

Part 2



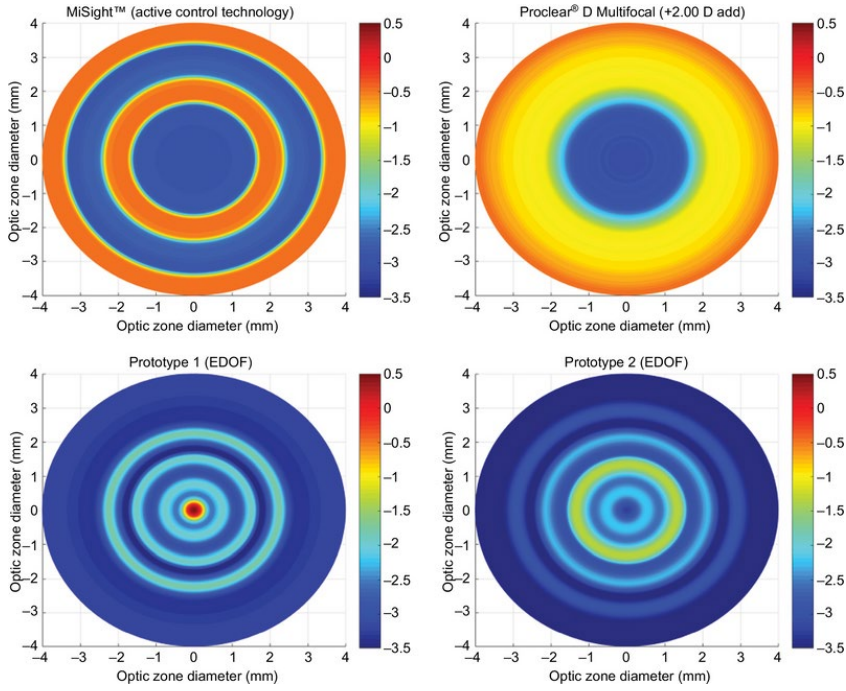
Myopia Management Treatment Options

Dr. Ariel Cerenzie

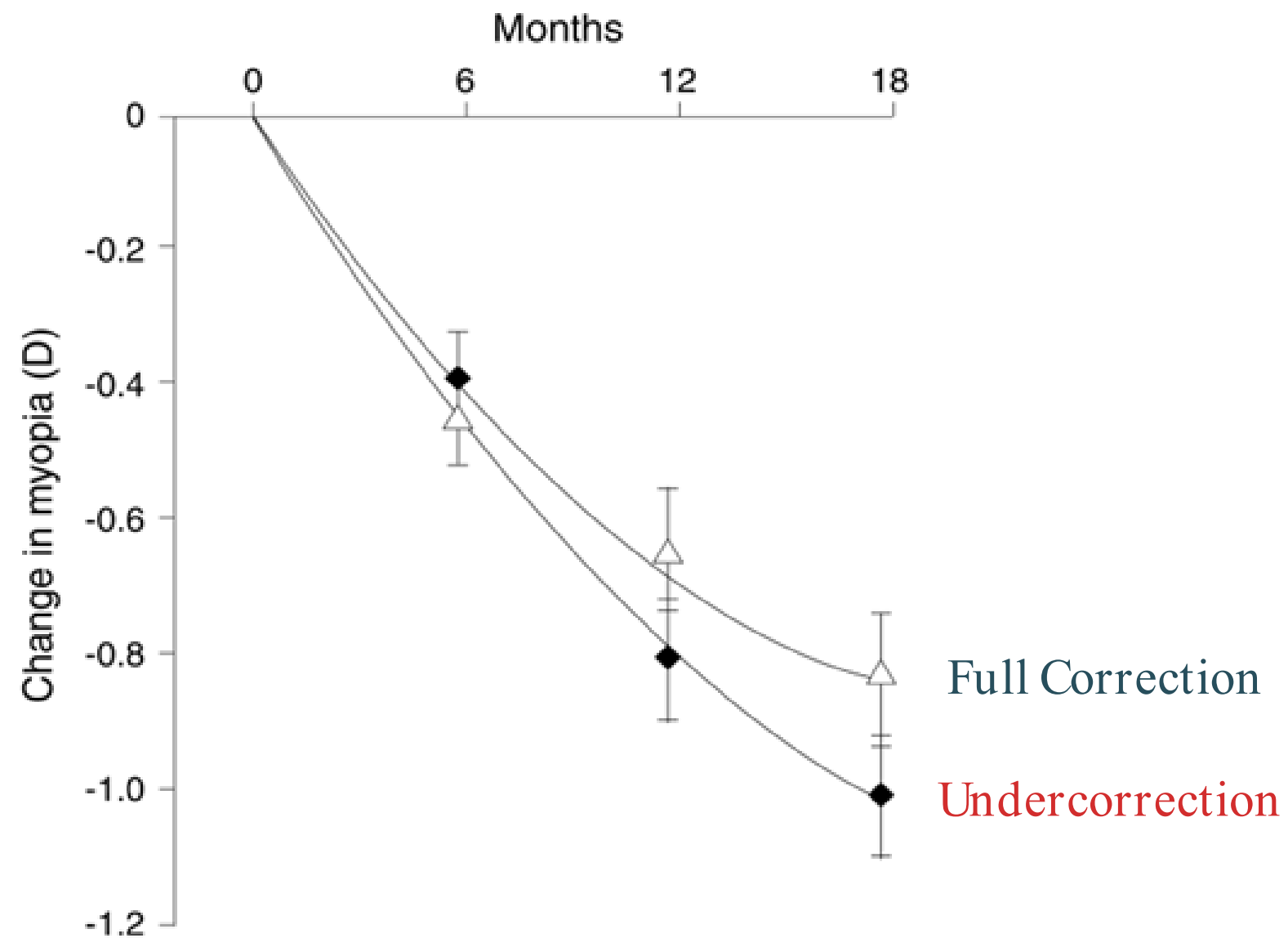
Myopia Management Options

.....

