

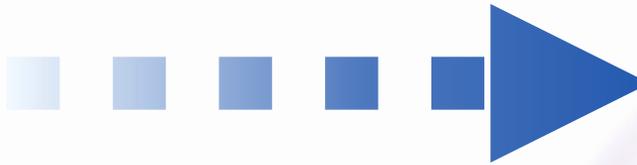


**Slowing myopia**  
with ZEISS MyoCare

# Changing the trajectory with myopia control approaches: Spectacle lenses



**2010**  
MyoVision



**Today**  
MyoCare



# More than 10 years managing myopia

## 10 years at glance



ZEISS has been engaged in the myopia control research for over 20 years to develop spectacle lenses with the **accommodation lag management technology**.

We have also been collaborating with Vision CRC since 2007 (known as BHVI) on the development of spectacle lenses for the **peripheral blur management**, that, in addition to providing optimal correction of myopic ametropia, may also contribute to the slowing down progression of myopia in children.

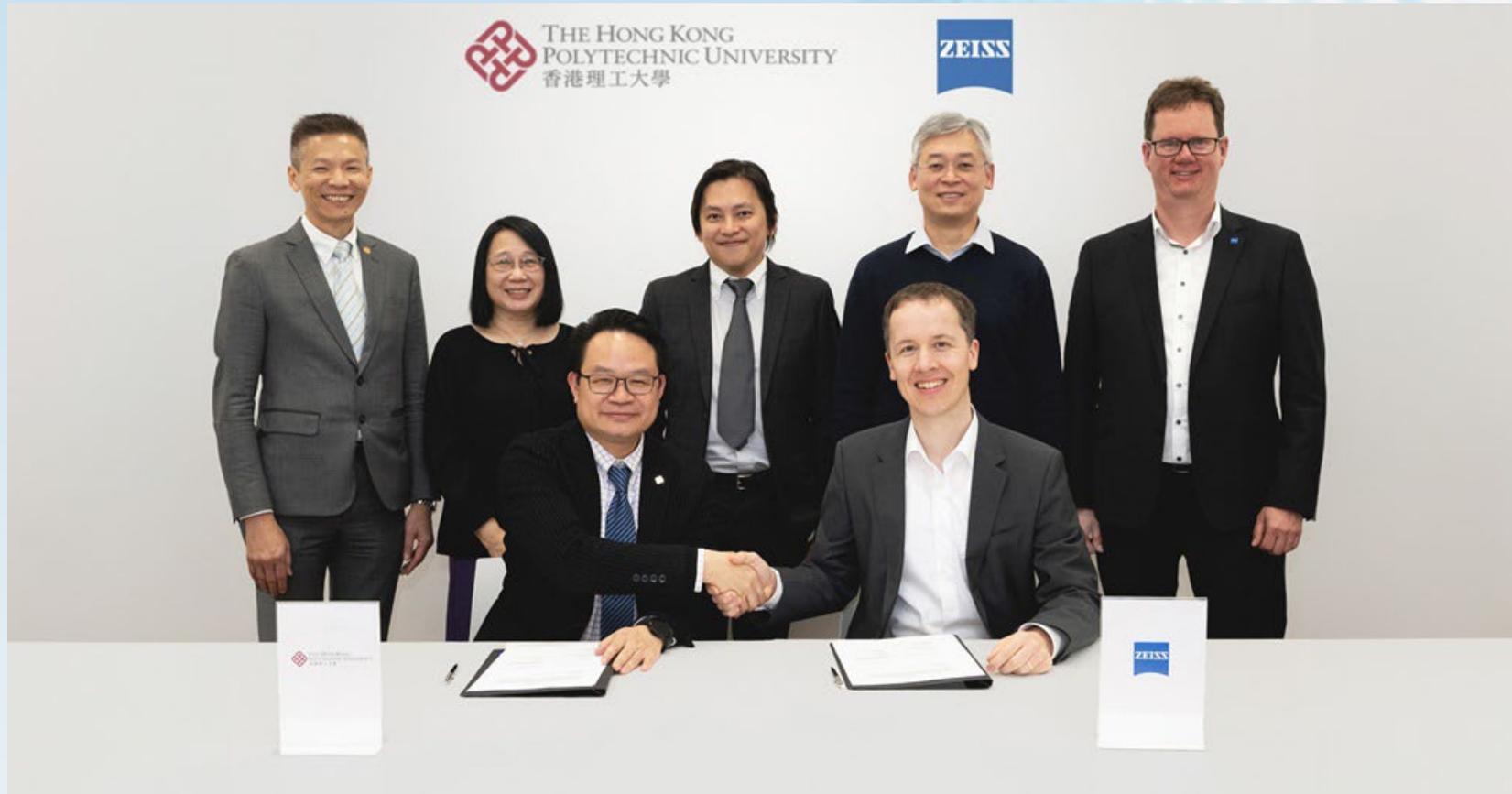




# Knowledge Transfer of PolyU Technology



PolyU licenses the **DISC spectacle lens patent family (including CN103097940)** to Carl Zeiss, and commence research collaboration on myopia management technologies and beyond



PolyU delegates visited Aalen, Germany on 18<sup>th</sup> Apr, 2024

# Myopia Management Lens Design invented by PolyU (2018)



## Defocus Incorporated Multiple Segments (DIMS)

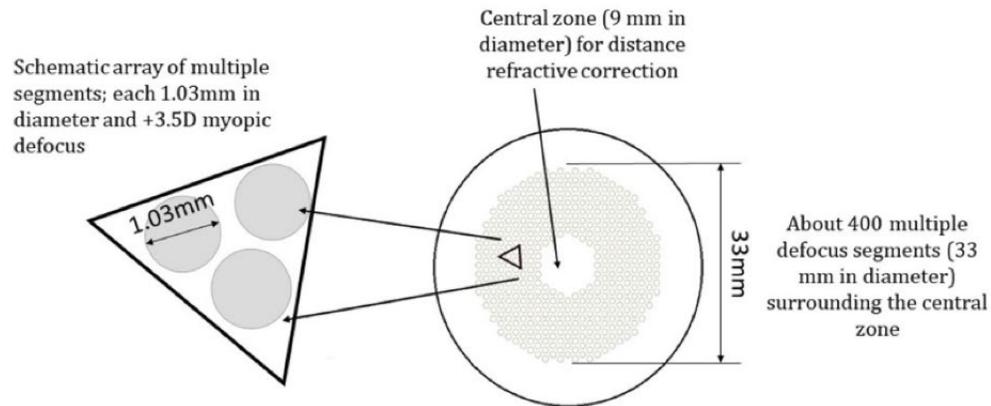
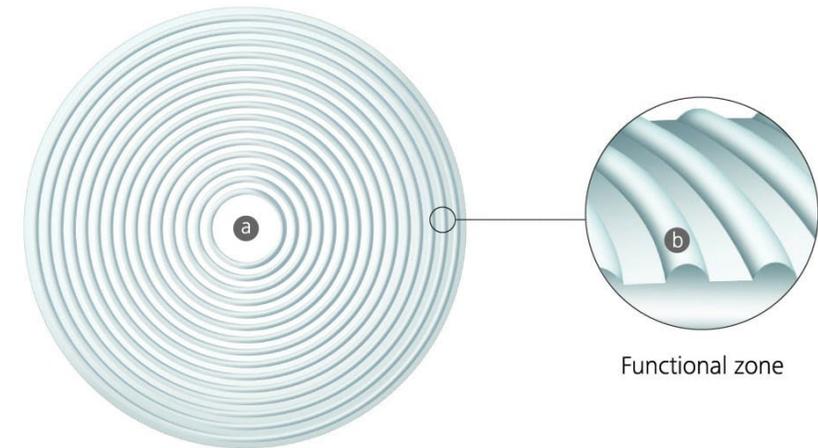


Figure 1 The design of the Defocus Incorporated Multiple Segments (DIMS) spectacle lens.

364

Lam CSY, et al. *Br J Ophthalmol* 2020;104:363–368. doi:10.1136/bjophthalmol-2018-313739

