

## Innovations in Multifocal Contact Lenses

Melissa Barnett, OD, FAAO, FSLs, FBCLA  
4860 Y Street  
Sacramento, CA 95817  
[drbarnett@ucdavis.edu](mailto:drbarnett@ucdavis.edu)

Janelle Davison, OD  
2450 Atlanta Road Southeast, #200  
Smyrna, GA 30080  
[dr.davison@brillianteyesvisioncenter.com](mailto:dr.davison@brillianteyesvisioncenter.com)

This lecture will focus on novel innovations in contact lens multifocals for the treatment of presbyopia. It will touch on the modern classification of presbyopia, the impact and burden of inadequately treated presbyopia, and the role of corrective lenses and adjunctive therapies to successfully manage presbyopia.

### Learning Objectives

1. Become knowledgeable in contact lens multifocals for presbyopia.
2. Identify how to select different treatments based on the severity of presbyopia.
3. Learn different management strategies for presbyopia.
4. Identify opportunities for better presbyopia engagement.

### Course Outline

#### 1. Presbyopia

##### a. Current classification system

- i. Premature
- ii. Incipient
- iii. Functional
- iv. Absolute
- v. Nocturnal

##### b. Modern classification system

- i. Mild

- ii. Moderate
  - iii. Advanced
  - iv. Provide consistency of diagnosis among eye care providers
  - v. May aid in managing patient expectations with different treatment options.
    - 1. McDonald MB, Barnett M, Gaddie IB, Karpecki P, Mah F, Nichols KK, Trattler WB. Classification of Presbyopia by Severity. *Ophthalmol Ther.* 2022 Feb;11(1):1-11. doi: 10.1007/s40123-021-00410-w. Epub 2021 Oct 28. Erratum in: *Ophthalmol Ther.* 2021 Nov 20;: PMID: 34709607; PMCID: PMC8770716.
- 2. Prevalence of Presbyopia
  - i. Worldwide
  - ii. United States
  - iii. Emmetropic Presbyopia
    - 1. Opportunities-30 million Americans buy reading glasses at a box store without seeing an ECP
    - 2. Eye health awareness
    - 3. Importance of eye examinations for friends and family
  - iv. Millennial generation (born 1980 to 1994) are entering their 40s
    - 1. Millennials - largest adult cohort worldwide at 72.1 million, surpassing the size of the baby boomer population (ages 58 to 76) of 71.6 million.
    - 2. <https://www.pewresearch.org/fact-tank/2020/04/28/millennials-overtake-baby-boomers-as-americas-largest-generation/>
  - v. Patient Journey
    - 1. Frustration
    - 2. Consumer surveys
- 3. Contact Lenses
  - a. Global market (contact lenses)
    - i. Global market size - valued at USD 7.84 billion in 2020 and is projected to grow from \$8.58 billion in 2021 to \$12.56 billion in 2028, a compound annual growth rate of 5.6%
    - ii. "Contact Lenses Market Size, Share & COVID-19 Impact Analysis, By Modality (Reusable, and Disposable); By Design (Toric, Multifocal, and Spherical); By Distribution Channel (Ophthalmologists, Retail Stores, and Online Stores), and Regional Forecast, 2021-20," 2021; "Grand View Research," 2022
    - iii. One of the reasons for growth of the contact lens market is the correction of presbyopia.
  - b. Dominant eye
    - i. Sighting vs. sensory method
    - ii. Importance of checking dominant eye
- 4. Contact lens options
  - a. Single vision contact lenses with glasses
  - b. Monovision
  - c. Multifocal
  - d. Modified multifocal
  - e. Multifocal studies
    - i. MV vs Essential GP (Johnson 2000)

1. 75% preference for multifocal
- ii. MV vs Acuvue Bifocal (Situ et al 2003)
  1. 68% preference for multifocal
  2. Issues with near vision in low light
- iii. MV vs Softlens MF (Richdale et al 2006)
  1. 76% preference for multifocal
  2. Issues with near vision in low light
- iv. Woods J et al (2009)
  1. Objective (exam room), MV “best performer” for high- and low-contrast near vision tests
  2. Subjective (“real world”), MV “lowest performer”
  3. MF CLs “highest performer” (night driving, television, computer)
- v. MV vs Air Optix Aqua MF (Woods et al 2015)
  1. 51% preference for multifocal
  2. 37% preference for monovision

f. Daily disposable multifocals and presbyopia

1. Convenience
2. Great for part-time wear
3. Helpful for ocular surface disease
4. Improved safety
  - a. Tempo study (Chalmers et al. Rates of adverse events with hydrogel and silicone hydrogel daily disposable lenses in a large postmarket surveillance registry: the TEMPO Registry. 2015).
  - b. CIE rates of 0.4% and 0% with daily replacement CLs
  - c. Lower than rates with reusable SCLs (3%-4% per year)

5. Daily disposable MF options

- a. Lens selection
- b. Available options
- c. How contact lenses differ

6. The astigmatic patient

- a. Soft
- b. Hybrid
- c. Scleral
- d. Importance of lens stability

7. Suspended soft contact lens

- ii. Lentechs
- iii. How the lens is fit differently compared to other lens options
- iv. Lens designed to be suspended from the inside of the upper lid and to float above the cornea on the tear film

8. Virtual reality option

- a. Mojo
- b. Scleral lens that includes the worlds’s smallest LED display, a microprocessor, eye tracking sensors, wireless data, and rechargeable batteries
- c. Fit with monofocal scleral lens for distance vision
- d. Placed directly on top of the lens is another lens capable of adding up to 3 diopters, which is continuously adjustable by varying electrical input

9. Optimizing the ocular surface during the fitting process

- i. Dry eye screening
        - 1. Questionnaires
        - 2. Vital dyes
          - a. Sodium fluorescein
          - b. Lissamine green
          - c. Rose Bengal
          - d. When to evaluate vital dyes on eye
        - 3. Choice of hydrogen peroxide vs. multipurpose solutions.
    - b. Discuss presbyopia from the patient's point of view
      - i. Impact on quality of life
      - ii. What are the shortcomings of current treatments and why don't they address all populations?
    - c. Pharmaceutical Options in conjunction with contact lenses
      - 1. Presbyopia Drops Will Be Additive for a Majority of Patients, Supplementing their Current Near Vision Remedy
        - a. 80% of patients will still use Rx glasses or contact lenses in addition to drops
      - 2. Overview of current and emerging pharmaceutical options for presbyopia
        - a. Depth of focus and how can it be increased using pharmaceuticals
        - b. Review pharmaceuticals being investigated to increase DOF
        - c. Pharmaceuticals to slow presbyopic progression and restore accommodation
        - d. Review pharmaceuticals being investigated that address lens changes/accommodation loss
10. Opportunities for better presbyopia engagement
  - a. Educate on presbyopia
  - b. Use the word presbyopia
  - c. Understand that presbyopia will change over time regardless of treatments
  - d. What to expect over the next several years
  - e. Ideal treatment options
11. Staff Training (presbyopia champion)
  - a. Pretesting patient engagement
  - b. Explaining the term "presbyopia"
  - c. Lunch & Learn
  - d. Educating the pre-presbyope