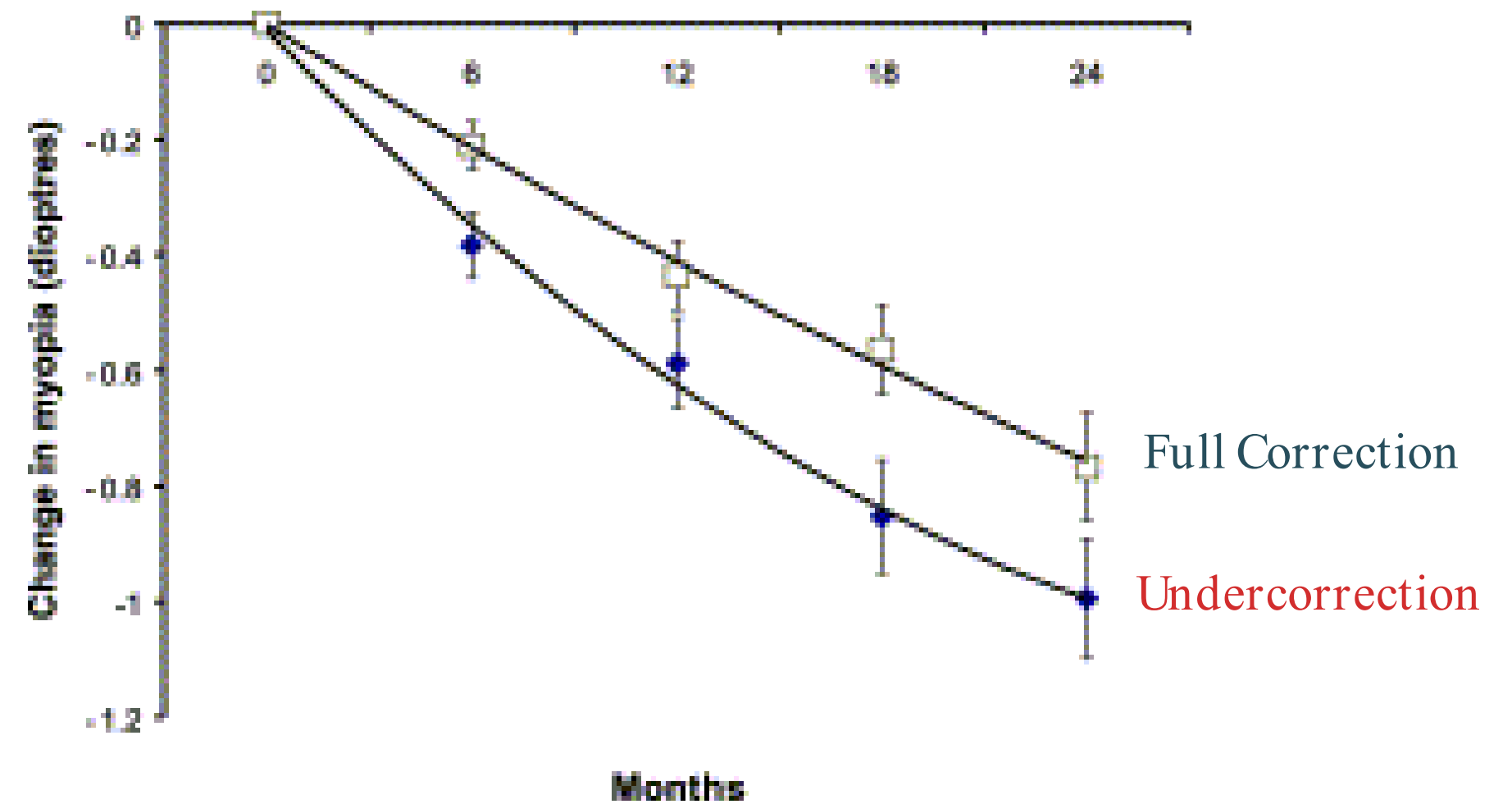
Spectacles



Undercorrection



0.17 D more progression over 18-month period



0.23 D more progression over 24-month period

Myopia Management

.....
Spectacles

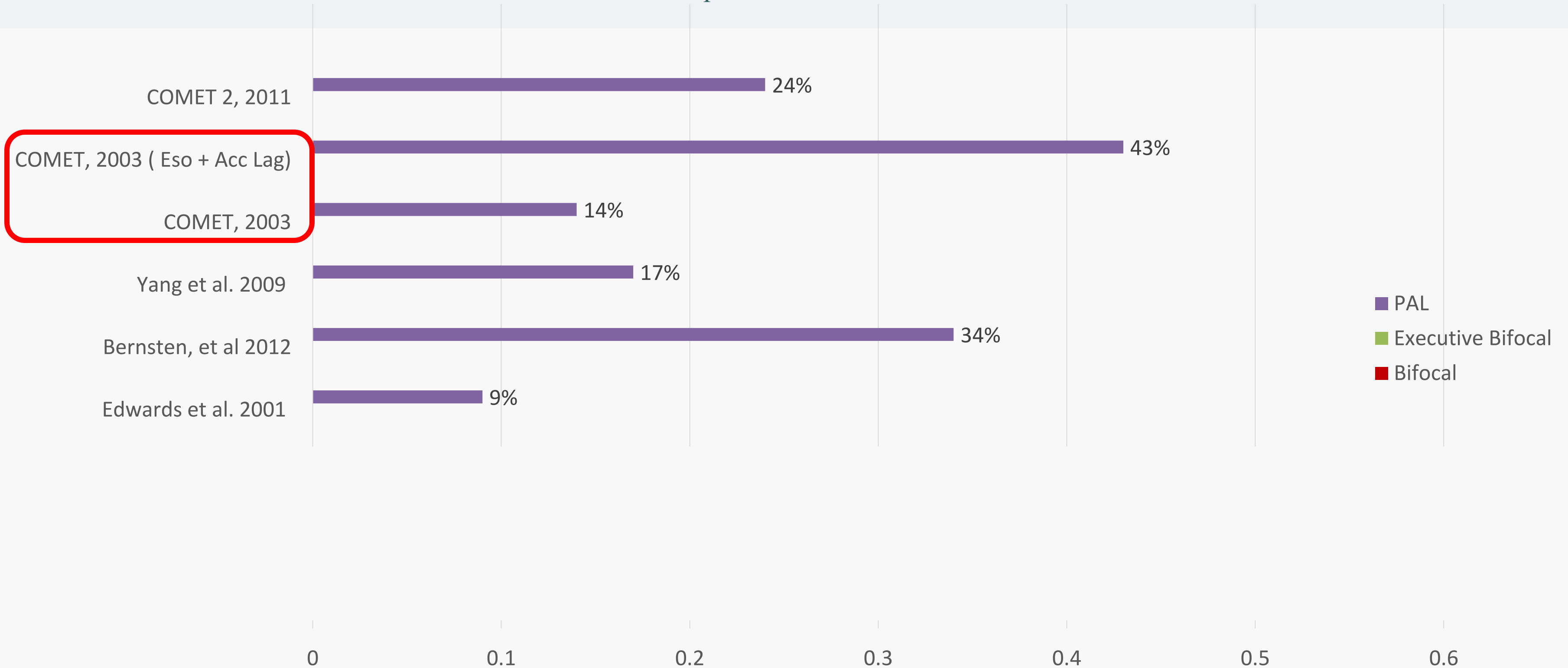
- PALs
- Bifocals
- Bifocals + Prism



Myopia Management



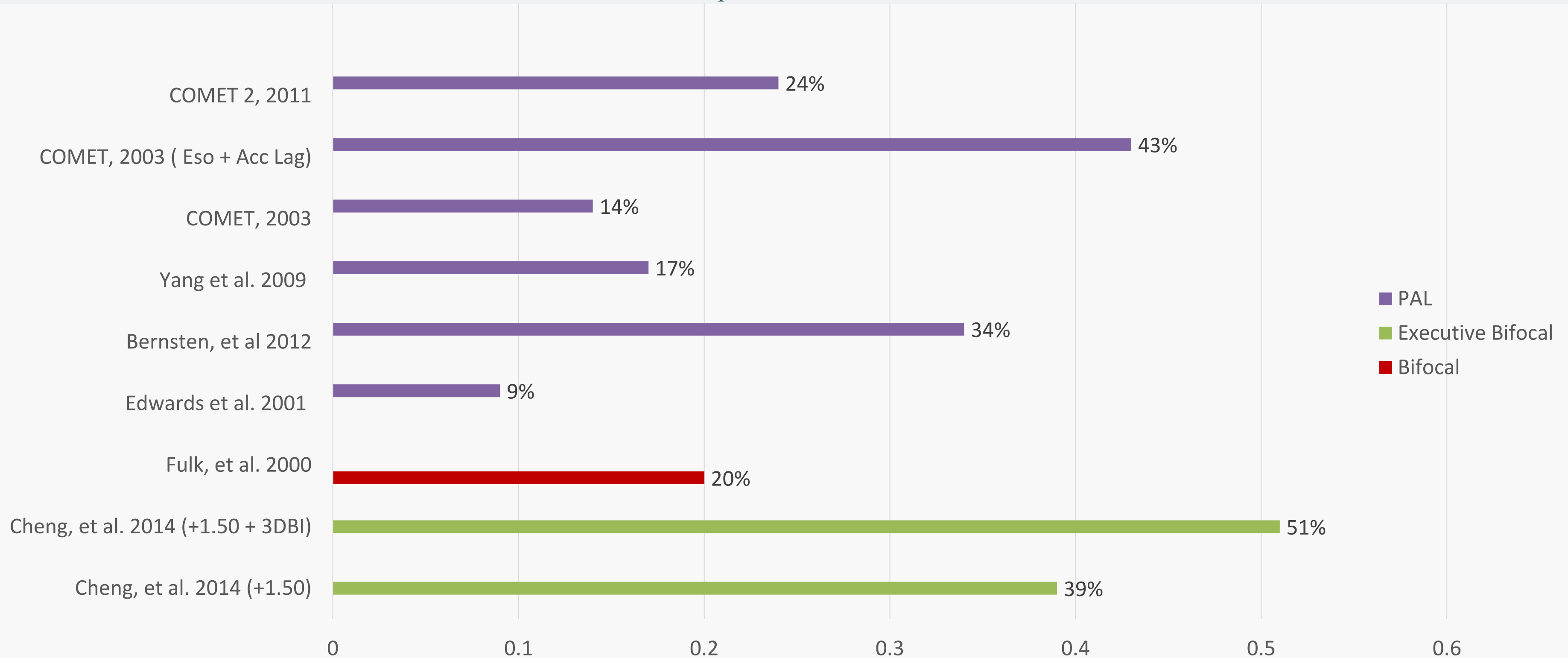
Spectacles



Myopia Management

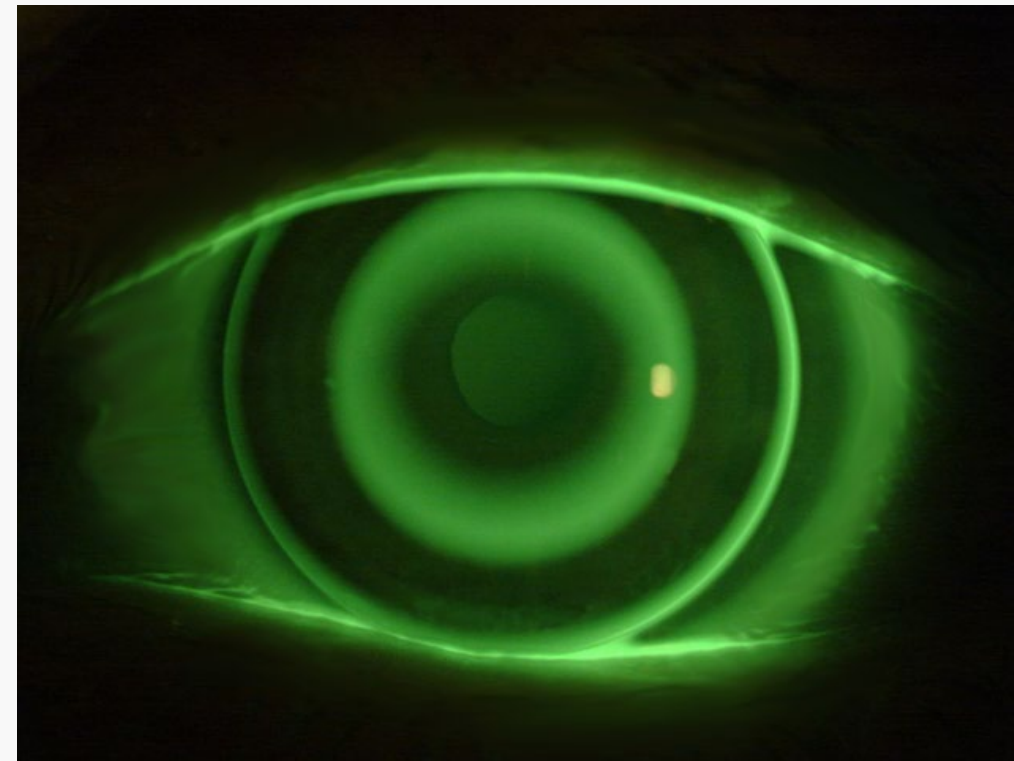
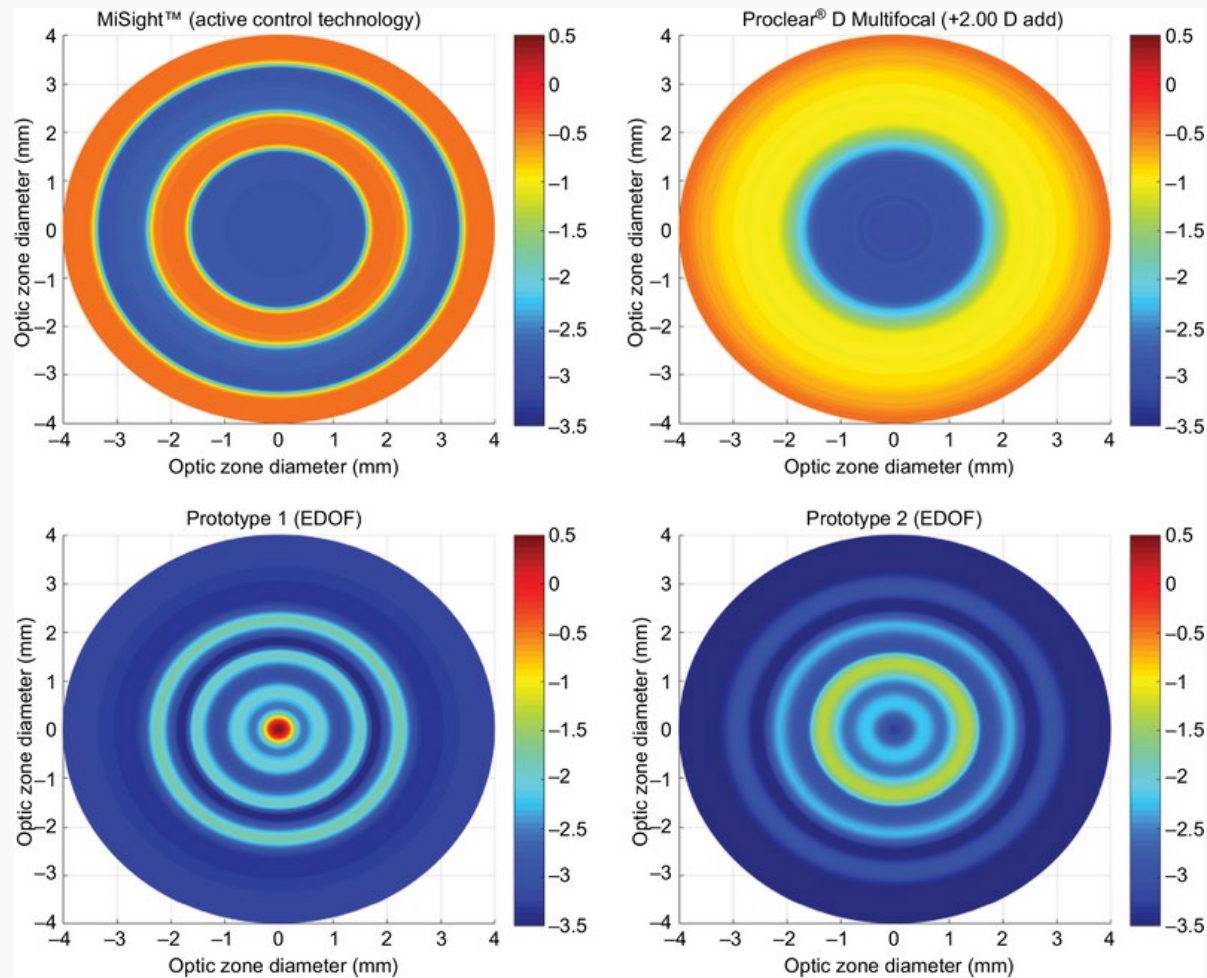


Spectacles



Myopia Management

Clinically Proven & Effective Modalities





What Tools do I need?

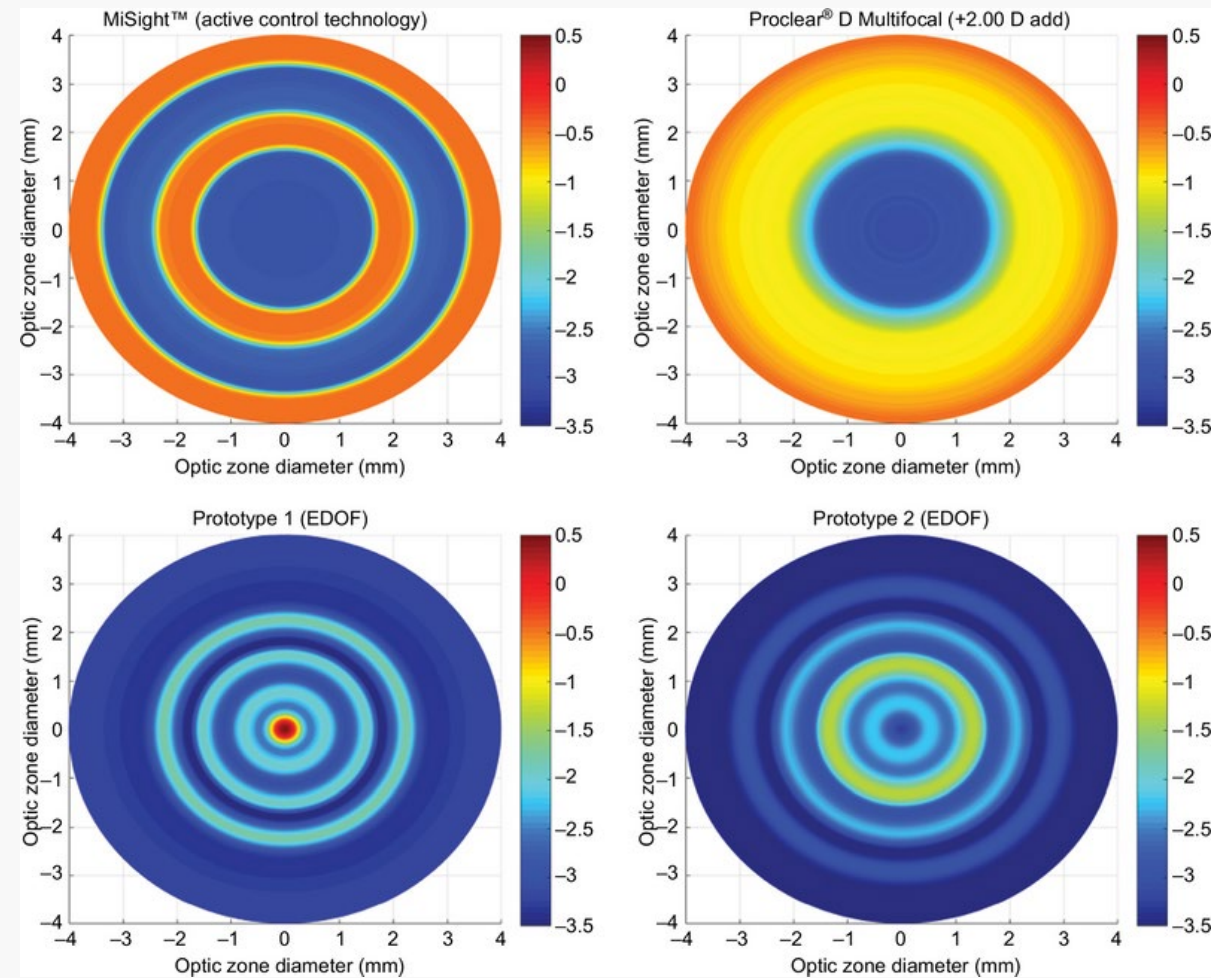
- Cycloplegic Refraction
- Topographer
- Compounding Pharmacy
- Biometry

Multifocals



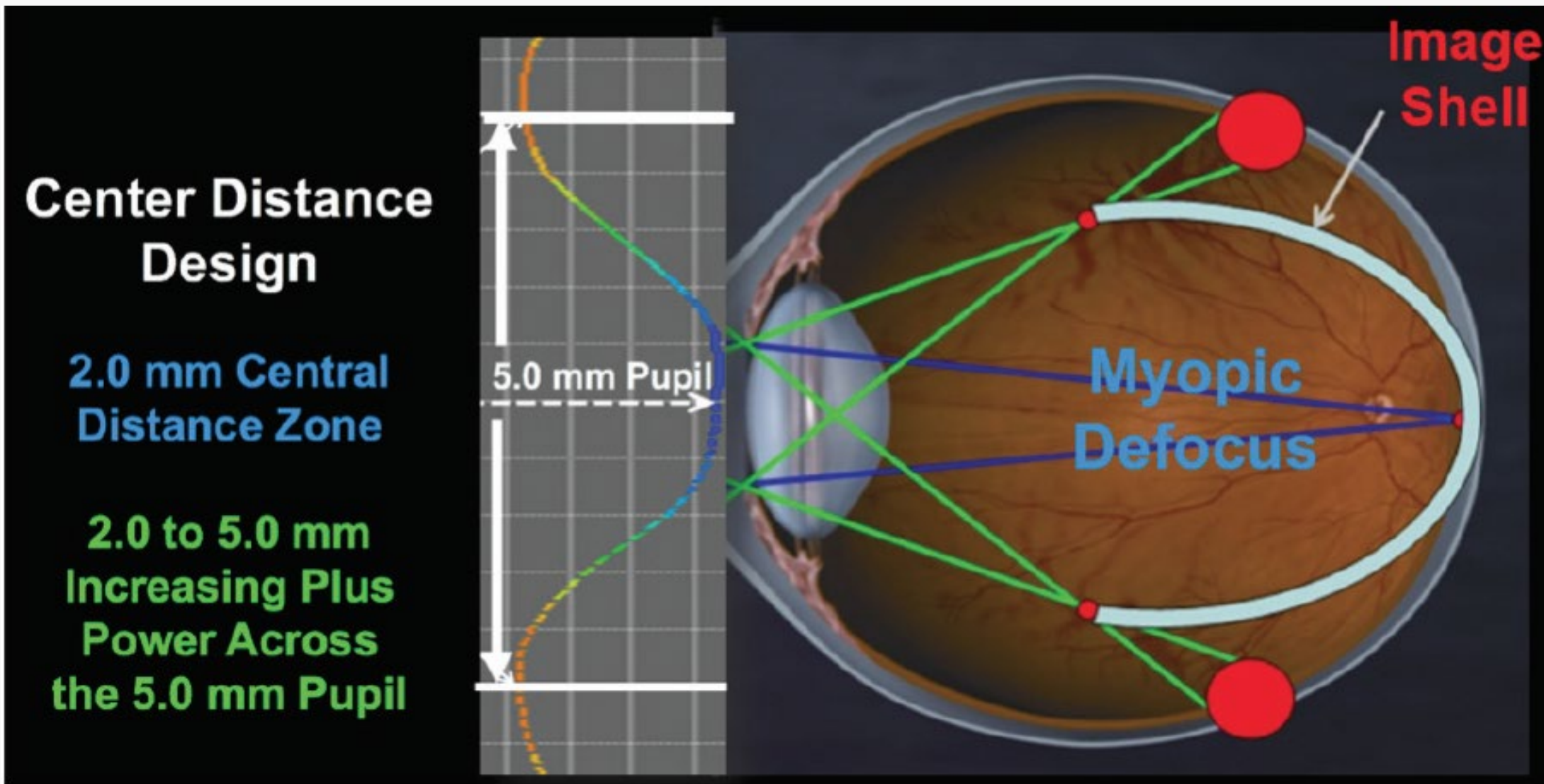
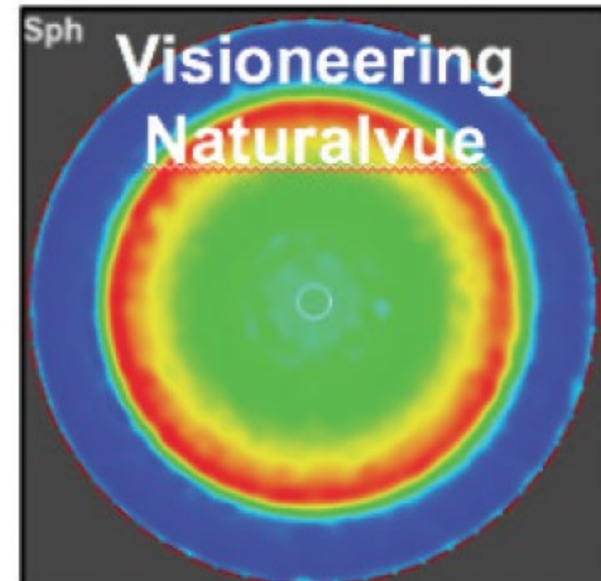
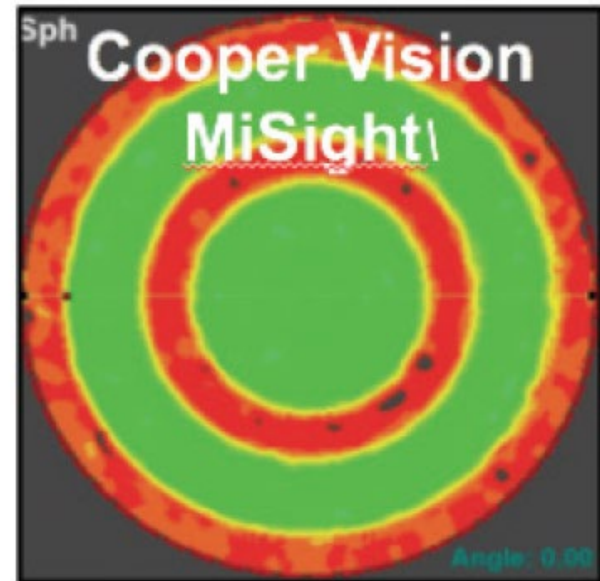
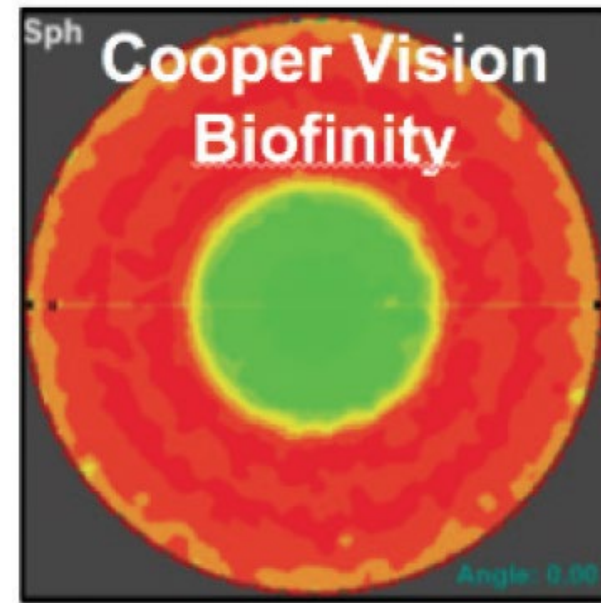
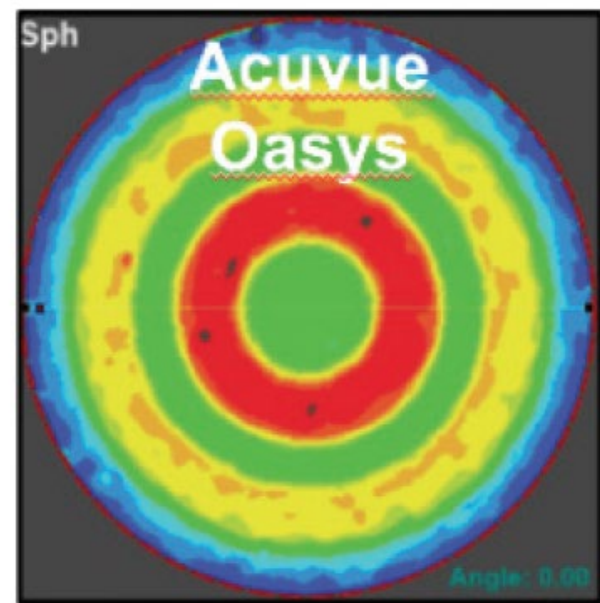
Options

- MiSight
- NaturalVue
- Biofinity MF "D"
- Proclear MF "D"
- Acuvue Oasys for Presbyopia



Multifocals

Mechanism of Action



Multifocals

Efficacy



QUESTION Can soft multifocal contact lenses with a high add power slow myopia progression in children more than medium add power or single-vision contact lenses?