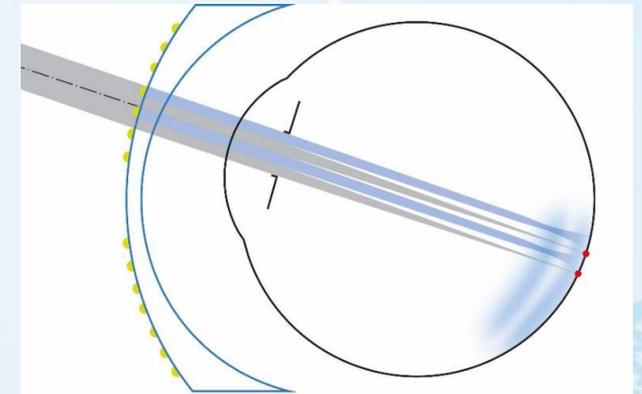
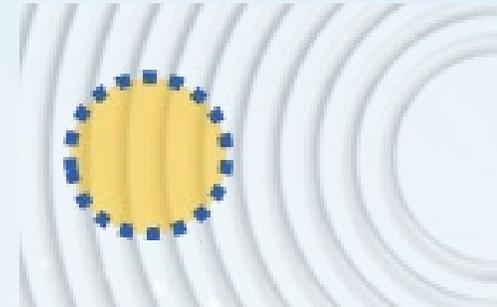
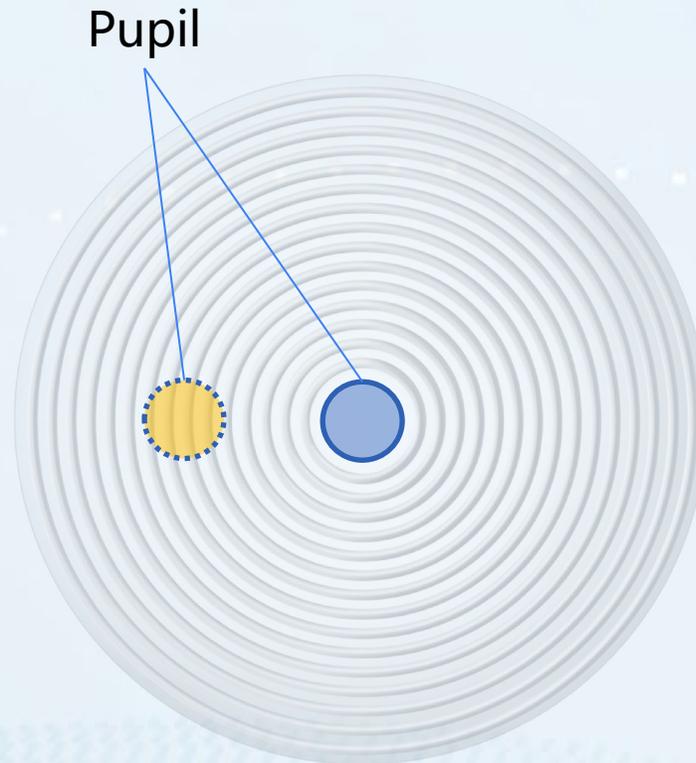
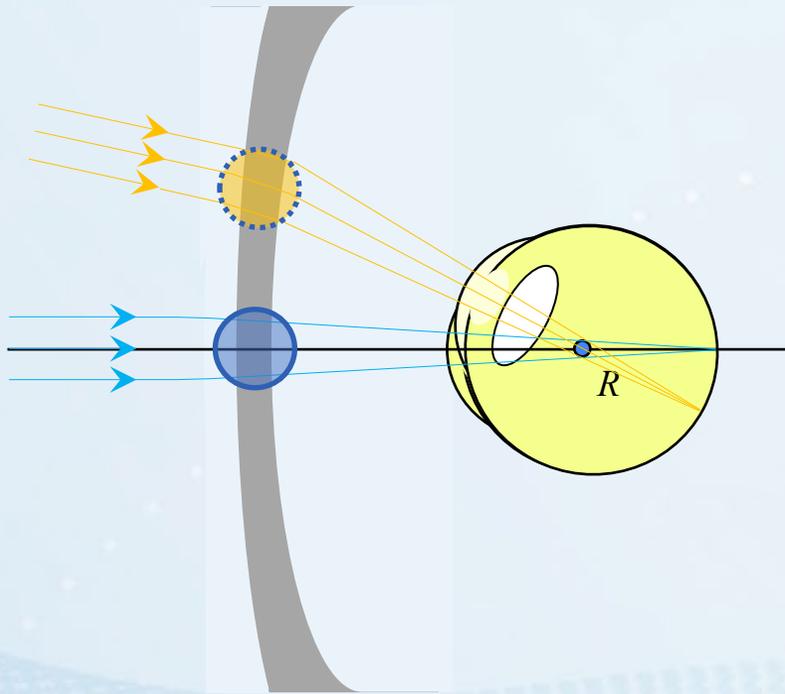
## Defocus Incorporated Soft Contact (DISC) technology



a Central clear zone

b ZEISS C.A.R.E.® technology  
(Cylindrical Annular Refractive Elements)

# From D.I.S.C. to C.A.R.E.



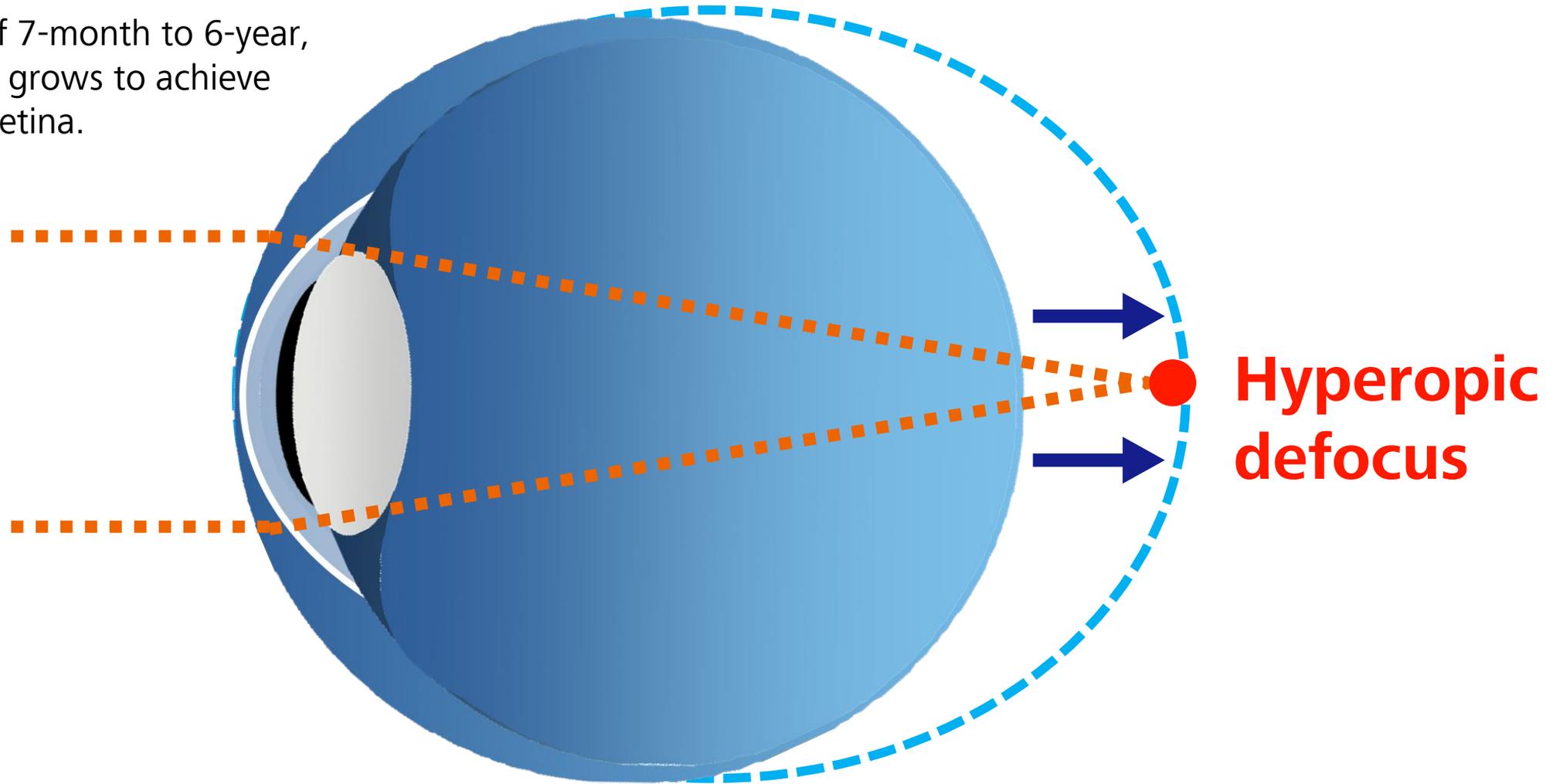
**01**

# **Myopia Management:**

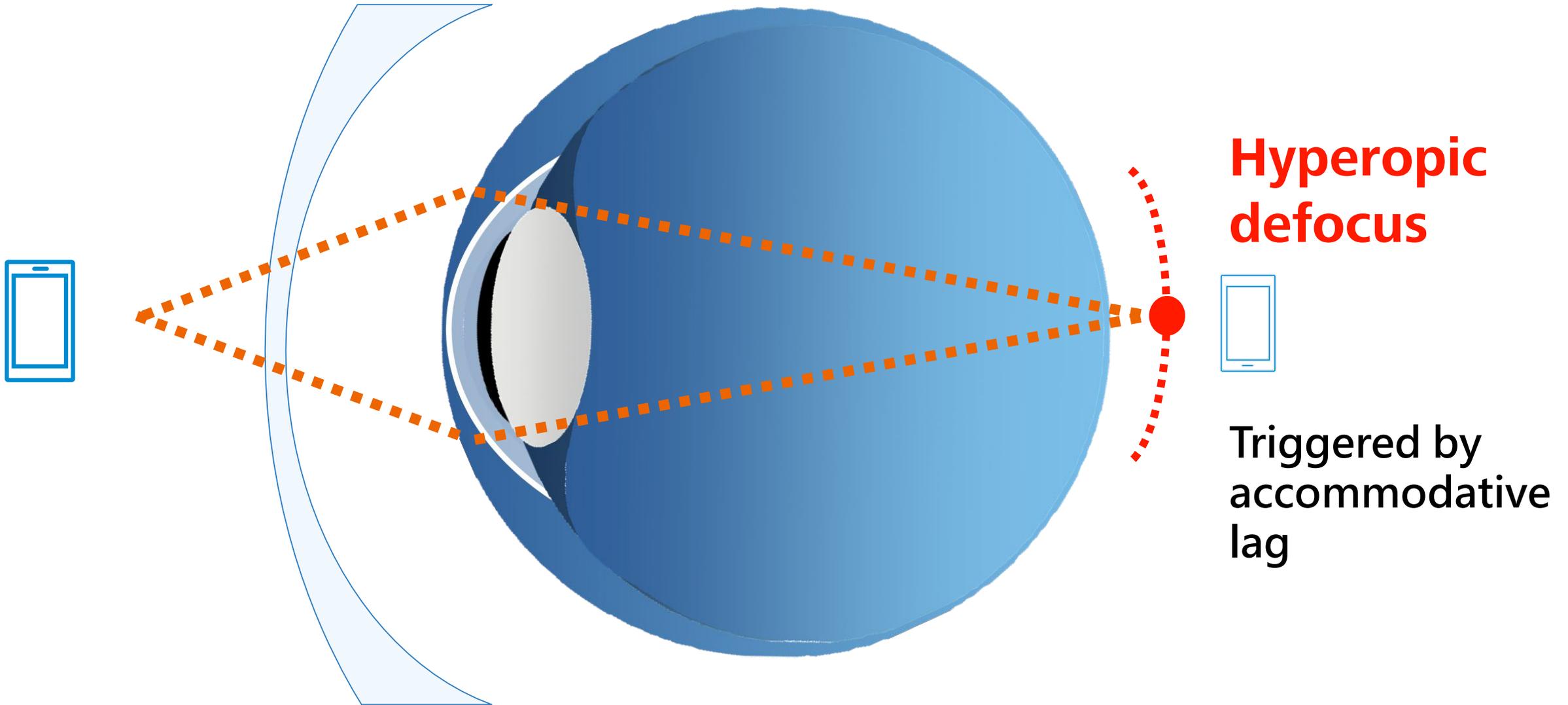
Consolidated Concepts On Myopia Progression

