v. Investigational agents targeting crystalline lens elasticity restoration

d. Patient selection and safety considerations
    i) Retinal screening in high myopes or lattice degeneration
    ii) Counseling regarding dim vision in low-light conditions
    iii) Ocular surface optimization prior to initiation
    iv) Contraindications and cautionary patient profiles
    v) Counseling regarding retinal detachment symptoms
    vi) Importance of baseline ocular surface evaluation

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4. Surgical Approaches to Presbyopia

a. Corneal-Based Procedures
    i. Monovision LASIK/PRK
        - Patient selection and binocular considerations
    ii. Multifocal/presbyLASIK ablation profiles
        - Induction of spherical aberration
    iii. Corneal inlays
        - Small-aperture optics
        - Reversibility and risk of haze
        - Contrast sensitivity implications

    iv. Patient tolerance for induced aberrations and reduced contrast sensitivity
    v. Long-term stability considerations

b. Lens-Based Surgical Solutions
    i. Refractive lens exchange (RLE)
    ii. Multifocal and trifocal IOLs
        - Mechanism: diffractive vs refractive optics
        - Dysphotopsia risk and contrast trade-offs
    iii. Extended depth of focus (EDOF) lenses
    iv. Light adjustable Lens technology
        - Postoperative refractive customization
    v. Accommodating IOLs and investigational designs
    vi. Patient personality profiles and candidacy considerations
    vii. Spectacle independence versus quality-of-vision trade-offs
    viii. Considerations in post-refractive surgery patients

c. Causes of postoperative dissatisfaction
    i. Residual refractive error
    ii. Dry eye exacerbation
    iii. Unrealistic expectations regarding spectacle independence
    iv. Neuroadaptation challenges
    v. Dysphotopsias and nighttime visual symptoms
    vi. Persistent ocular surface disease after surgery

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5. Quality of Life and Clinical Outcomes

    a. Evaluating patient-reported outcomes
        i. Functional near acuity
        ii. Spectacle independence rates
        iii. Satisfaction vs visual quality trade-offs

iv. Visual quality versus visual acuity outcomes
v. Functional intermediate vision performance

b. Case-based review
    i. Early emmetrope presbyope
    ii. Hyperopic moderate presbyope
    iii. Post-LASIK emerging presbyope
    iv. Dry eye patient struggling with multifocal contact lenses
    v. High myope considering pharmacologic therapy
    vi. Early presbyope resistant to spectacle correction

c. Adherence considerations
    i. Drop discontinuation rates
    ii. Multifocal contact lens dropout
    iii. Long-term satisfaction after RLE
    iv. Neuroadaptation failure in multifocal optics
    v. Importance of expectation management in long-term satisfaction

d. Mitigation strategies
    i. Dose titration for pharmacologic agents
    ii. Managing dysphotopsias
    iii. Setting realistic goals before intervention
    iv. Ocular surface optimization across all treatment modalities
    v. Gradual staged treatment escalation strategies

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6. The Future of Presbyopia Management

a. Growth of pharmacologic innovation
b. Advances in accommodating and next-generation IOL technologies
    i. Dynamic optic technologies
    ii. Fluid-based and shape-changing lens systems
c. Movement toward staged, combination therapy models
    i. Combining optical and pharmacologic management
    ii. Personalized and lifestyle-driven presbyopia care pathways
d. Integrating presbyopia discussions earlier in patient care to enhance lifetime visual planning

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