CONCLUSION This clinical trial found that in children with myopia, treatment with high add multifocal contact lenses, compared with medium add multifocal and single-vision contact lenses, reduced the rate of myopia progression over 3 years, but further research is needed.

POPULATION

117 Males
177 Females



Children aged 7-11 years with -0.75 to -5 D myopia and corrected visual acuity 20/25 or better

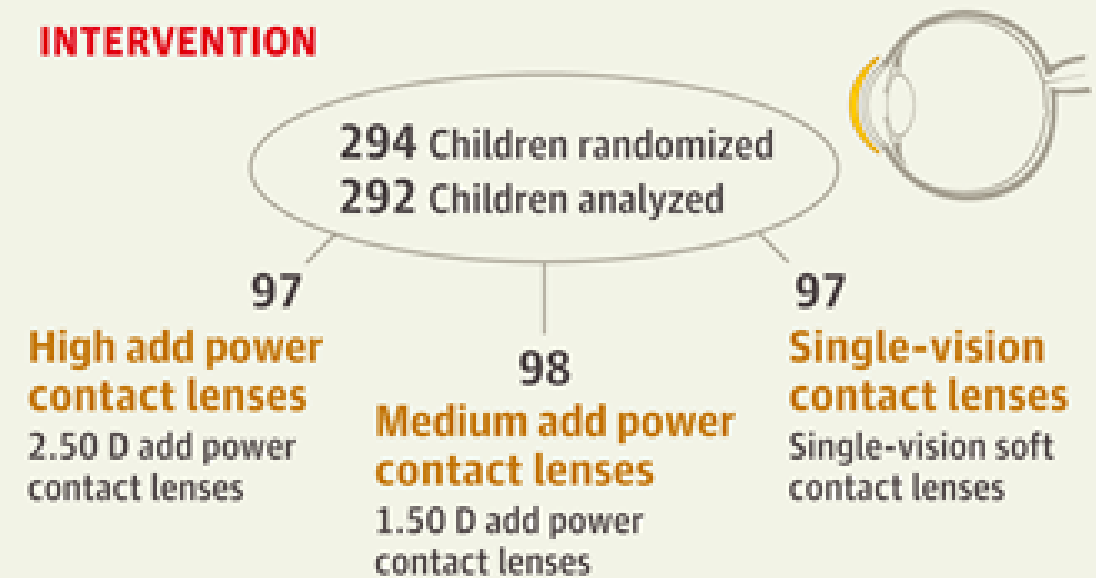
Mean age: 10 years

LOCATIONS

2
Optometry schools
in the US



INTERVENTION

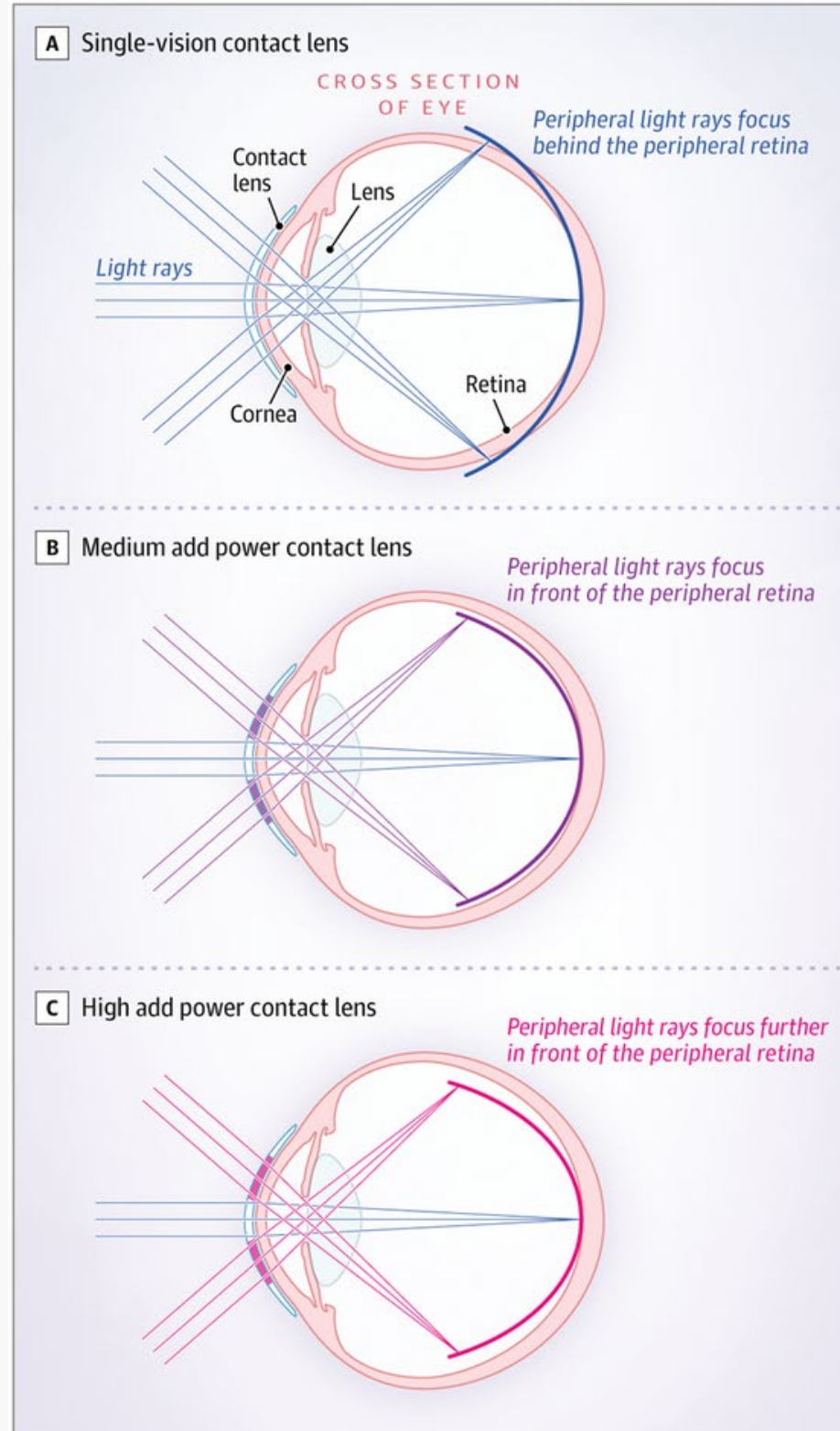


PRIMARY OUTCOME

Change in myopia progression at 3 years, measured via cycloplegic spherical equivalent autorefractometry

Walline JJ, Walker MK, Mutti DO, et al; for the BLINK Study Group. Effect of high add power, medium add power, or single-vision contact lenses on myopia progression in children: the BLINK randomized clinical trial. *JAMA*. Published August 11, 2020. doi:10.1001/jama.2020.10834