# Emmetropization

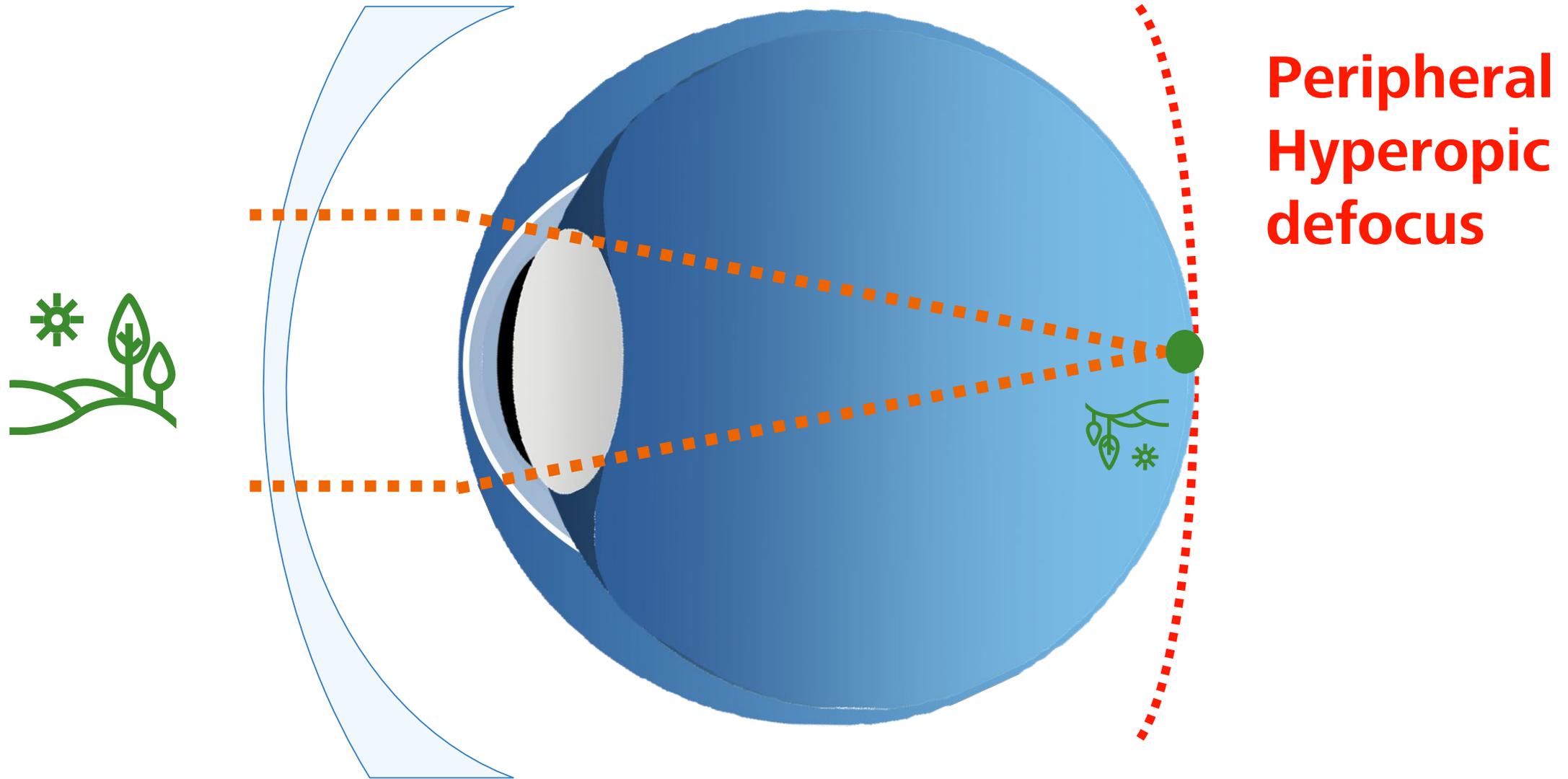
During the age of 7-month to 6-year, the eye gradually grows to achieve clear images on retina.



# Hyperopia defocus stimulates myopia development

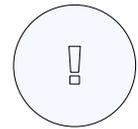


# Hyperopia defocus stimulates myopia development

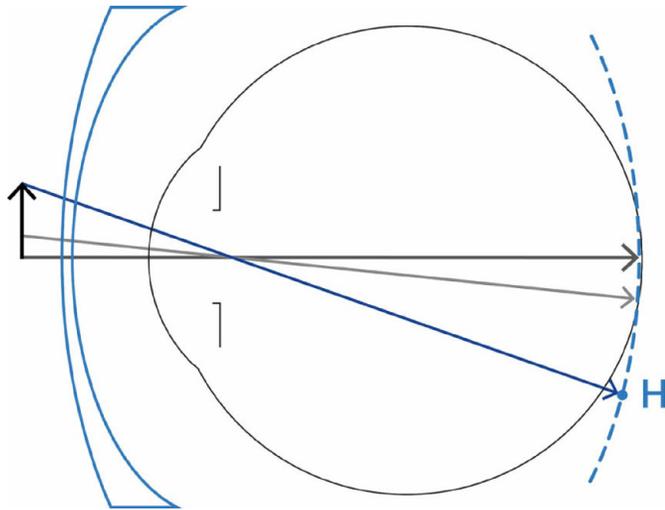


# Consolidated Concepts on Myopia Progression

## Peripheral Defocus Theory

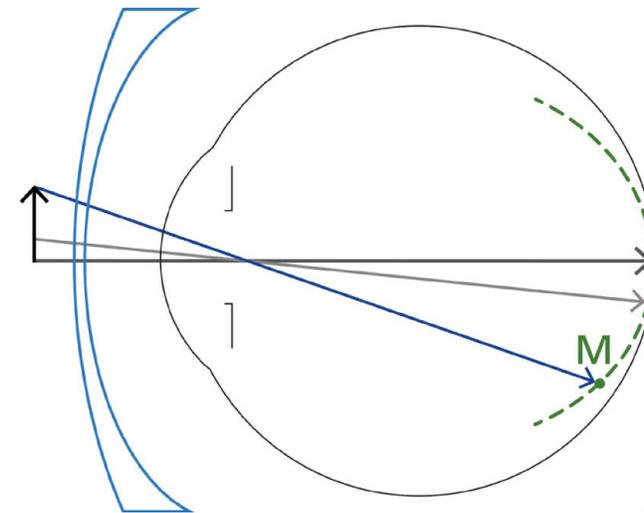


**Peripheral defocus theory:** To reduce the progression of myopia and inhibit eye length growth, targeted myopic defocus in the retinal periphery is created.



### Peripheral hyperopic defocus:

may stimulate myopia development even in the presence of a focused foveal image.

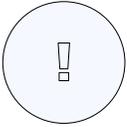


### Peripheral myopic defocus:

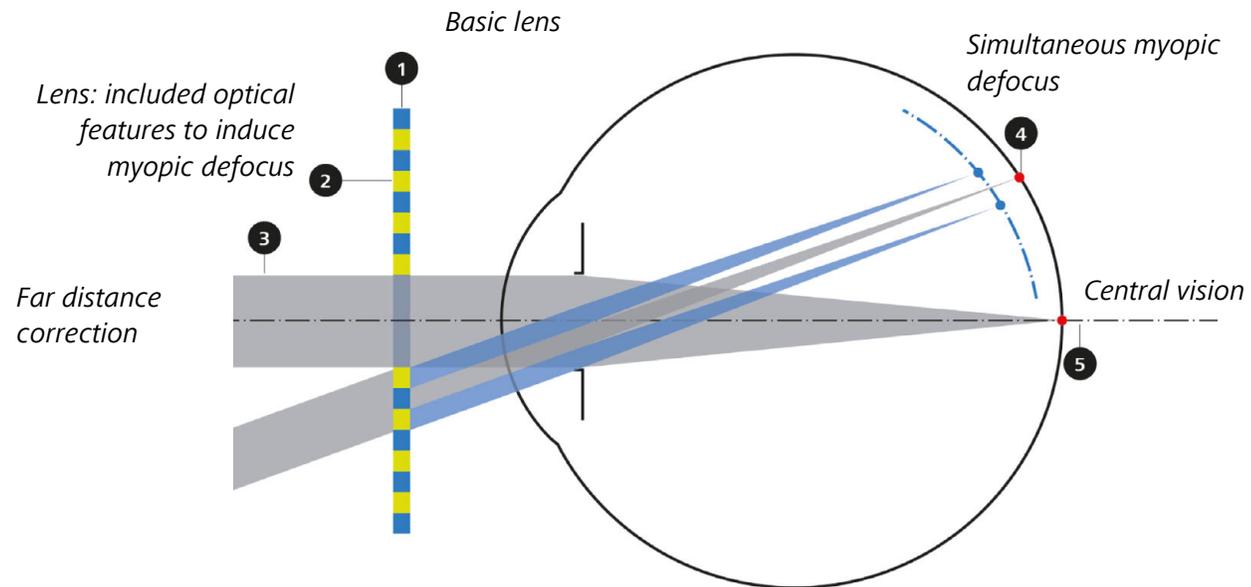
may slow the progression of myopia.

# Consolidated Concepts on Myopia Progression

## Simultaneous Competing Defocus Theory



**Simultaneous competing defocus theory:** The peripheral retina receives simultaneous defocus through a lens incorporating optical features.



**02**

# **Myopia Management:**

Overview of Competitor products.

### What are DIMS and H.A.L.T. technology?

DIMS and H.A.L.T. technology is like a single vision lens for myopia correction, with an overlaying 'treatment zone' for myopia control.

- Each has a clear single vision distance zone in the centre of the lens, and a 'background' of single vision correction in the periphery of the lens.
- Each has a surrounding zone of lenslets to create a differential myopic defocus across the retina, with spaces in between them for the single vision correction. They do not alter accommodation or binocular vision function.