Multifocals

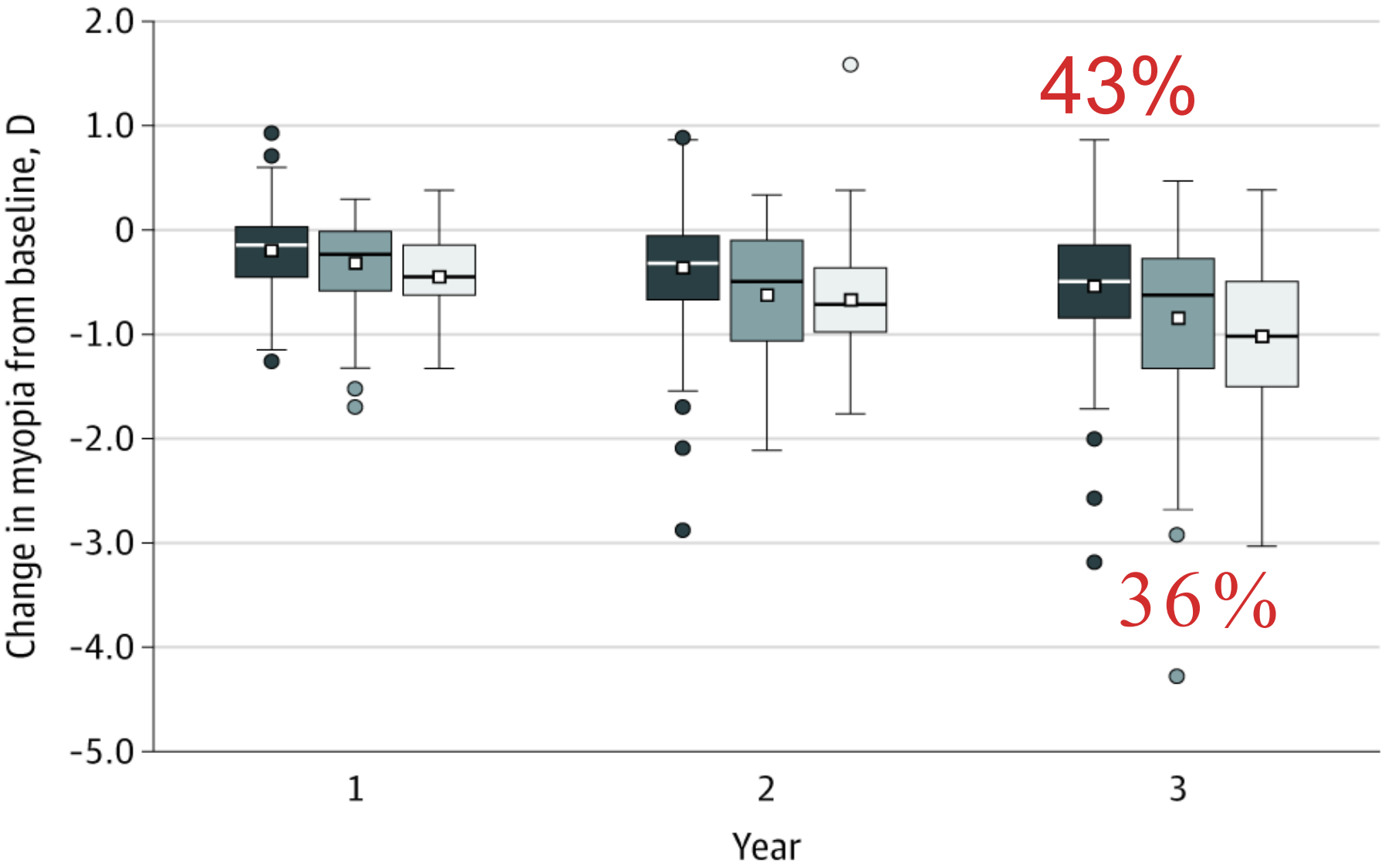


Multifocals

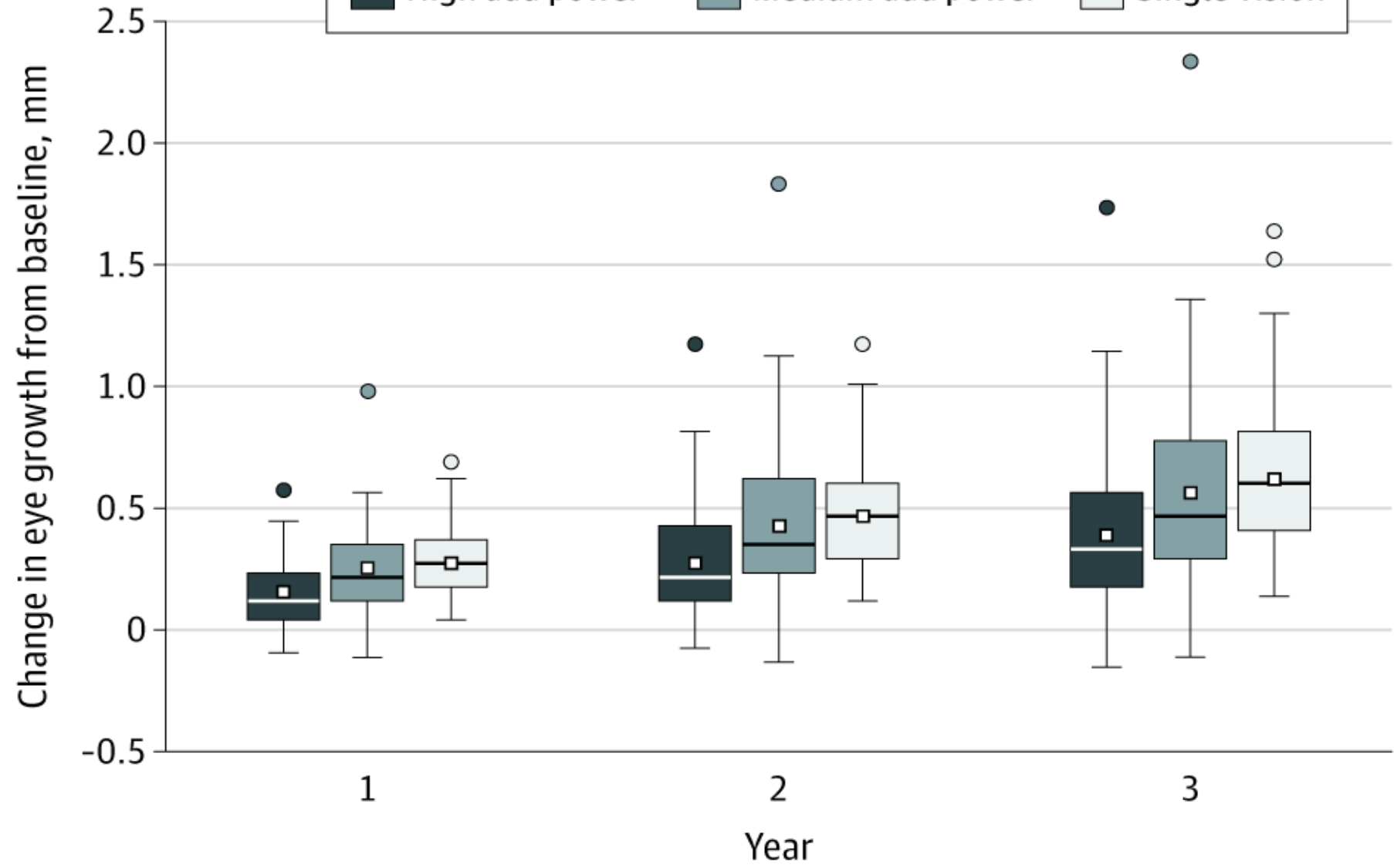
Efficacy



A Myopia progression



B Eye growth



Multifocals



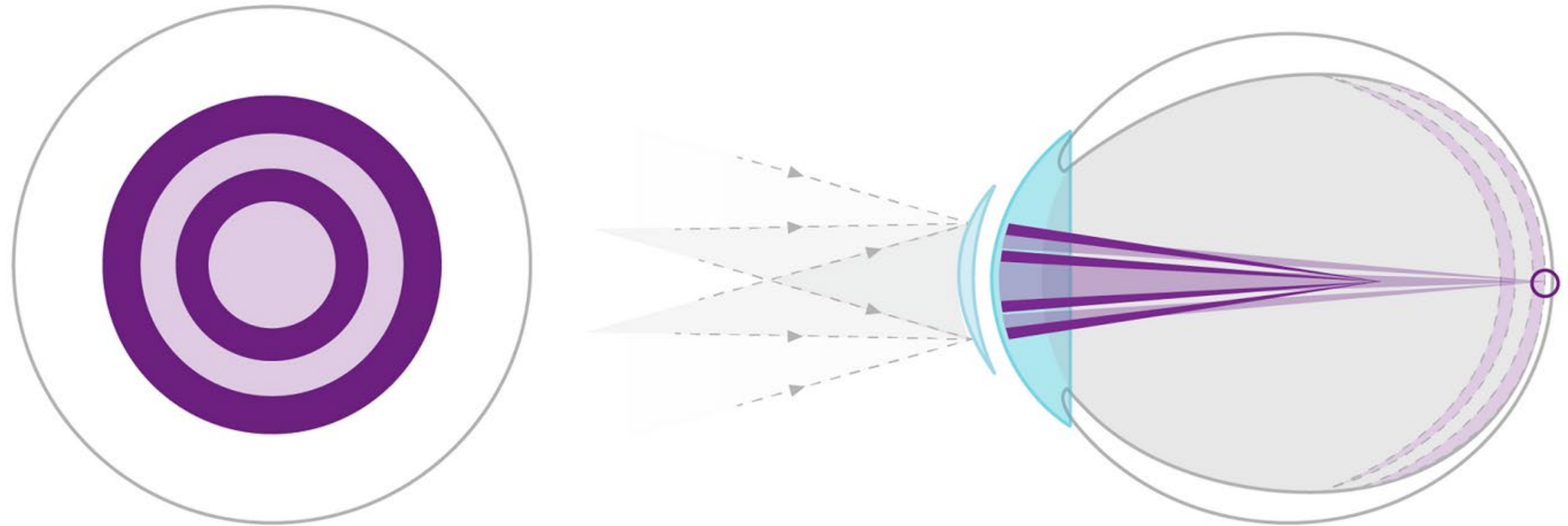
MiSight

FDA Approval Ranges

Age: 8-12 yo

Refraction:

- -0.75 D to -4.00 D SE
- ≤ 0.75 DC



- Treatment zones creating myopic defocus
- Correction zones

Multifocals

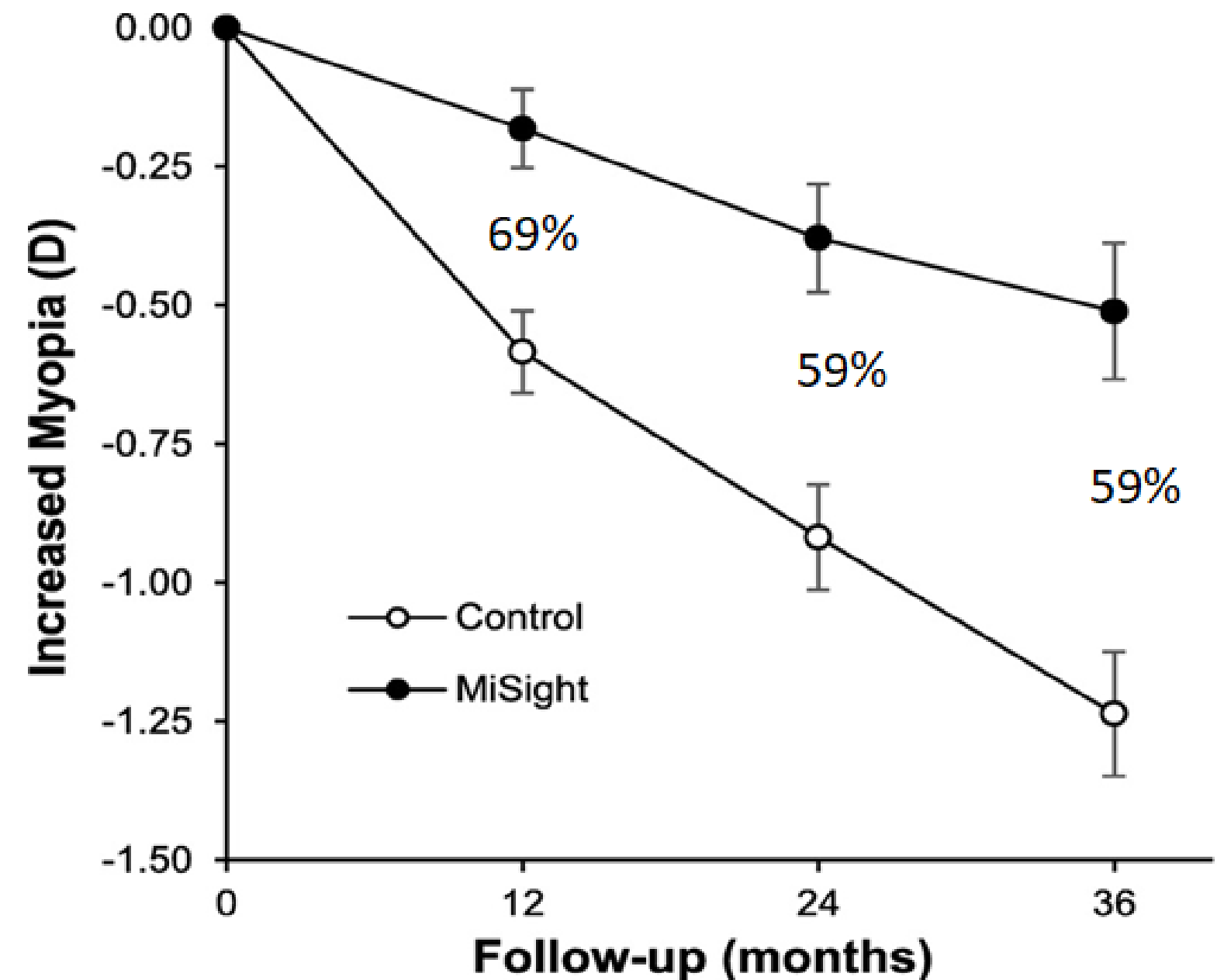
MiSight Results

Design:

- 109 children (8 - 12 years old)
- -0.75 to -4.00D of myopia and < 1.00D of astigmatism
- Fitted with either:
 - MiSight 1-Day
 - Proclear 1-Day

Results (3 years):

- -0.73 D (59%) reduction in myopia progression
- 0.32 mm (52%) reduction in axial elongation
- No cases of serious ocular adverse events reported.



Multifocals



6-Year Efficacy

2020 American Academy of Optometry Annual Meeting

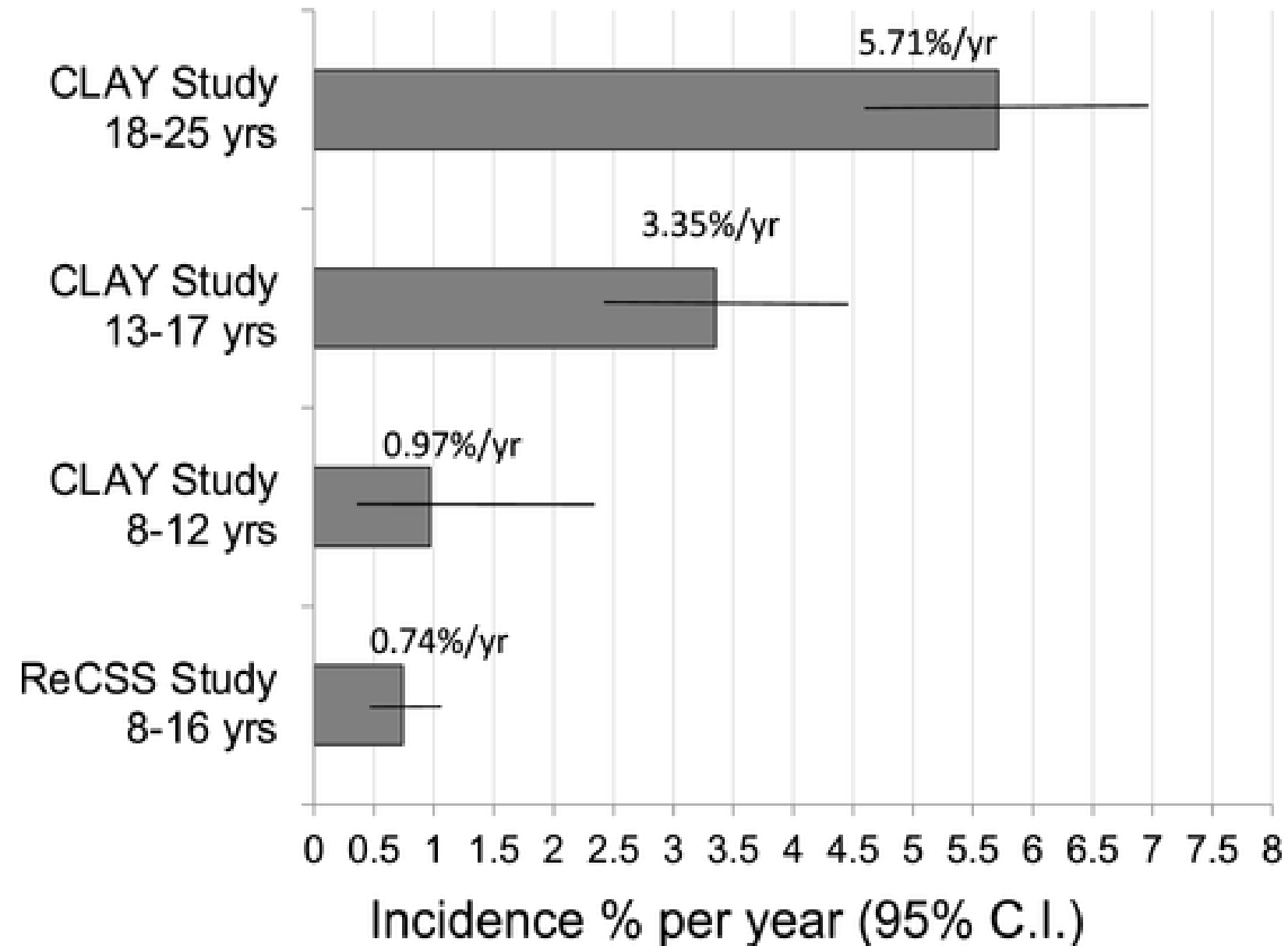
- 23% of eyes after year 6 displayed a total refractive change of less than $-0.25D$
- “Continued to demonstrated **excellent** safety profile, wearing time, and visual acuity for children in over 653 wearing years”

Multifocals

Safety

ReCSS Study

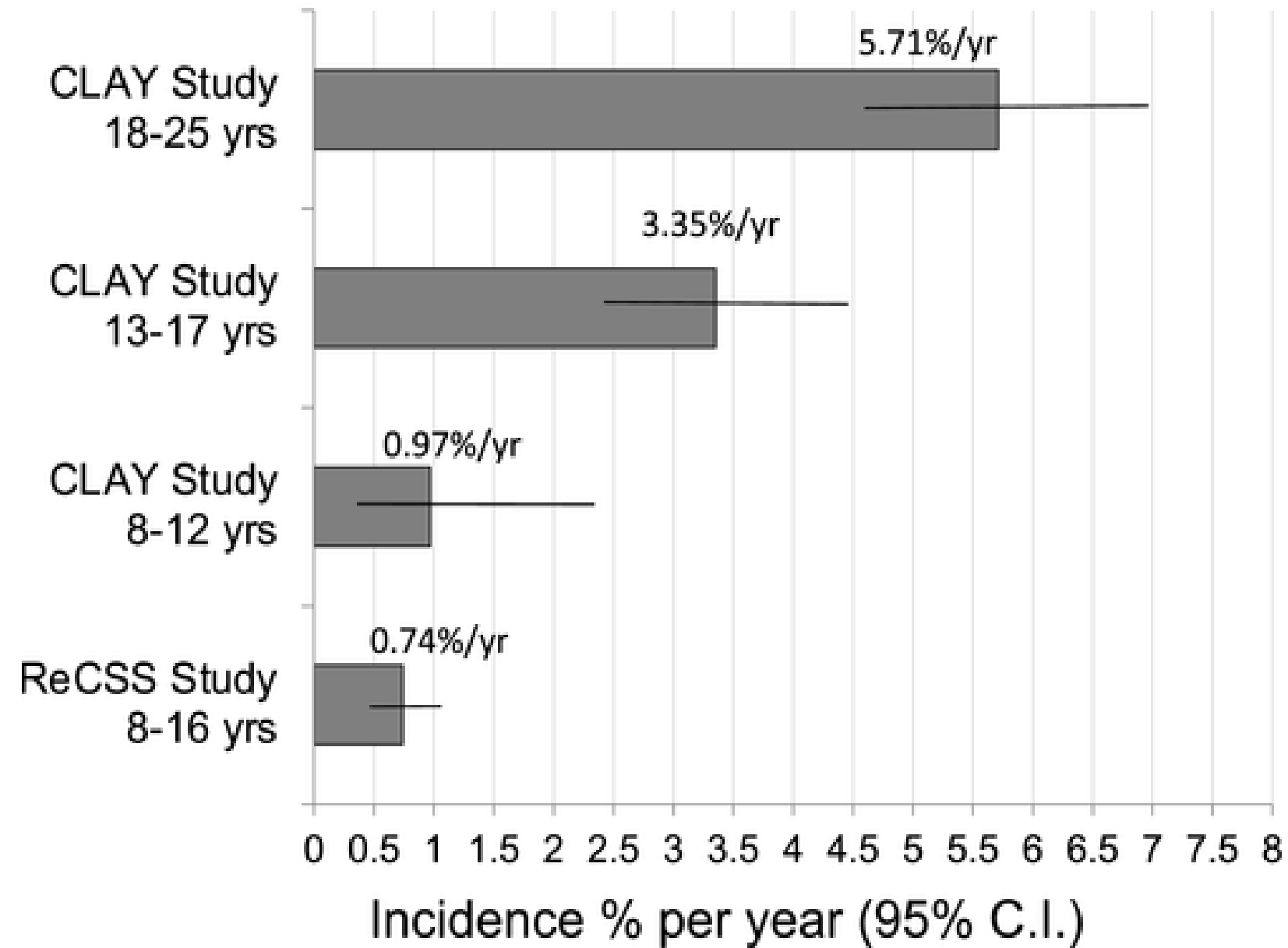
Retrospective Cohort Study of the Safety of Pediatric Soft Contact Lens Wear



- Studied children prescribed lenses <13 yo
- 1,000 children over 2,713 years of wear
- Annual incidence of inflammatory events: <1%
 - Conjunctivitis
 - FB abrasions
 - No vision loss

Multifocals

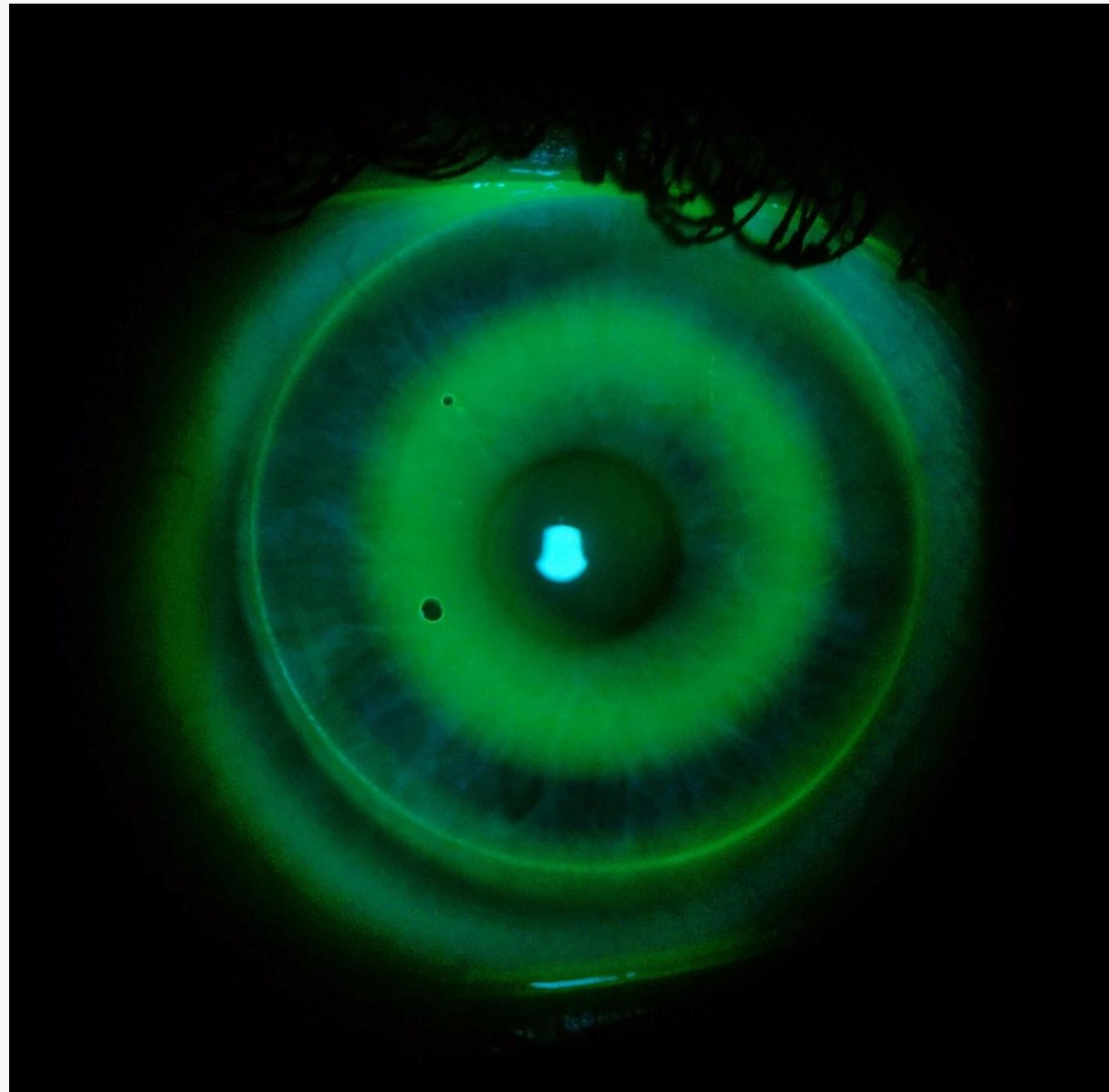
Safety



**“A daily disposable modality should be preferred
....solutions and storage cases are two major risk
factors for infectious and inflammatory events”**

Orthokeratology

Efficacy

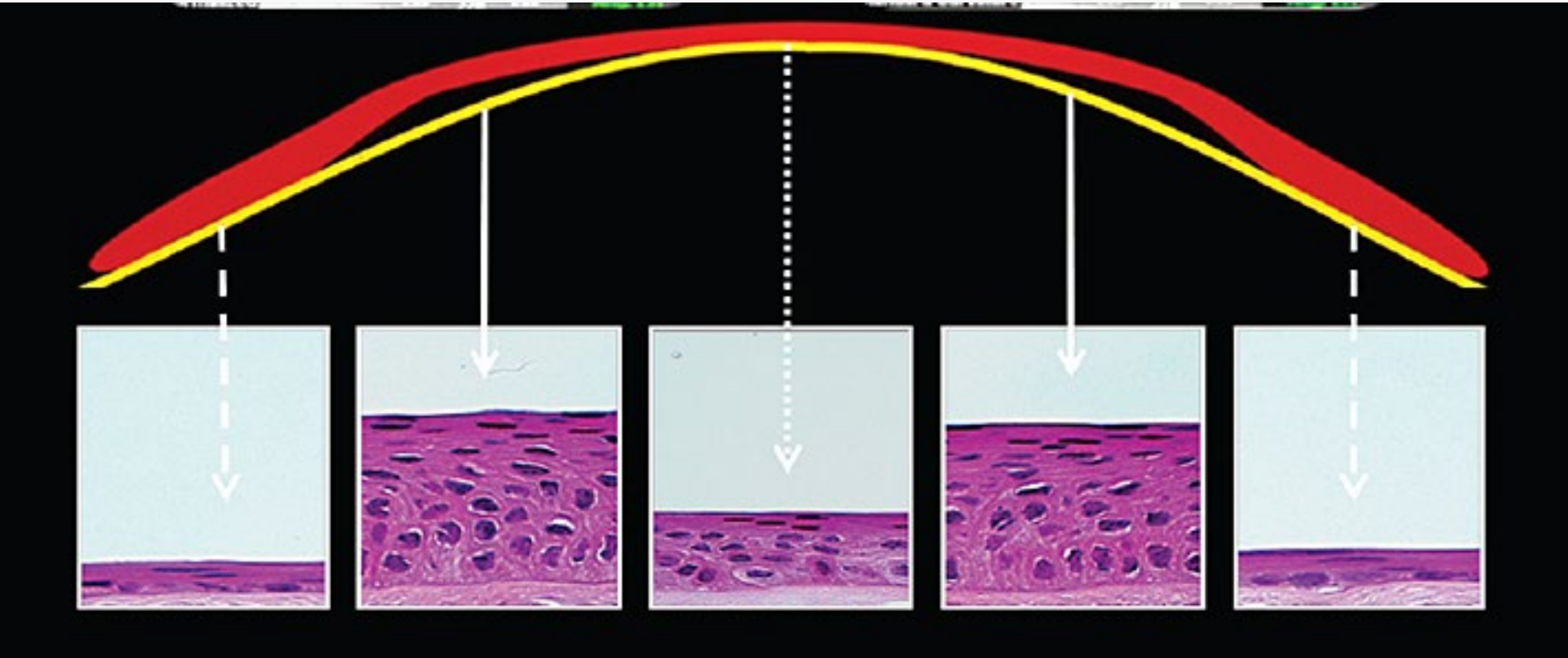


Reduces myopia progression by slowing axial length elongation **by slightly less than 50%** ; **ranging from 41 -45%** in most meta -analyses.

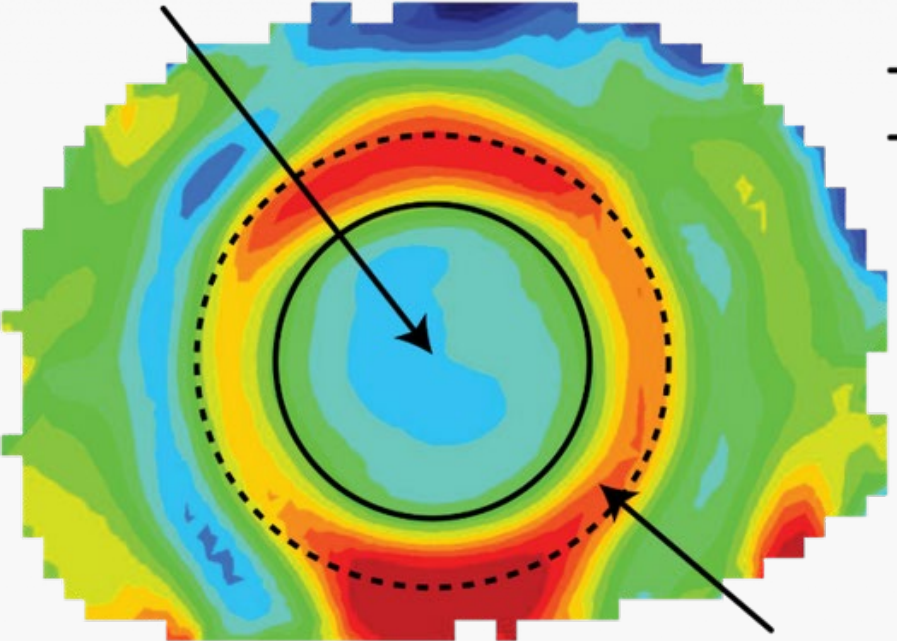
Orthokeratology



Mechanism of Action

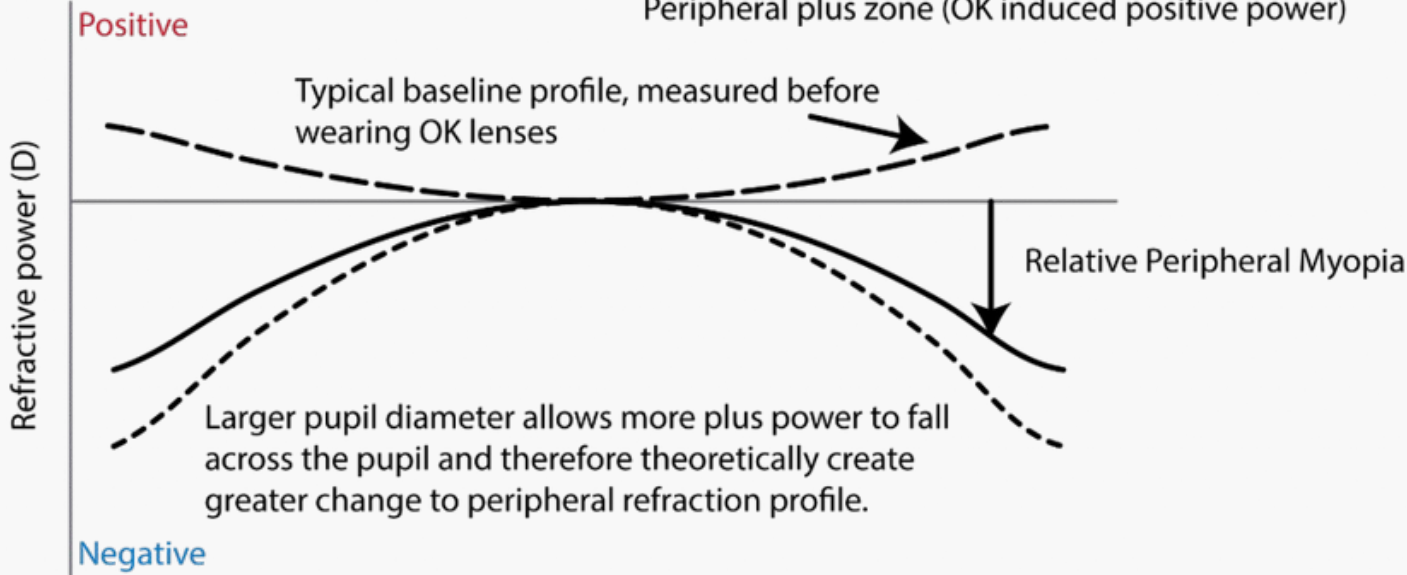


Central treatment zone (OK induced negative power)



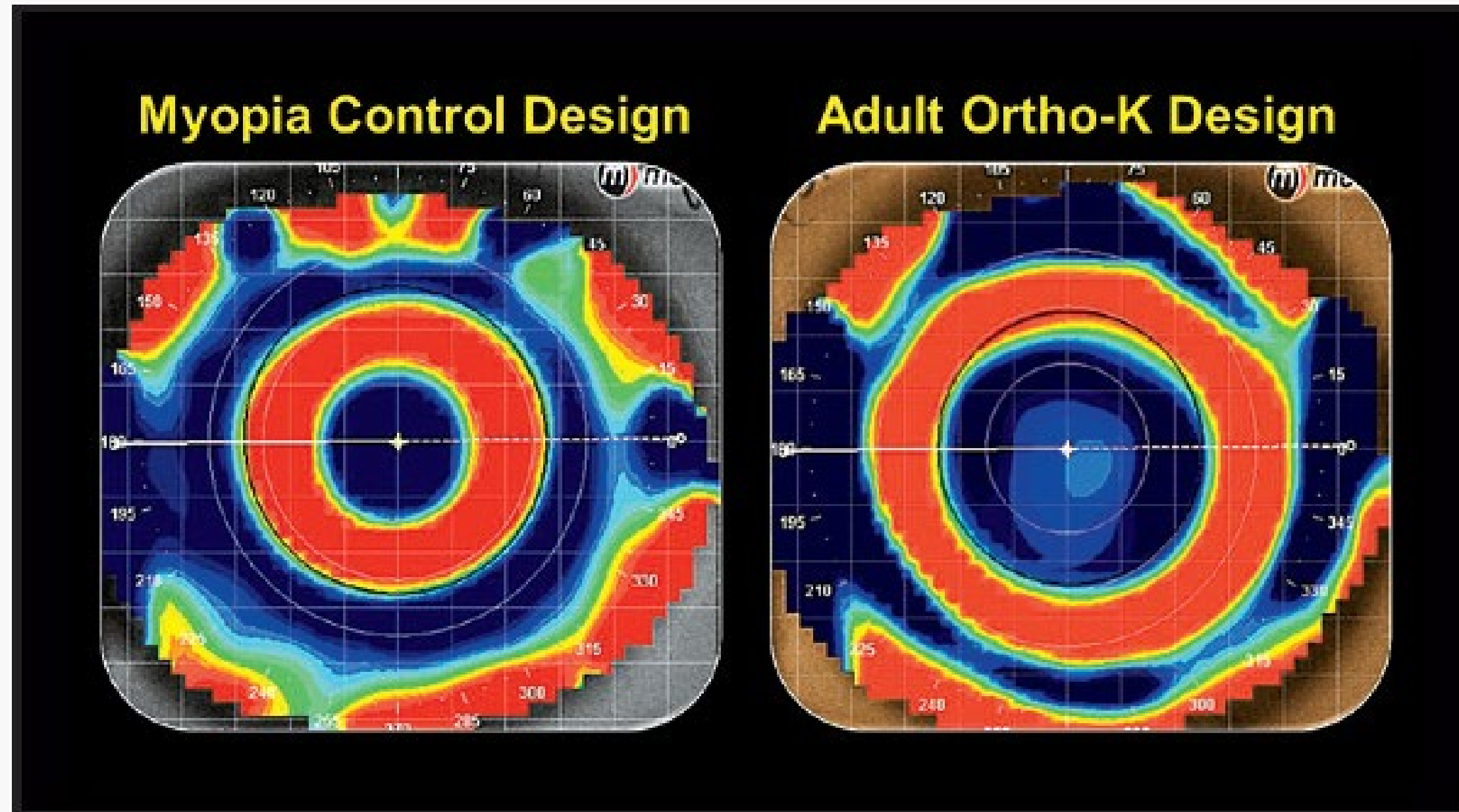
— Small pupil
- - - Large pupil

Peripheral plus zone (OK induced positive power)



Orthokeratology

Mechanism of Action



Orthokeratology

Safety

Risk of MK: 13.9 out of 10,000 years or patient wear

- Most common: **corneal staining**

No vision loss reported

Long term success requirements:

- Proper lens fits
- Rigorous compliance to CL care regimen
- Adherence to follow ups
- Timely ttx of complications



Low Dose Atropine

Efficacy

Dose-Dependent Response

- 0.01% - 27%
- 0.025% - 43%
- **0.05% - 67%**

Major Studies:

- ATOM 1
- ATOM 2
- LAMP



Low Dose Atropine

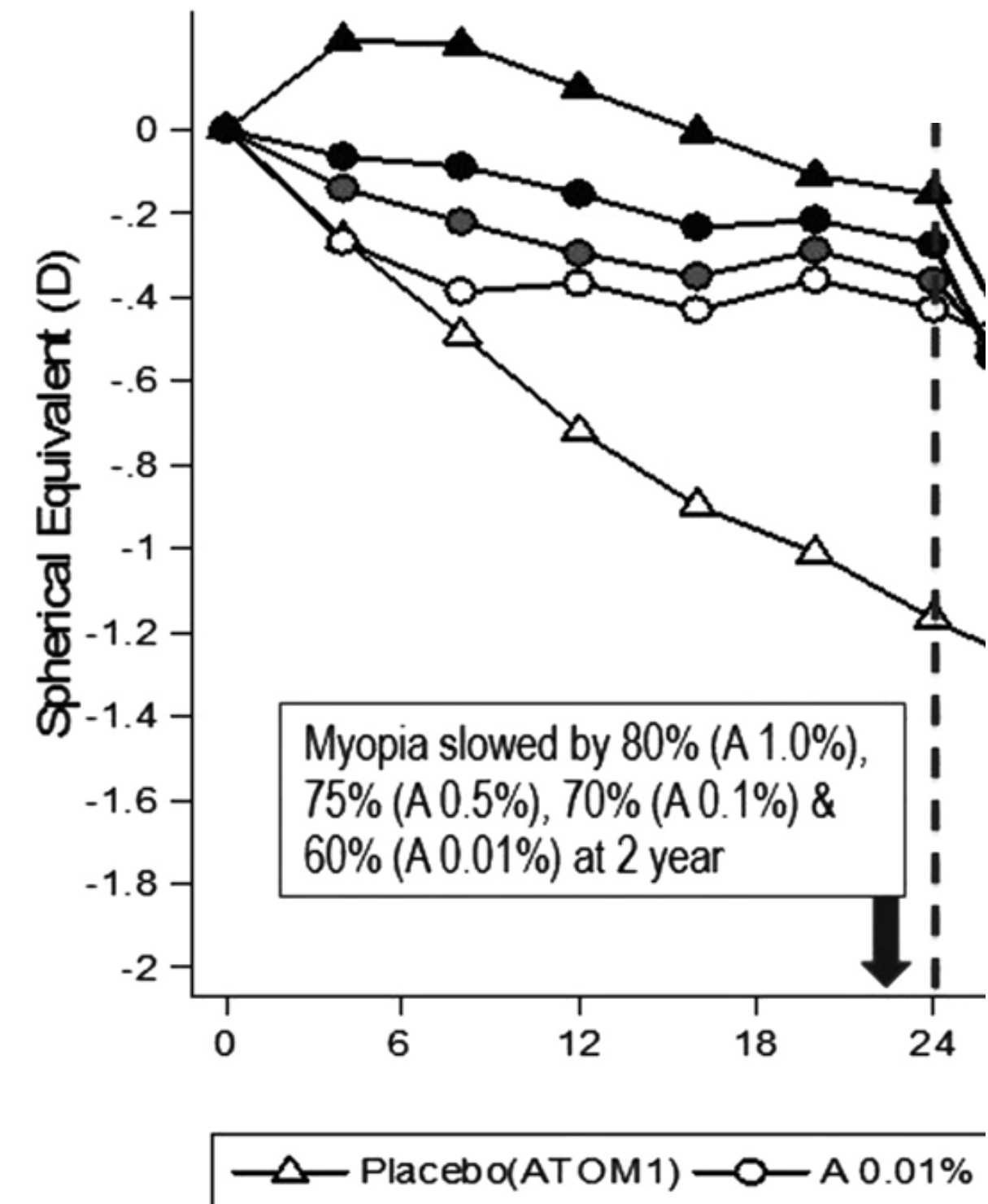
ATOM 1

Design

- 400 myopic children (6-12 yo)
- SE -1.00 to -6.00 D
- 1% atropine or saline drops
 - 1 gtt qd x 2 years