### How do they work?

The DIMS technology works on the concept of creating simultaneous defocus, during both distance and near viewing - one plane on the retina due to the single vision zone(s) of the lens, and one plane creating myopic defocus due to the +3.50D defocus lenslets.

The H.A.L.T. technology follows the same theory and introduces the concept of a 'volume of myopic defocus', using aspherical lenses with a power gradient. The differences of both are based on: from simultaneous defocus in two planes (one being on the retina to correct myopia, and the other in front of the retina for myopic defocus – Hoya) to a three-dimensional 'volume' of defocus in front of the retina of varying dioptric power - Essilor.

**03**

# **ZEISS MyoCare Lenses:**

Incorporating A New Lens Design

# A New Lens Design Creating Simultaneous Competing Defocus

## Innovated by ZEISS



Scientific concepts transferred into interventions allow us to draw conclusions from evidence-based learnings on effectiveness:



- **Orthokeratology:** efficacy proven being an inspiration for a new lens design.
- **Science & new generation of spectacles:** creating simultaneous competing defocus in the peripheral retina with lenses incorporating microstructures, the most promising concept to slow down myopia progression.



# ZEISS MyoCare design

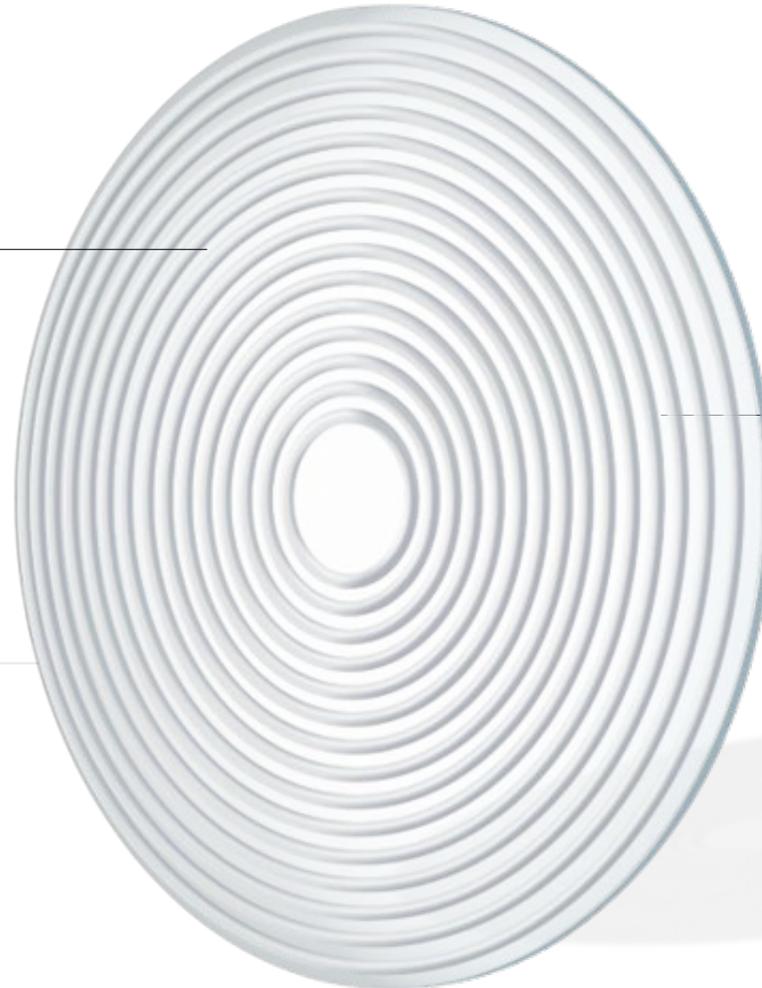
A design based on two pillars



## Front surface

### C.A.R.E. ® technology

Cylindrical **A**nnular **R**efractive **E**lements  
inducing simultaneous myopic defocus



## Back surface

### ZEISS ClearFocus design

Free-form optimized back surface  
managing hyperopic defocus

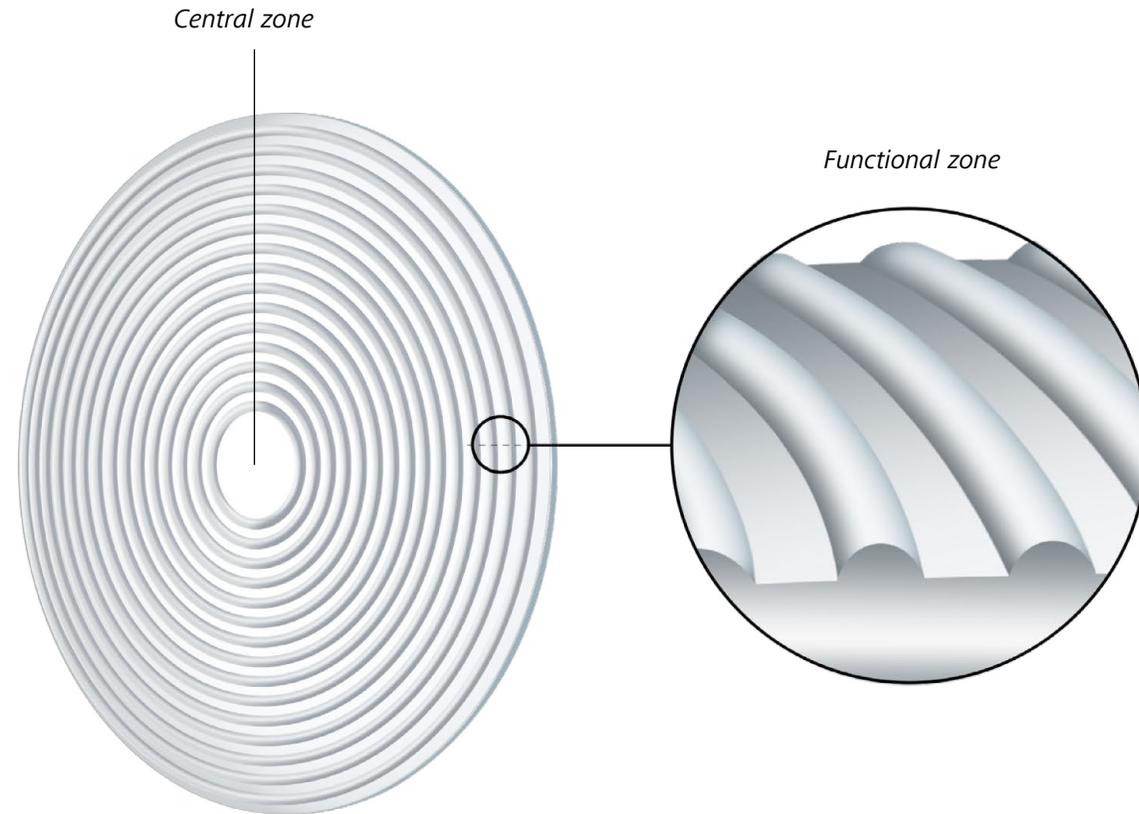
# ZEISS MyoCare design

## Optimization of the C.A.R.E.<sup>®</sup> technology



### Key considerations to find the right balance:

- Size of central zone.
- Cylindrical annular refractive elements and their power.
- Fill Factor (functional zone size / area devoted to distance error correction).