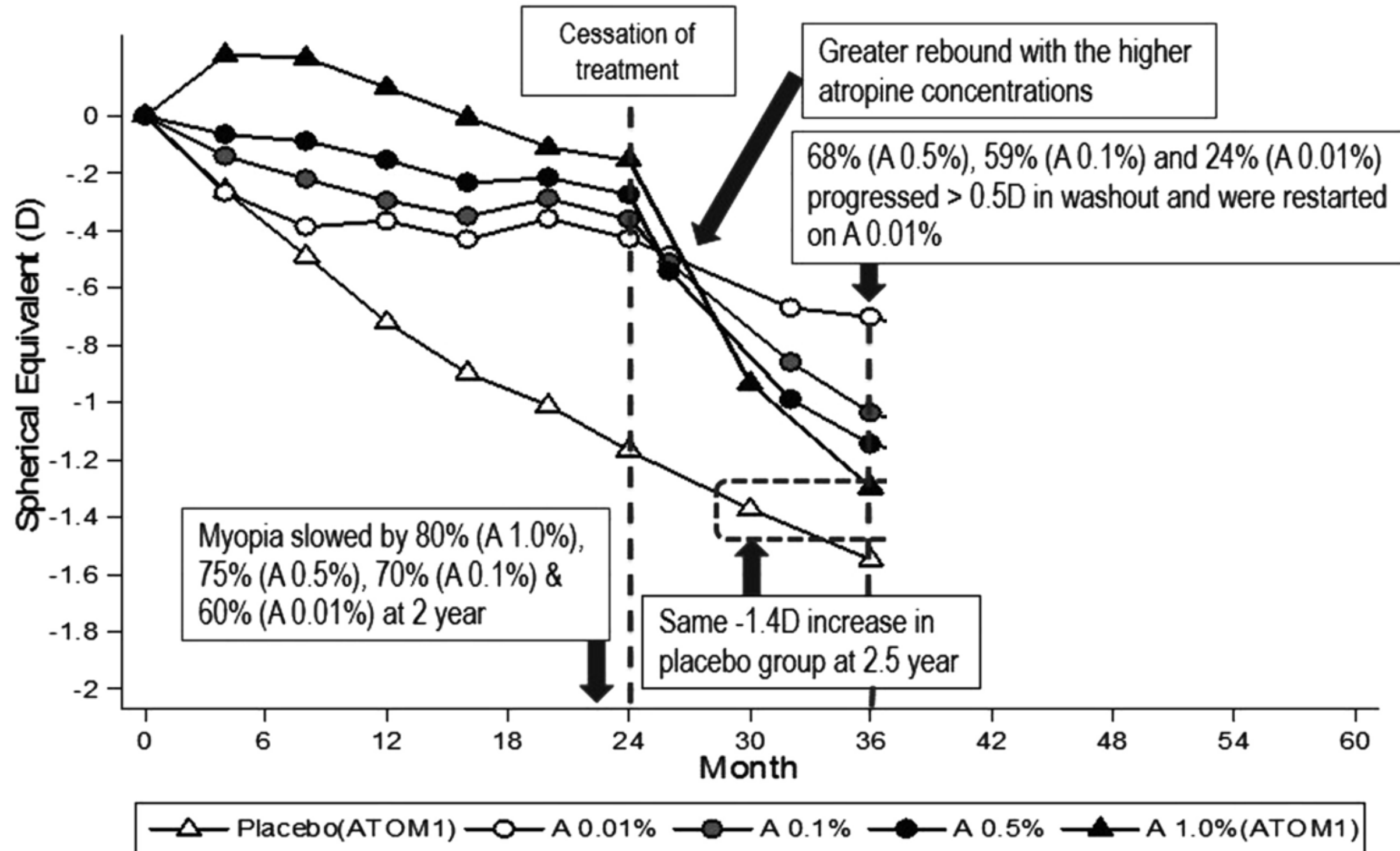
Results:

- 80% reduction



Low Dose Atropine

ATOM 1: Rebound



Low Dose Atropine

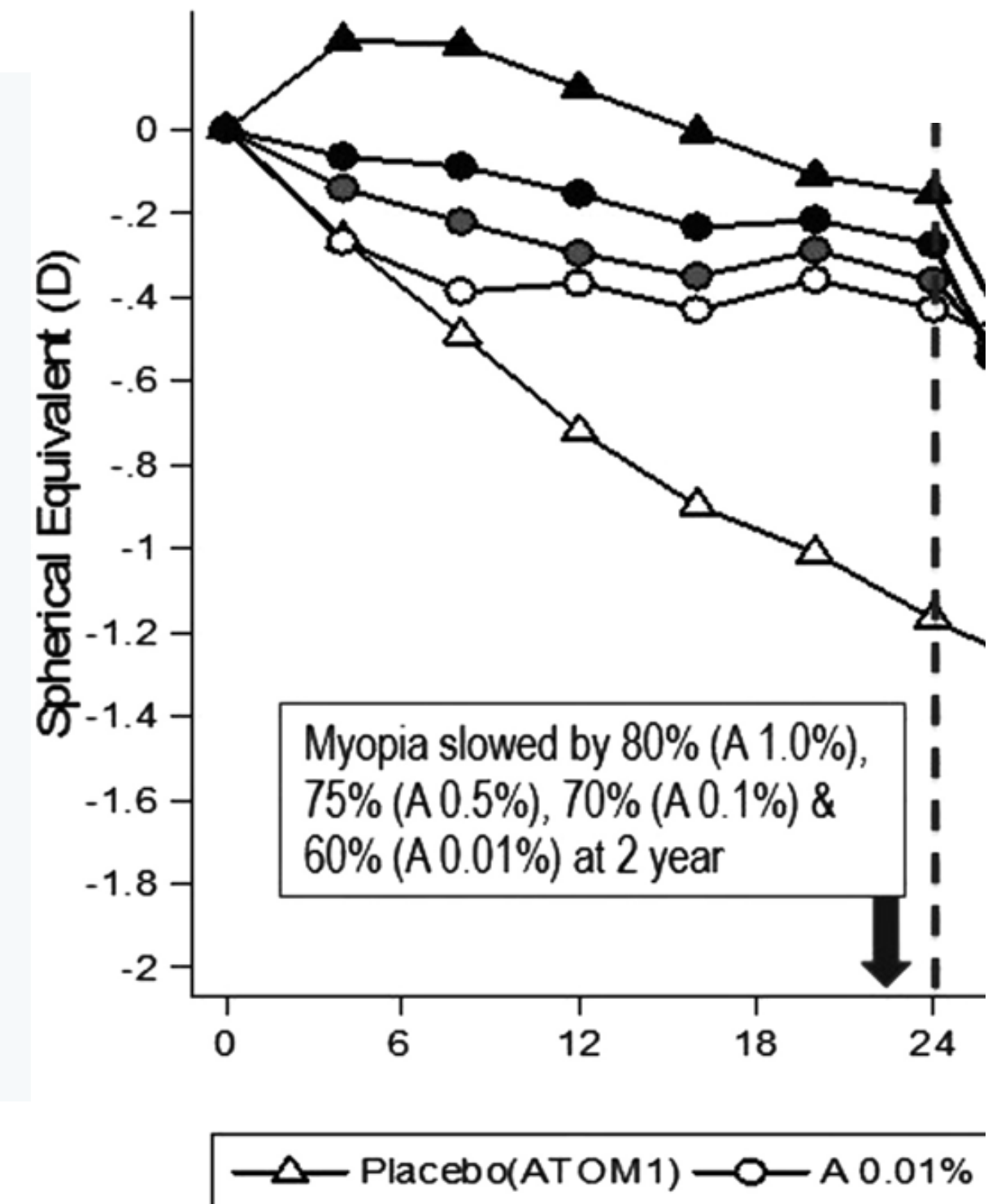
ATOM 2

Design

- Randomized into groups:
 - 0.5%
 - 0.1%
 - 0.01%

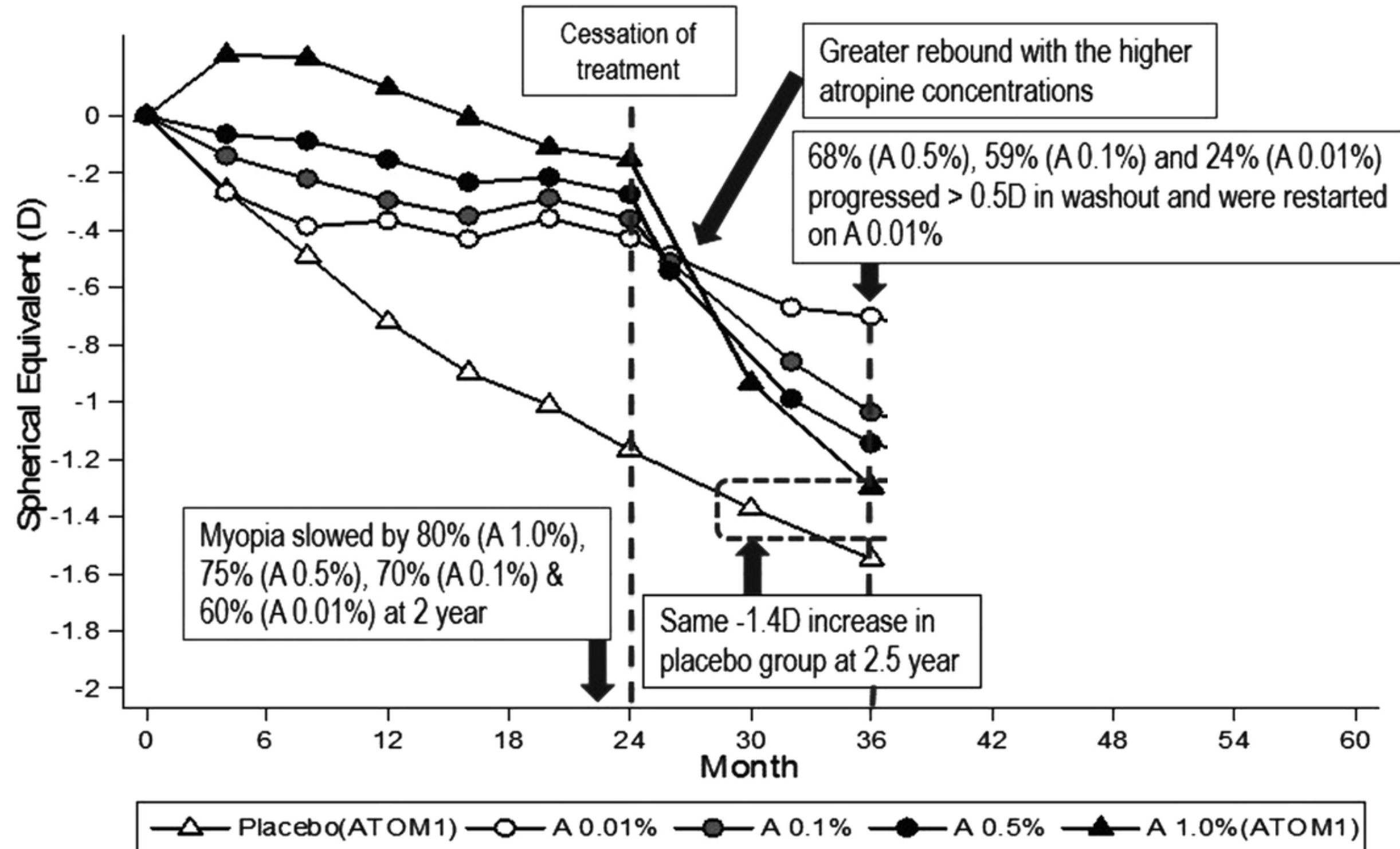
Goal:

- Compare safety and efficacy of lower doses of atropine



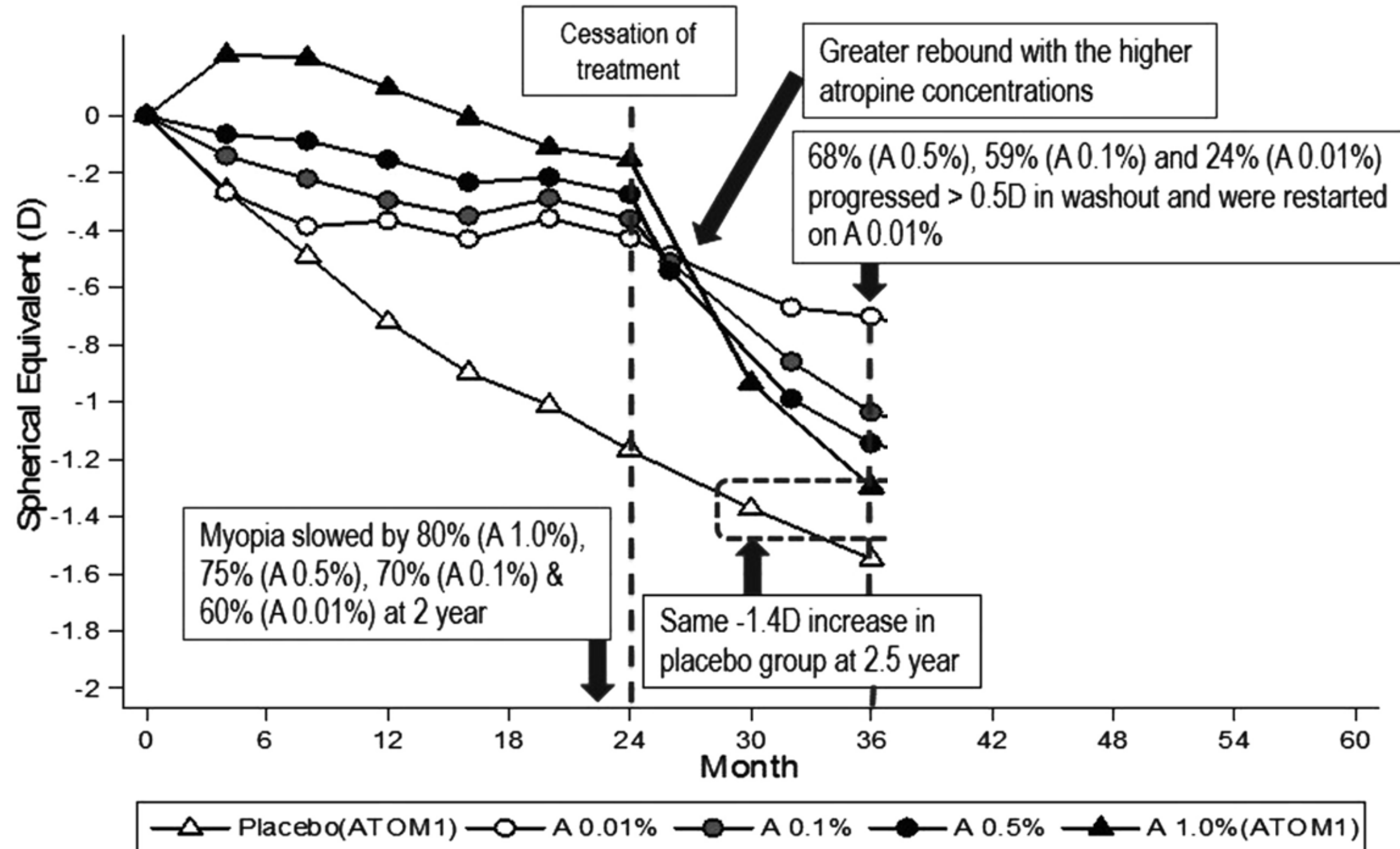
Low Dose Atropine

ATOM 2



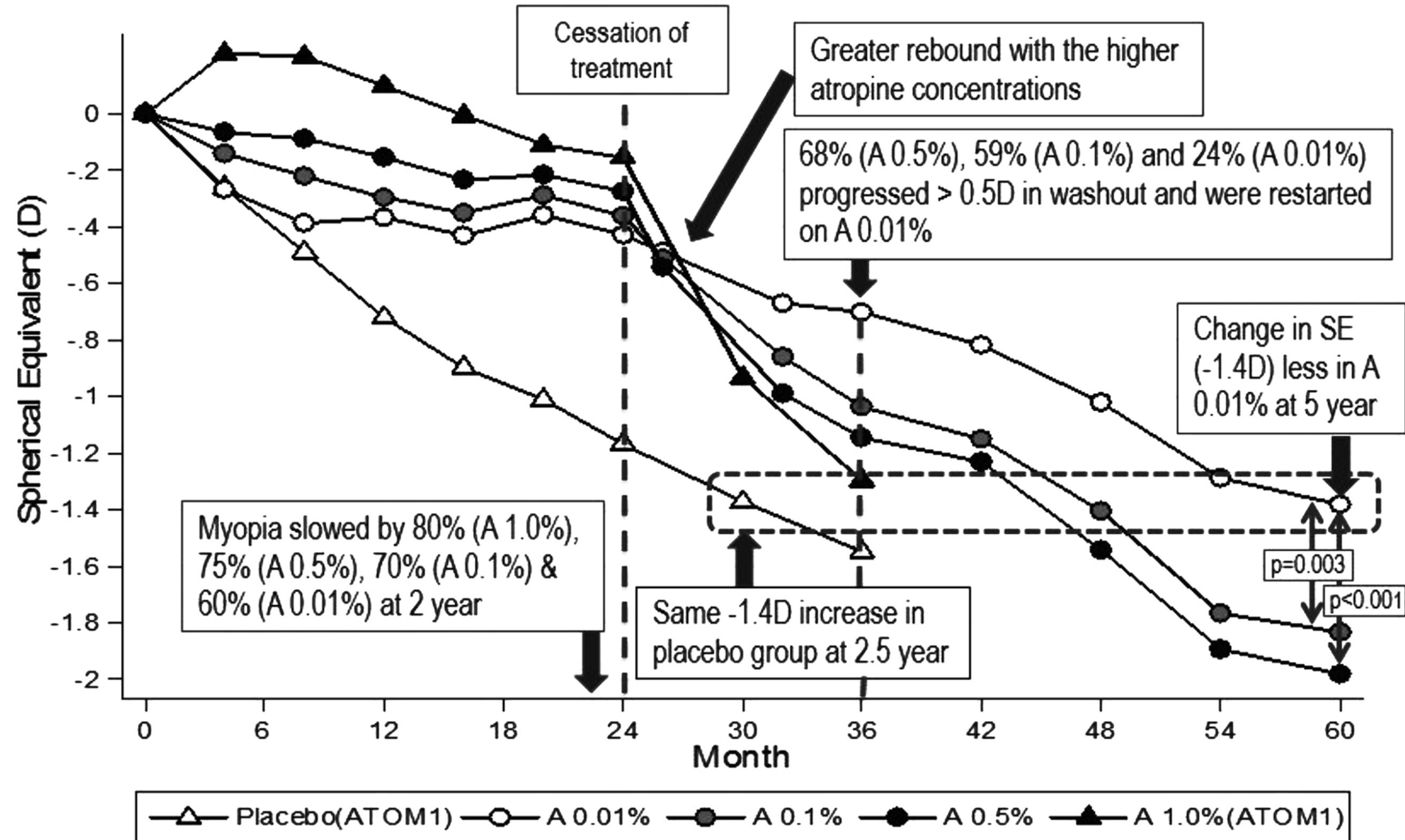
Low Dose Atropine

ATOM 2



Low Dose Atropine

ATOM 2

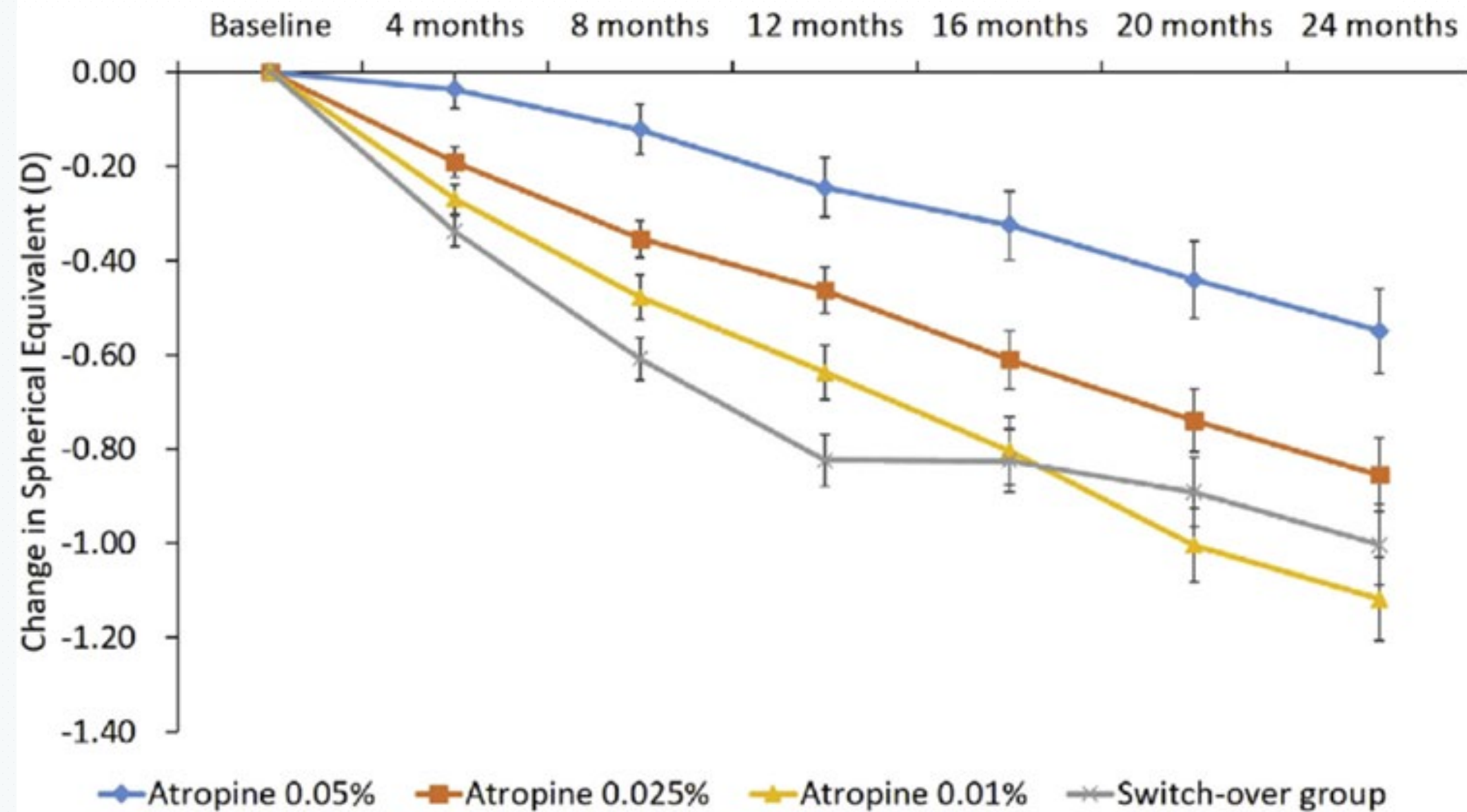


Low Dose Atropine

LAMP

Design

- 383 myopic children (4-12 yo)
- ≥ -1.00 D
- Randomized into groups:
 - 0.05%
 - 0.025%
 - 0.01%
 - Placebo
 - 1 gtt qd x 2 years



67%

43%

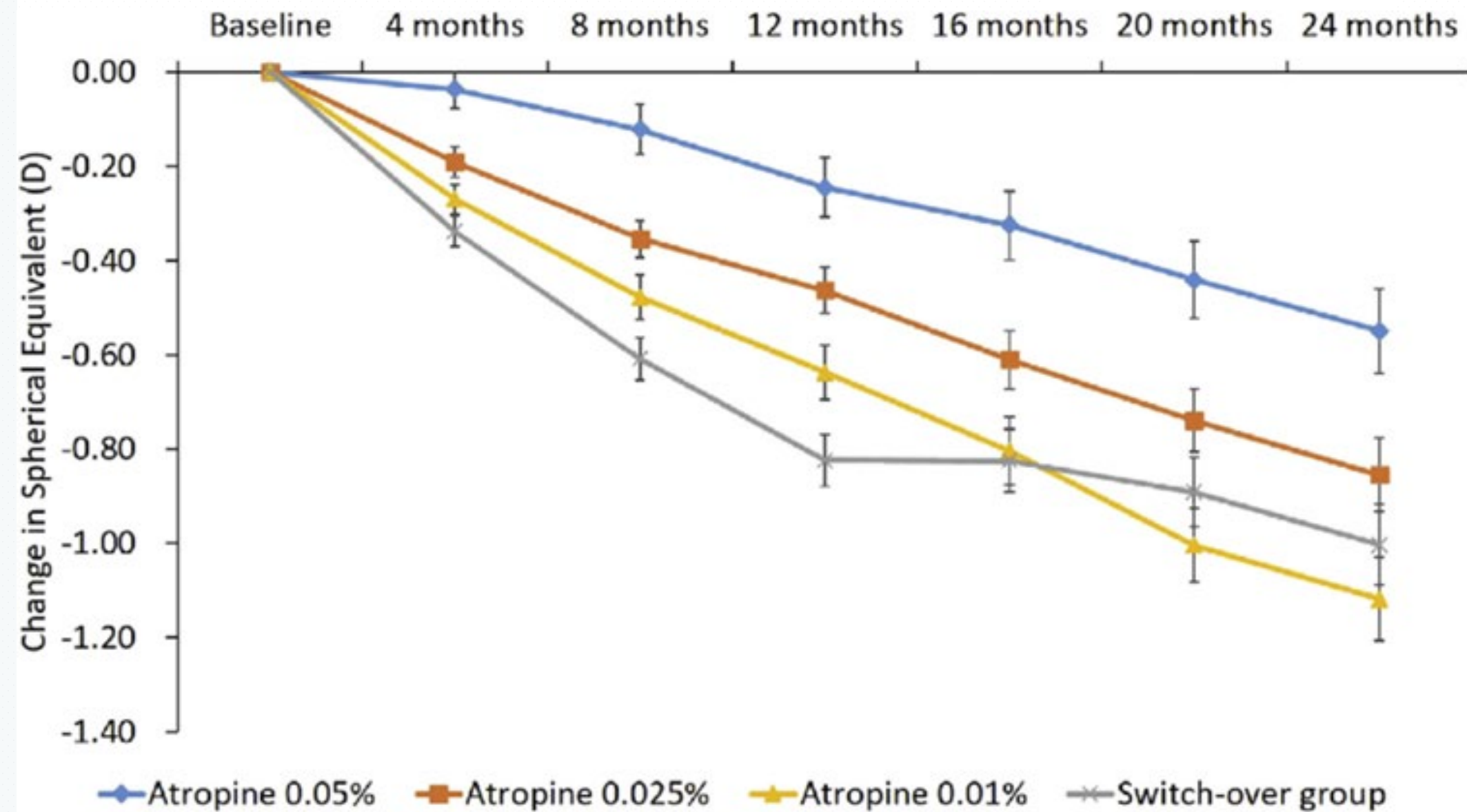
27%

Low Dose Atropine

LAMP

Design

- 383 myopic children (4-12 yo)
- ≥ -1.00 D
- Randomized into groups:
 - 0.05%
 - 0.025%
 - 0.01%
 - Placebo
 - 1 gtt qd x 2 years



67%

43%

27%

Low Dose Atropine

	ATOM 2			LAMP		
Atropine Dosage	0.5%	0.1%	0.01%	0.05%	0.025%	0.01%
Refractive Efficiency	75%	68%	59%	66%	43%	27%
Axial Efficiency	29%	25%	-8%	51%	29%	12%

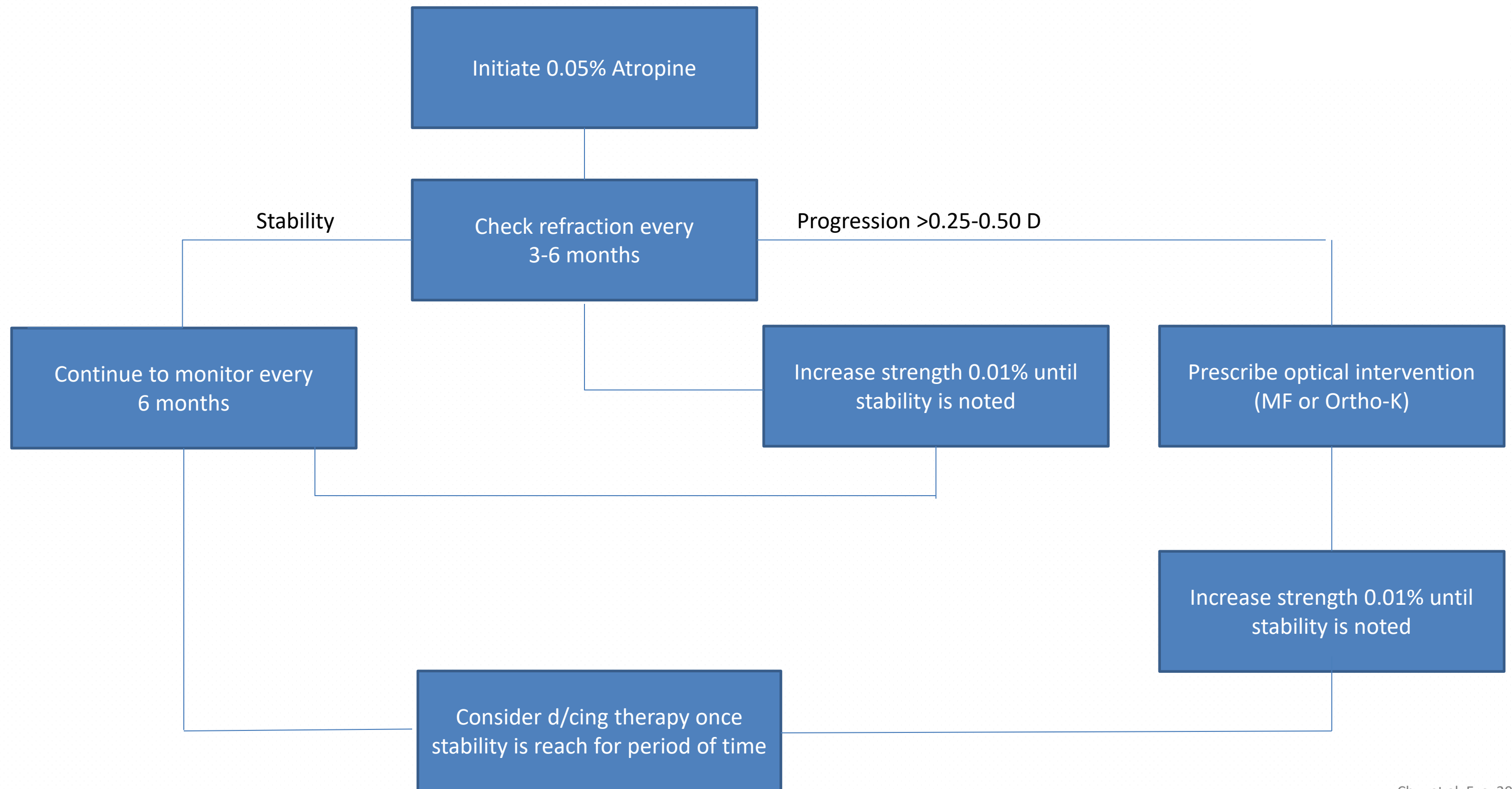
Low Dose Atropine

LAMP

	0.05% Atropine	0.025% Atropine	0.01% Atropine	Placebo
Photopic pupil size (+m m)	1.03	0.76	0.80	0.13
Photophobia, 2 weeks	31.2%	18.5%	5.5%	12.6%
Photophobia, 1 year	7.8%	6.6%	2.1%	4.3%
Photochromic Lenses	30.3%	34.3%	30%	39.6%
Accommodative Amp (D), 4 mo	-2.38	-1.34	-0.50	-0.35
Accommodative Amp (D), 1 yr	-1.98	-1.61	-0.26	-0.32
PALS	0.96%	0%	1.8%	0.9%

“Over 2 years, the efficacy of 0.05% atropine observed was double that observed with 0.01% atropine, and it remained the optimal concentration among the studied atropine concentrations in slowing myopia progression.”