# ZEISS MyoCare lens portfolio

## ZEISS MyoCare Specifications



### ZEISS MYOCARE

Central zone diameter **7mm**

Mean additional surface power **+4.6D**

Fill factor **0.5**



### ZEISS MYOCARE S

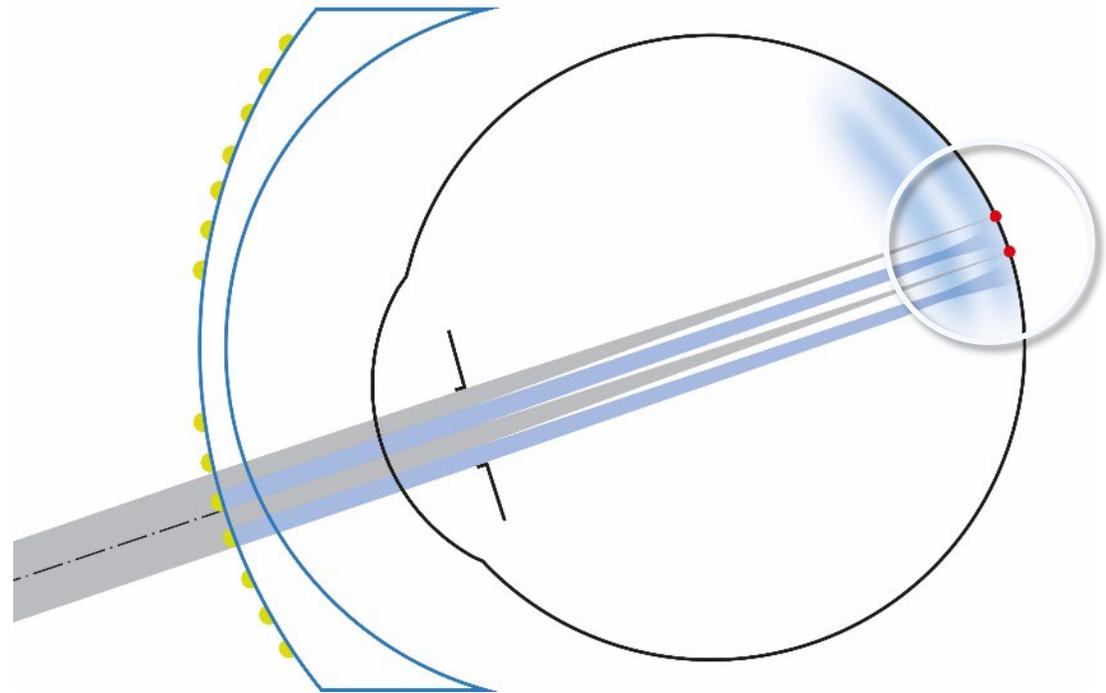
Central zone diameter **9mm**

Mean additional surface power **+3.8D**

Fill factor **0.5**

### Point-by-point free form optimized back surface design

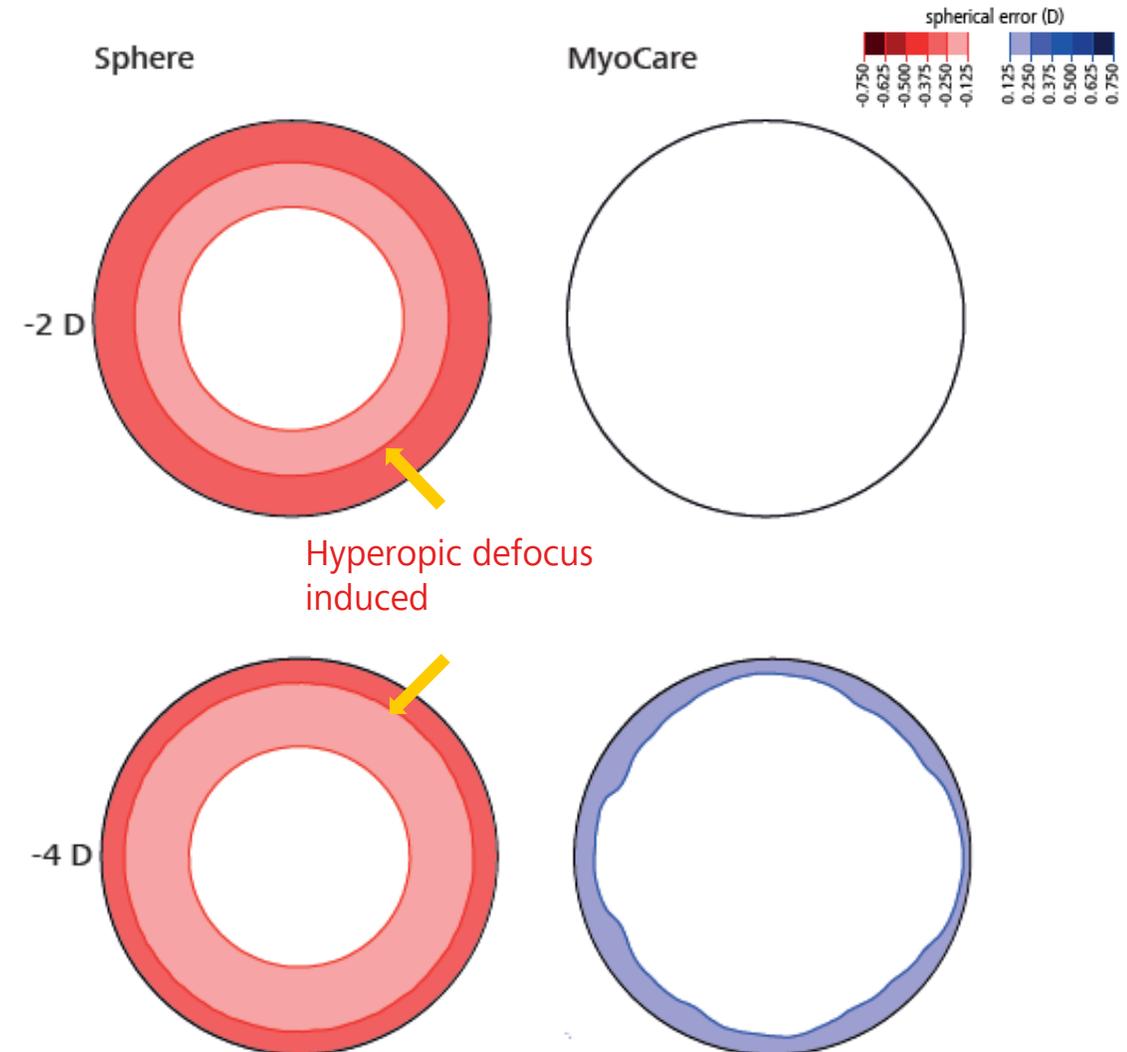
- **Minimizes** the induction of **hyperopic defocus towards lens periphery** as opposed to typical spherical single vision lenses.
- **Maintains** optimal **refractive correction** and the intended **myopic defocus for all gaze directions**.



# ZEISS MyoCare design

## ZEISS ClearFocus design: Meeting the challenge of the moving eye

- In the **spherical lens design**, the spherical error becomes obvious, with increasing negative power towards the outer lens perimeter, thereby **inducing hyperopic defocus**.
- In contrast, **ZEISS MyoCare** lenses exhibit a flat and almost invariant spherical error throughout the lens, ensuring the focus to remain close to the intended focus shell. With increasing eccentricity from the lens center, the spherical error is even growing slightly more positive, inducing relative **myopic defocus**.



**04**

# **ZEISS MyoCare Lenses:**

Clinical Trial

**24-month results**  
from a prospective, multicentre trial in China

# Multicentre clinical trial.

Multicentre trial: 3 cities in north of China.



- **Objective:** To evaluate the efficacy of two types of C.A.R.E lenses in slowing myopia in a prospective, randomized, multicentre clinical trial

- **Study sites: (n=240)**

	Tianjin	Beijing	Shenyang
# of recruited children	84	72	84

- **Duration: 2 years.** Trial extended to 3.5 years
- **Primary outcome:** Change in ocular axial length and cycloplegic spherical equivalent refractive error
- **Clinical trial registration number:** NCT05288335

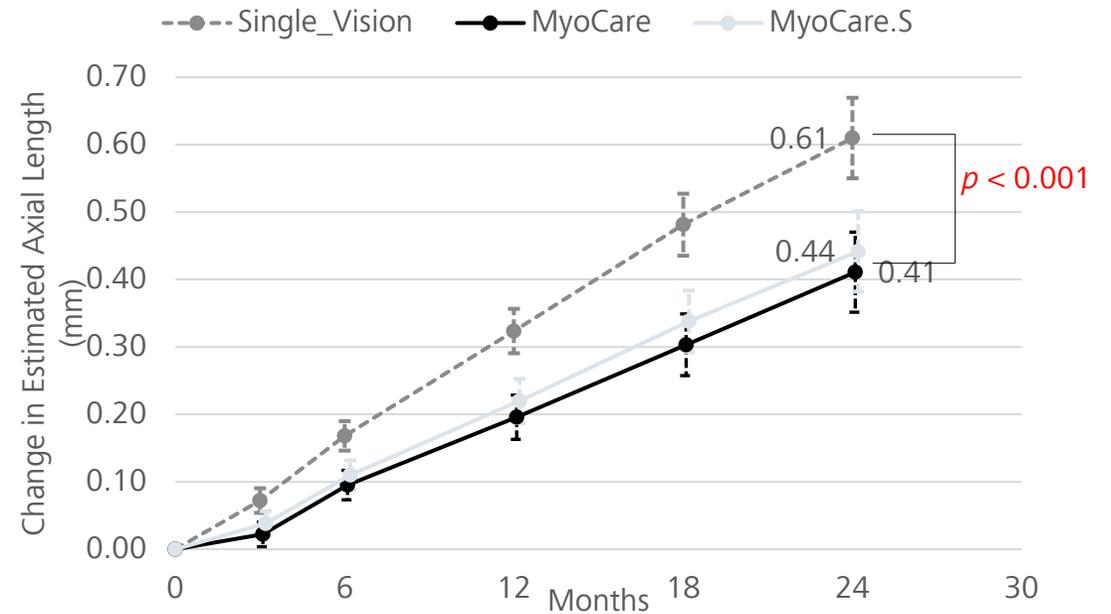
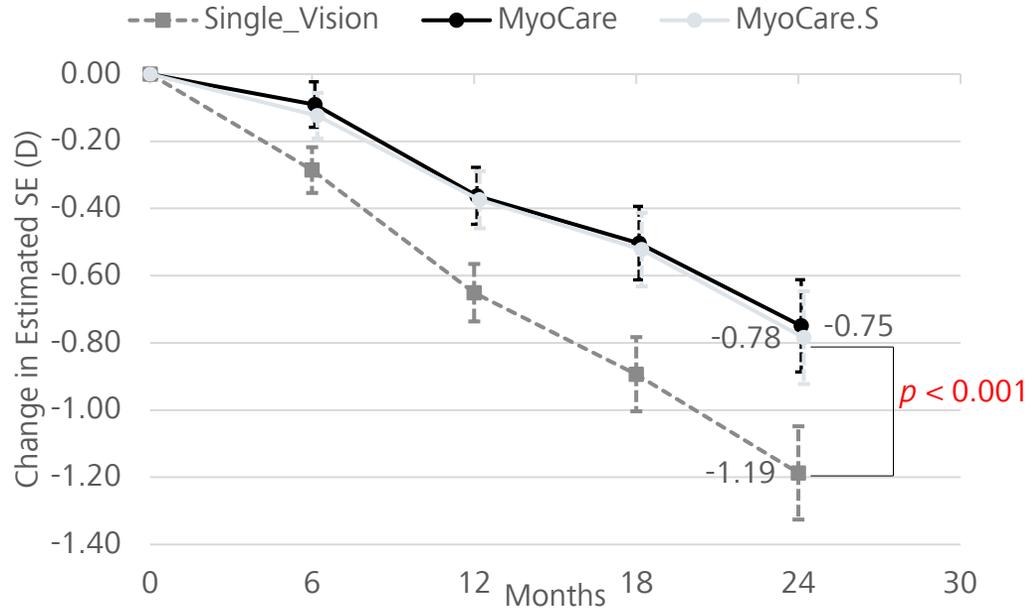
# 24-Month efficacy compared to single vision spectacles.

## Cycloplegic Spherical Equivalent/Axial length.



Compared to single vision,  
**myopia significantly slowed SE/AL by** after 24-months.

<b>ZEISS MyoCare</b>	0.44D / 0.20mm
<b>ZEISS MyoCare S</b>	0.41D / 0.17mm



Estimated mean differences<sup>^</sup> with 95% Confidence intervals of cycloplegic spherical equivalent change from baseline (D)  
<sup>^</sup>Linear mixed model, adjusted for site, age, gender and baseline SE; OD only.

- **Chen X et al: Presented at Association for research in Vision and Ophthalmology meeting (ARVO), Salt Lake City, USA 2025**
- **Article in peer review**

# ZEISS MyoCare and ZEISS MyoCare S.

Summary after 24M.



## 24-Month results from a 3-yr prospective, multicentre trial

Executive summary

- Both ZEISS MyoCare and ZEISS MyoCare S lenses significantly slowed myopia.
- Fewer children demonstrated fast progression (i.e., -1.0D or worse over 24 months) with ZEISS MyoCare and ZEISS MyoCare S (29.7% & 29.2% with ZEISS MyoCare and ZEISS MyoCare S vs. 56.9% with single vision spectacle lenses).
- Both ZEISS MyoCare and ZEISS MyoCare S were worn for approx. 14 hrs/day. Subjective assessment indicates high ratings for most aspects of vision.
- MyoCare performed better, however, differences between MyoCare and MyoCare S were not significant ( $p > 0.3$ ).
- Trial extended to 42 months.

**12-month results**  
from a prospective, multicentre trial in Spain

# Multicentre clinical trial

## Six ophthalmology clinics across Spain and Portugal



- **Objective:** To evaluate the efficacy of ZEISS MyoCare lenses in slowing myopia in a prospective, randomised, parallel-group, double-masked, multicentre clinical trial in Europe.
- **Number of recruited children by study site: (n=234)**

	Novo-vision, Madrid	ICQO, Bilbao	CPO, Lisbon	Virgen de Lujan, Seville	Novo-vision, Murcia	IMO, Madrid
# of children	57	19	34	31	50	43

- **Duration:** 2 years. Trial extended to 3 years
- **Primary outcome:** Change in ocular axial length and cycloplegic spherical equivalent refractive error
- **Trial registration:** NCT05919654

# Multicentre Clinical Trial

## Baseline Characteristics

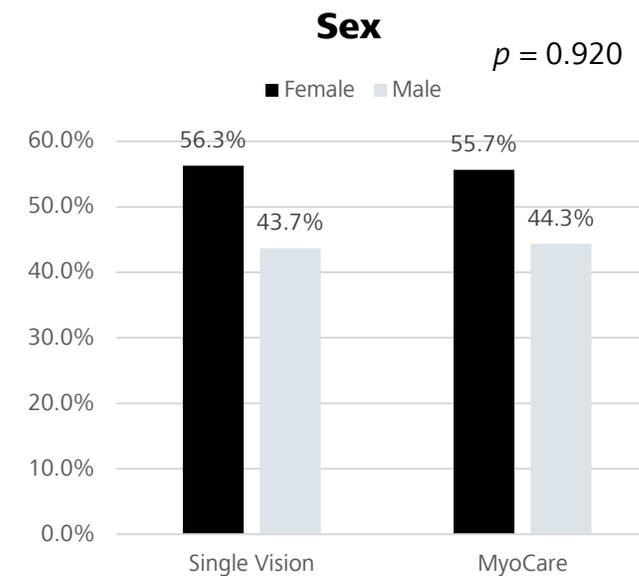
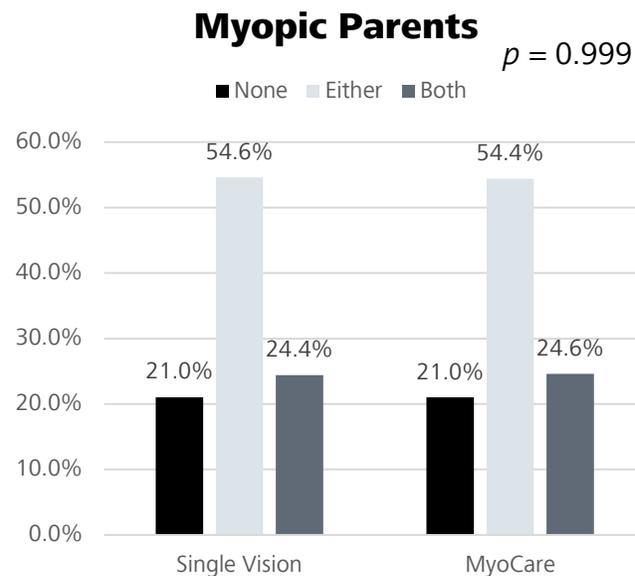


No significant group differences in **age, refractive error, or axial length at baseline.**

No significant differences in **parental myopia or gender across groups.**

	Single Vision (n=119)	ZEISS MyoCare (n=115)	p-value
Age (years)	10.3±1.9	10.8±1.9	0.075
Spherical Equivalent (D)	-2.12±0.94	-2.28±0.94	0.123
Axial length (mm)	24.17±0.75	24.34±0.68	0.075

Values are reported as mean ± SD.



# 6- & 12-Month efficacy compared to single vision spectacles

Cycloplegic Spherical Equivalent (adjusted or estimated mean)

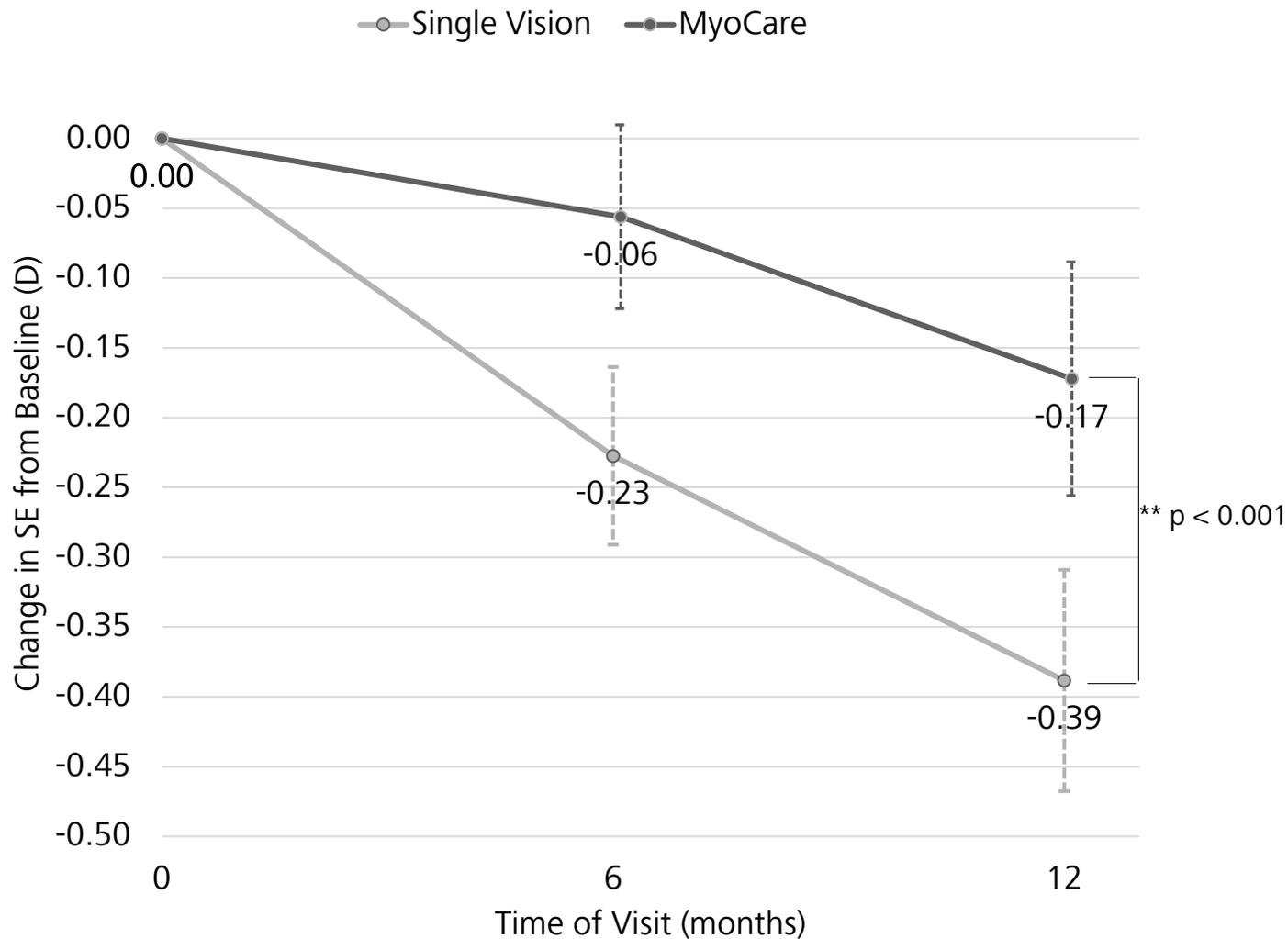


Compared to single vision lens wear,  
**ZEISS MyoCare significantly  
 slowed myopia by**

**0.17 D @ 6M**  
**0.21 D @12M**

Progression with	6M	12M
<b>SV</b>	-0.23 (-0.29, -0.16)	-0.39 (-0.47, -0.31)
<b>MyoCare</b>	-0.06 (-0.12, 0.01)	-0.17 (-0.26, -0.09)

Estimated mean differences<sup>^</sup> with 95% Confidence intervals of cycloplegic spherical equivalent change from baseline (D)  
<sup>^</sup>Multiple linear regression, adjusted for age, gender, parental myopia, baseline SE, site, and visit date.