Low Dose Atropine



Atropine MOA

Accommodative Pathway Theory

Accommodative Pathway - Blocks excessive accommodation

- Unlikely hypothesis:
 - Chicks lack muscarinic receptors in ciliary muscle
 - Myopia induced in species without accommodation system

Atropine MOA

Receptor Pathways in Retina, Choroid, &/or Sclera

Retina - Alters retinal neurotransmission

- Increases the release of dopamine in RPE

Choroid - Rapid & transient choroidal thickening

- Inhibited choroidal thinning secondary to hyperopic defocus

Sclera - Inhibition of glycosaminoglycan synthesis (scleral matrix)

Combination Treatments



0.05% Atropine + PALS

Treatment

PALS

SV specs

0.5% Atropine + PALS

Elongation

0.49 mm

0.59 mm

0.22 mm

Spherical Eq.

1.19 D

1.40 D

0.42 D

Combination Treatments



0.01% Atropine + Orthokeratology

Treatment

Ortho-K

Ortho-K + 0.01% Atropine

Elongation
(2 years)

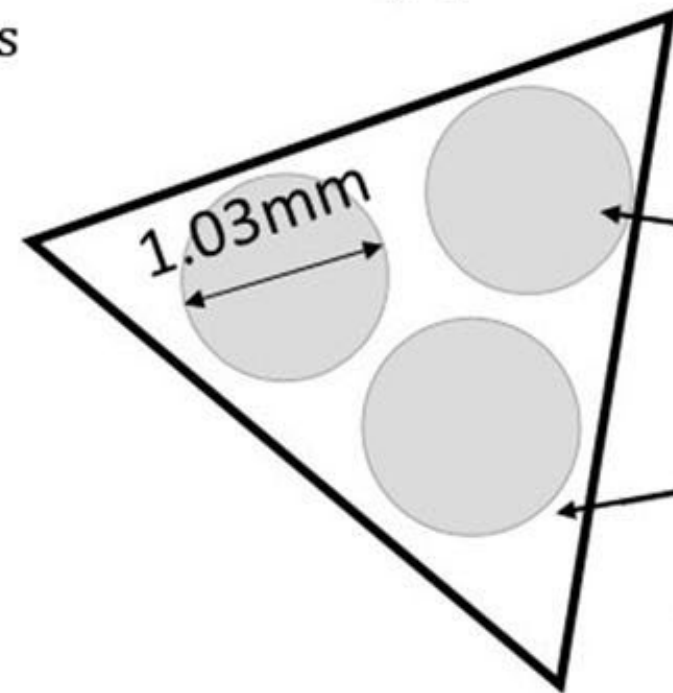
0.19 mm

0.09 mm

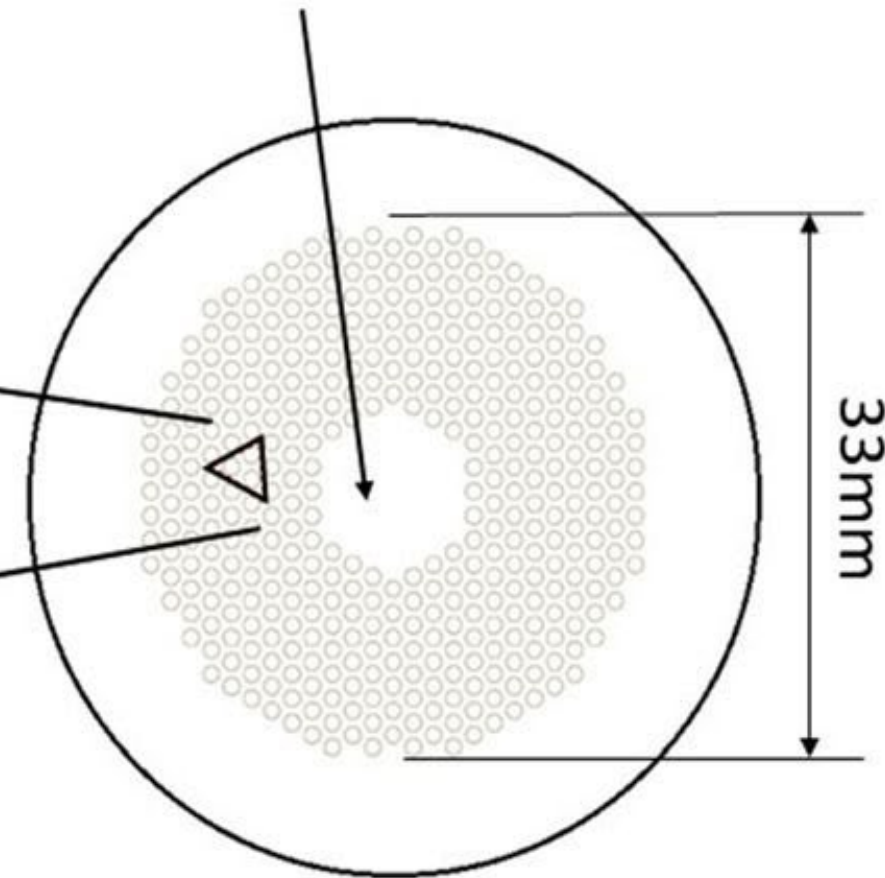
The Future

MiyoSight DIMS Technology (HOYA)

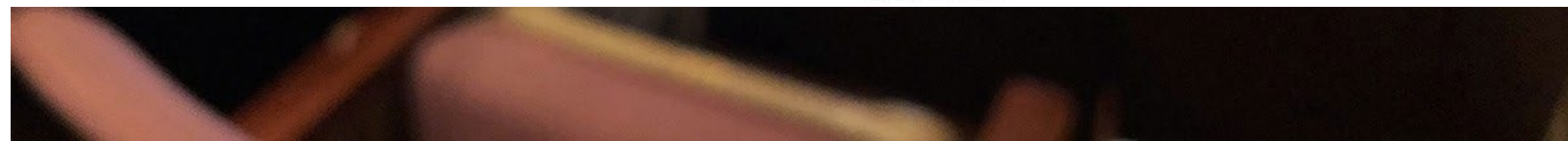
Schematic array of multiple segments; each 1.03mm in diameter and +3.5D myopic defocus



Central zone (9 mm in diameter) for distance refractive correction



About 400 multiple defocus segments (33 mm in diameter) surrounding the central zone



The Future

Stellest HALT technology (Essilor)



H.A.L.T. (Highly Aspherical Lenslet Target)

The Future

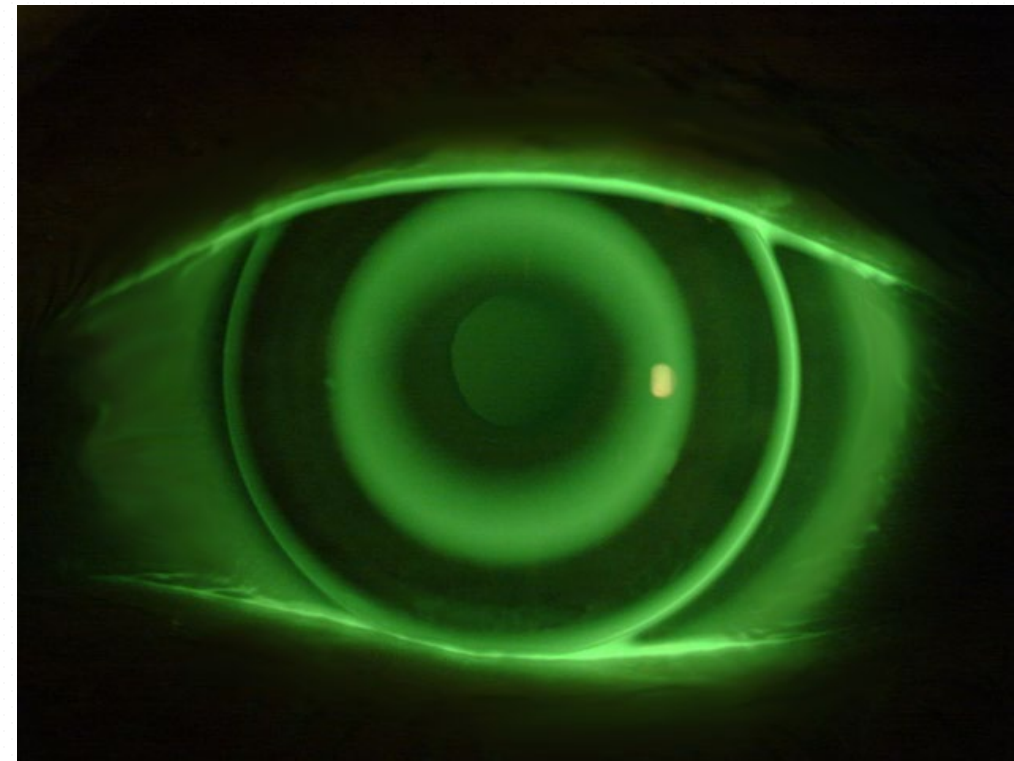
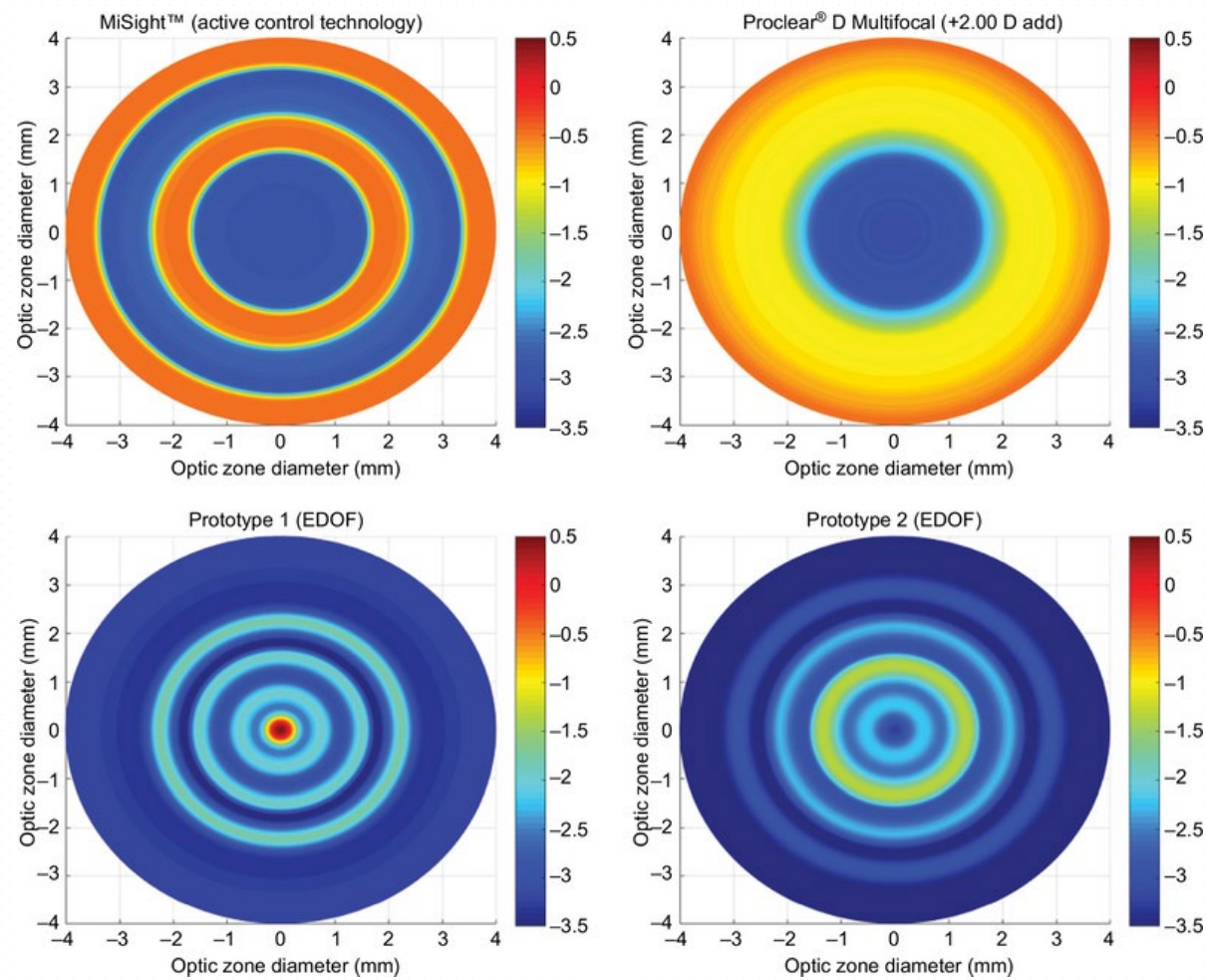
.....
D.O.T Lens technology (SightGlass Vision)

Diffusion optics technology (DOT):

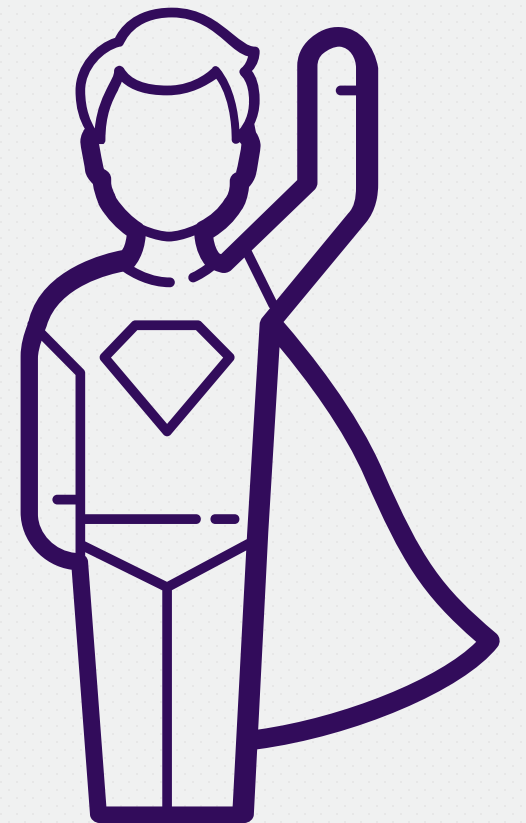
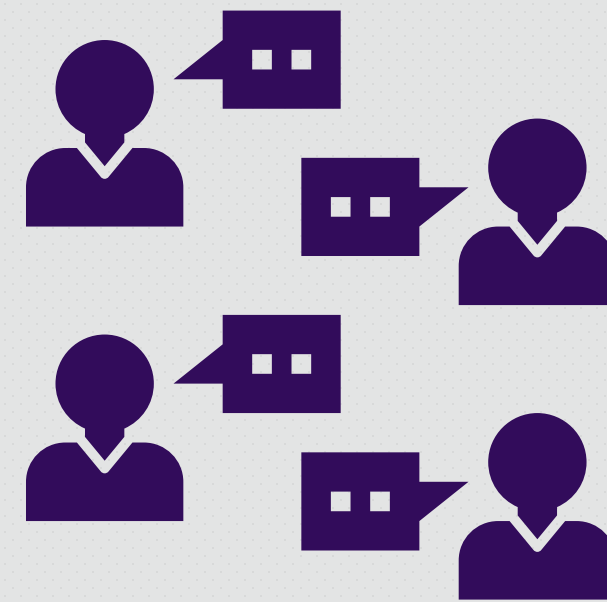
- Reduce the peripheral retinal contrast by 1/3 to 1/2 compared to central or on-axis contrast.
- Based on theory that high contrast signals at retinal photoreceptors induce the eye to grow and low contrast induce the eye to slow the axial growth.

Myopia Management

Clinically Proven & Effective Modalities



Why Myopia Management?



A top-down view of a desk with a laptop on the left, a calculator, a spiral notebook, and wooden stamps on the right. The background is a light orange color.

THANK
YOU

**ANY
QUESTIONS?**

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