# 6- & 12-Month efficacy compared to single vision spectacles



Axial Length (adjusted or estimated mean)

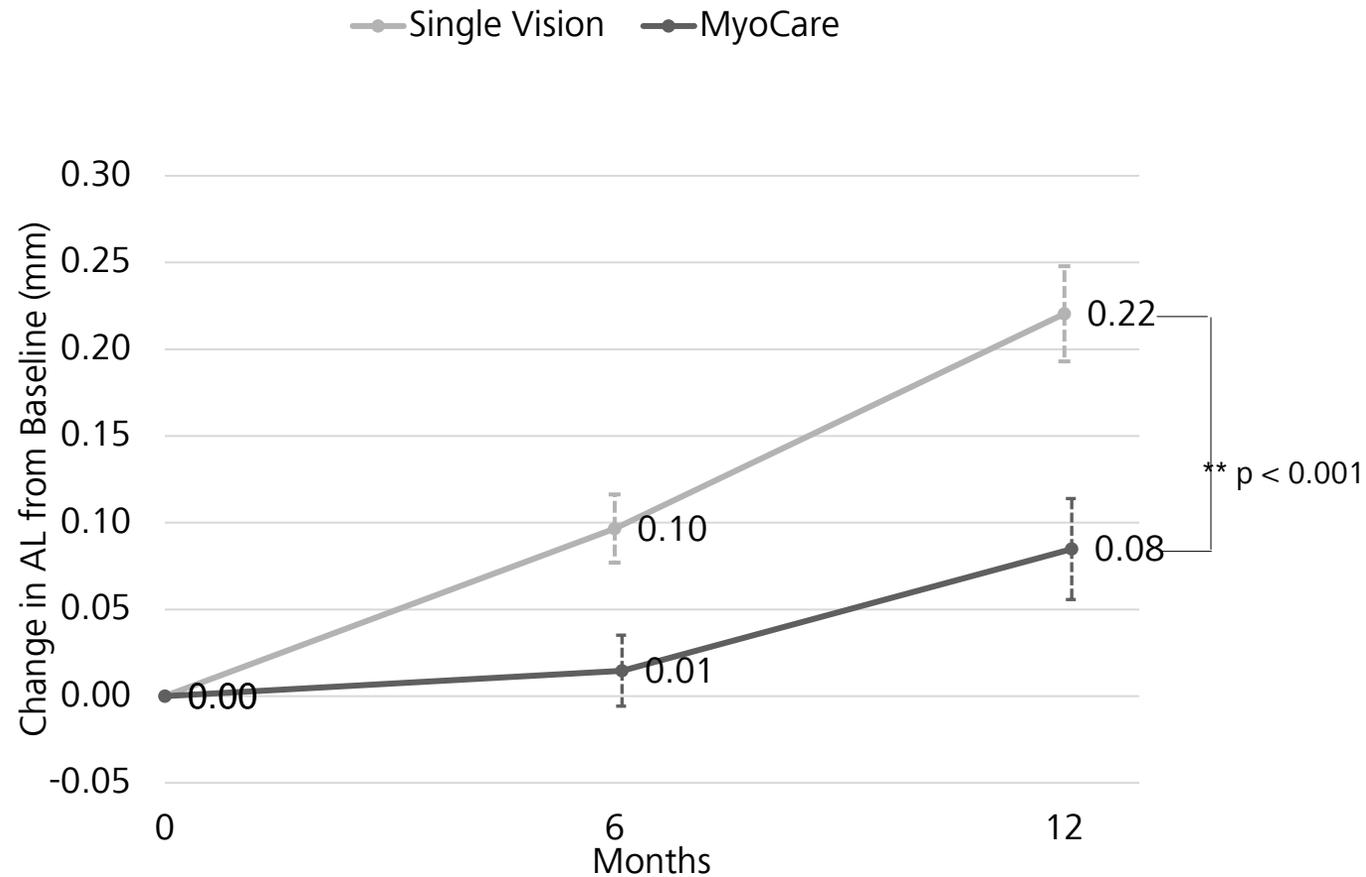
Compared to single vision lens wear,  
**ZEISS MyoCare significantly slowed myopia by**

**0.08 mm @ 6M**  
**0.14 mm @12M**

Progression with	6M	12M
<b>SV</b>	0.10 (0.08, 0.12)	0.22 (0.19, 0.25)
<b>MyoCare</b>	0.01 (-0.01, 0.04)	0.08 (0.06, 0.11)

Estimated mean differences<sup>^</sup> with 95% Confidence intervals of axial length change from baseline (mm)

<sup>^</sup>Multiple linear regression, adjusted for age, gender, parental myopia, baseline AL, site, and visit date.



# 12-Month efficacy compared to single vision spectacles

## Progression in Cycloplegic Spherical Equivalent & Axial Length

Compared to single vision lens wear, **ZEISS MyoCare reduce fast myopia progression**

### Fast progressor in SE:

Myopia progression of **0.5D or worse\*** over 12 months

**Fast progressors** with SV (40.2%)  
**ZEISS MyoCare (21.1%).**

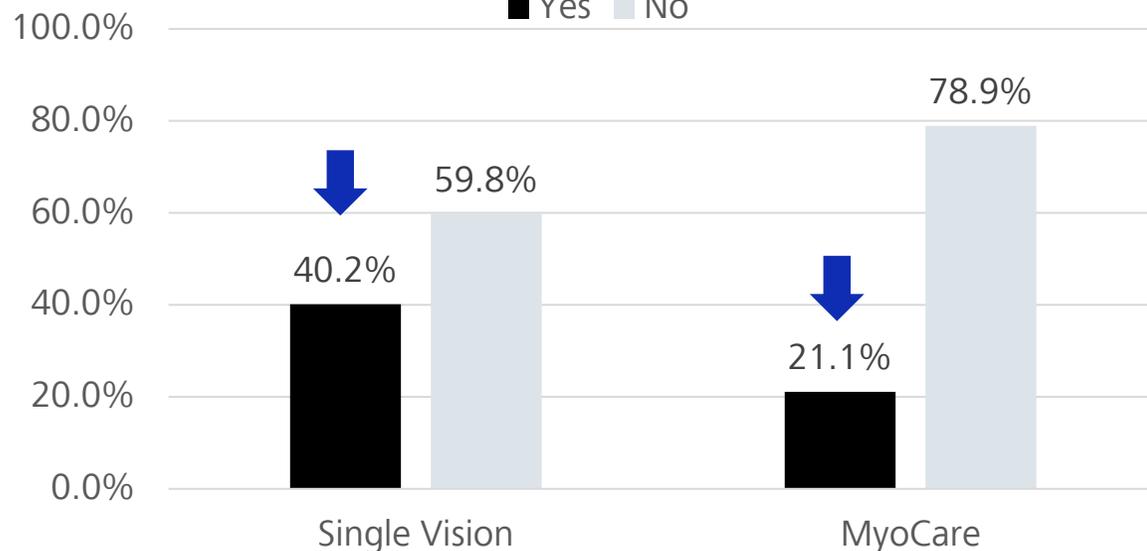
### Fast progressor in AL:

axial elongation of **0.2mm or more** over 12 months

**Fast progressors** with SV (59.8%)  
**ZEISS MyoCare (21.3%).**

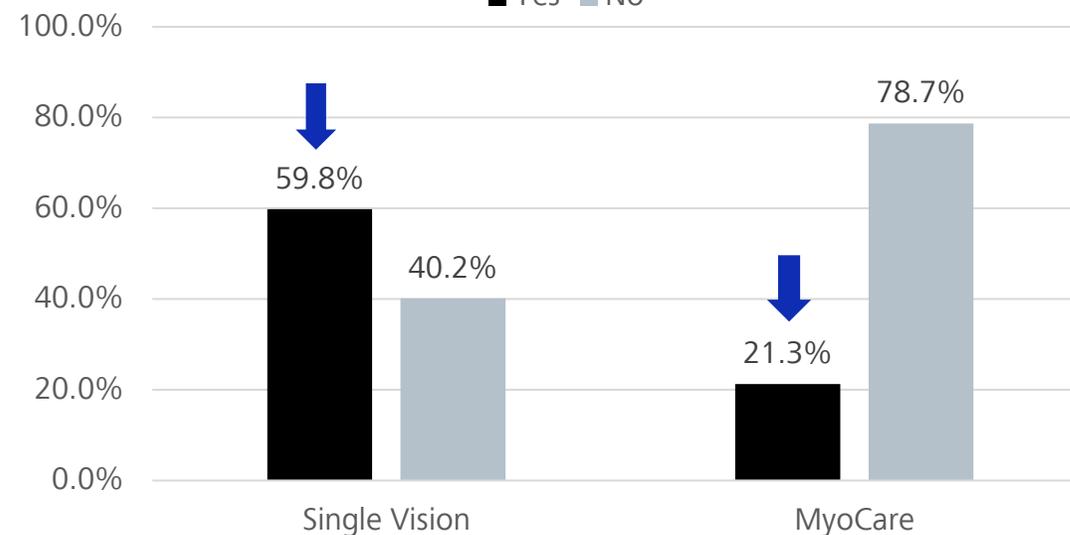
### SE progression of -0.5D or worse

■ Yes ■ No



### AL elongation of 0.2mm or more

■ Yes ■ No



# Wearability of ZEISS MyoCare

## Vision Ratings: 1 week & 3 months



1 week, smiley face scale of 1-10 where 10= best (very happy), 1=worst (very unhappy)



**Distance Vision**



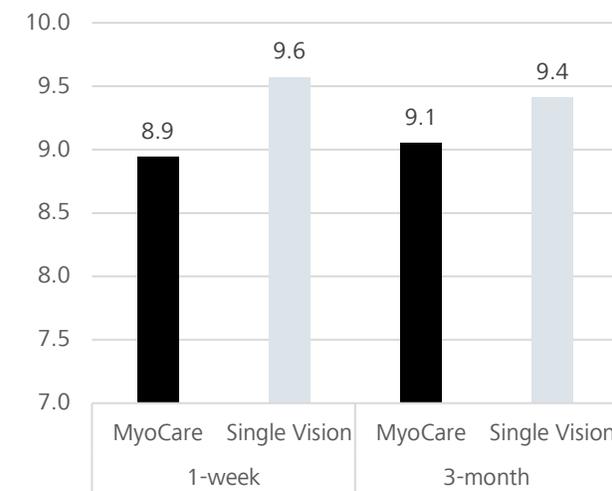
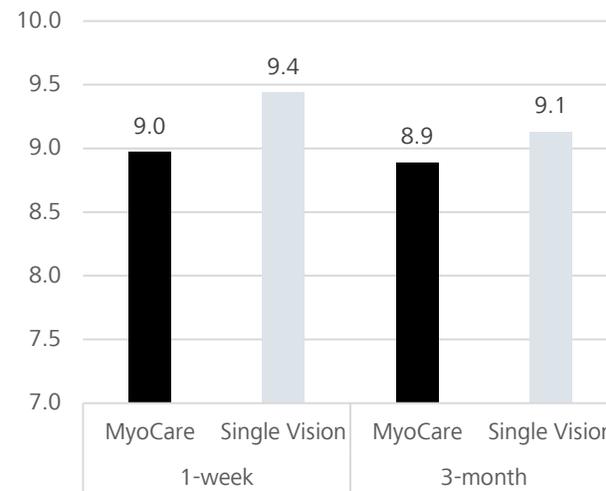
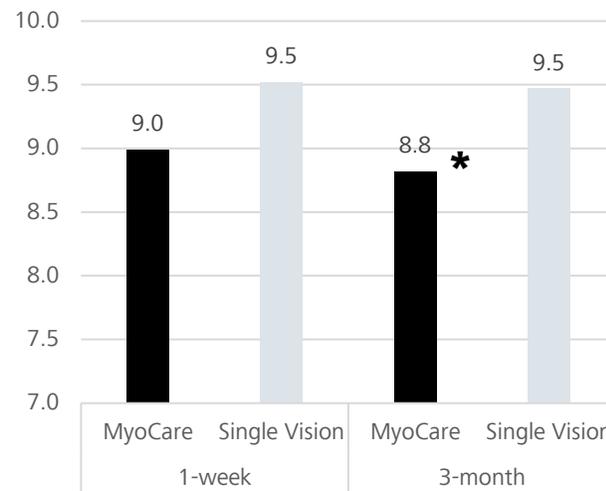
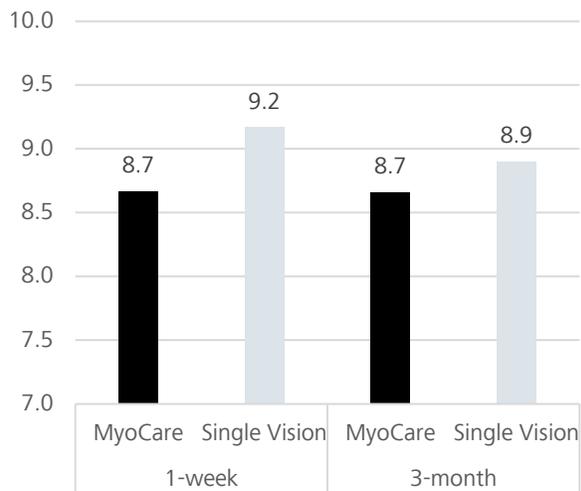
**Near Vision**



**Sports**



**Walking Stairs**



**\*At 1 week, ZEISS MyoCare was rated lower but at the 3-month visit, there were no differences in subjective ratings for all except near vision.**

## 12-Month results from a 3-yr prospective, multicentre trial

Executive summary

- ZEISS MyoCare lenses **significantly slowed myopia in European children.**
- **Fewer children demonstrated fast progression (i.e., -0.5D or worse over 12 months) with ZEISS MyoCare** (21.1% with ZEISS MyoCare vs 40.2% with single vision specs).
- ZEISS MyoCare performance was **similar** in younger (6-9 yrs) and older (10-13 yrs) children.
- Trial extended to **36 months.**

The background features a series of smooth, flowing, wavy lines in various shades of light blue, creating a sense of movement and depth. The lines curve and ripple across the frame, set against a lighter, pale blue gradient background.

**How do ZEISS CARE lenses  
perform when compared to  
other myopia management  
solutions**

# Benchmarking efficacy

## US FDA guidelines

A mean difference between intervention groups of **0.25 D/yr** would be regarded as clinically significant (i.e. **0.75 D** over the course of a three-year study). Corresponding to a difference in axial length of approximately **0.3 mm.**

Walline JJ, Robboy MW, Hilmantel G., et al. Food and Drug Administration, American Academy of Ophthalmology, American Academy of Optometry, American Association for Pediatric Ophthalmology and Strabismus, American Optometric Association, American Society of Cataract and Refractive Surgery, and Contact Lens Association of Ophthalmologists Co-Sponsored Workshop: controlling the progression of myopia: contact lenses and future medical devices. *Eye and Contact Lens* 2018;44(4):205-11

# Comparison of Efficacy

Meta-analysis, 104 trials, MyoCare® and MyoCare® S.



## Performance of MyoCare® on par with other PPS.

In absolute values for spherical equivalent and axial length, Myocare® and MyoCare® S are similar in performance to PPSL (they fall very close to mean and within 95% CI).

1 year	PPSL	Care	Care S
Spherical Equivalent	0.25D	0.31D	0.29D
Axial Length	0.13mm	0.13mm	0.11mm
2 year	PPSL	Care	Care S
Spherical Equivalent	0.43D	0.44D	0.41D
Axial Length	0.23mm	0.20mm	0.17mm

# Issues with use of relative efficacy (Percent)

## Scenario 1: Low progression

A myopia control lens reduces myopia by 0.25D / yr compared to single vision

### Single Vision Lenses

Annual Progression: 0.50D

### Myopia control lenses

Annual Progression: 0.25D



**Difference: 0.25D**

**= 50% relative efficacy**

# Issues with use of relative efficacy (Percent)

## Scenario 2: High progression

A myopia control lens reduces myopia by 0.25D / yr compared to single vision

### Single Vision Lenses

Annual Progression: 0.60D

### Myopia control lenses

Annual Progression: 0.35D

**Difference: 0.25D**

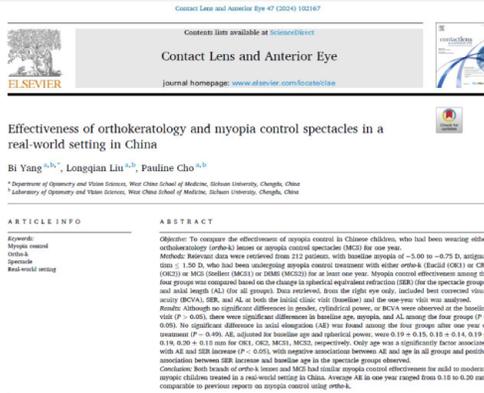
**= 42% relative efficacy**

**When progression is low, relative efficacy provides a higher value; diff trials yield diff percent values**

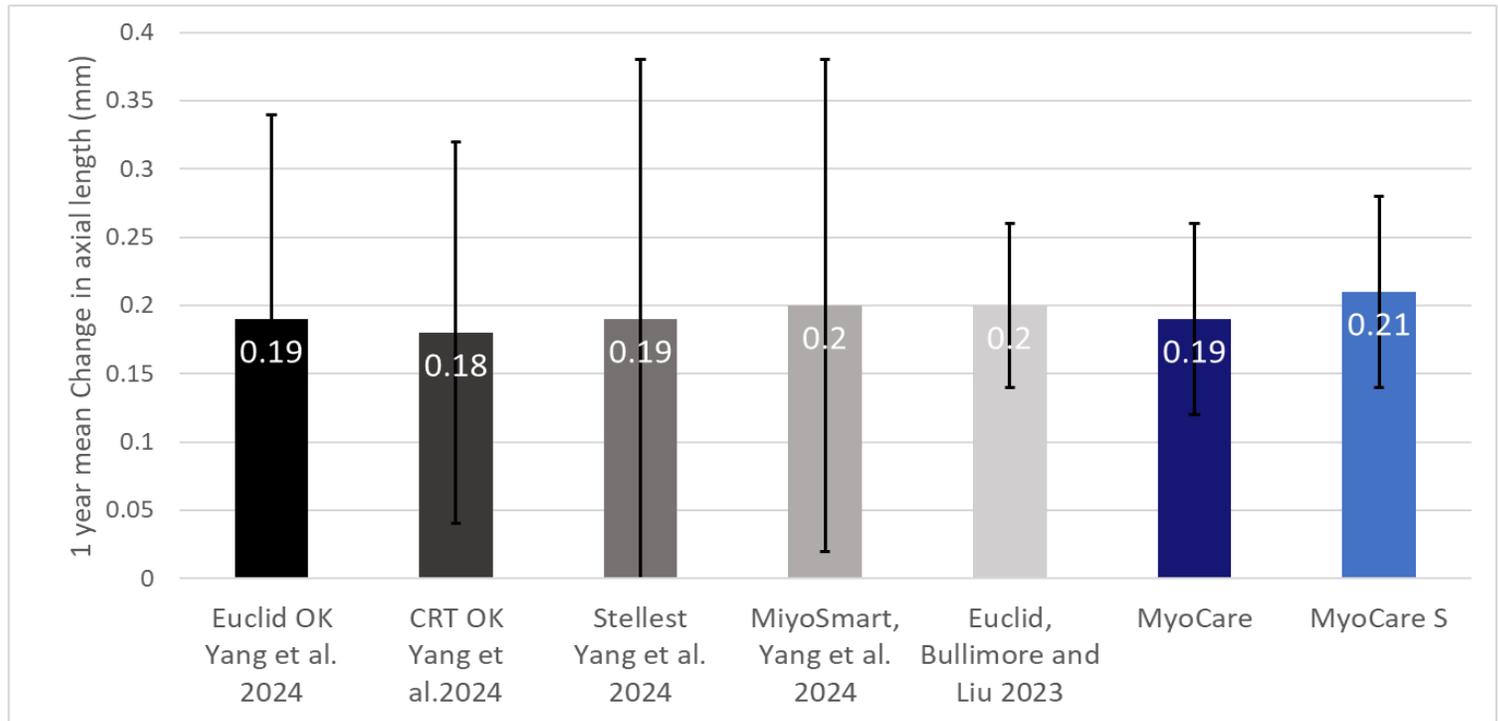
# Comparison of Efficacy

## Real world evidence and meta evidence

Change in 12-month eye length with 4 types of lenses  
Retrospective real world; -0.75D to -5.00D; Visits: BL and 1yr± 2m



- Similar performance across 2 Ortho K lenses, Stellest (MCS1) and Miyosmart (MCS2) (Yang et al. 2024)
  - 37 studies reported on axial elongation with OrthoK (Bullimore and Liu 2023)
- 12-month eye length change with Care lenses is similar to others**



Change in 12-month eye length with Ok lens from 37



Yang B, Liu L, Cho P. Effectiveness of orthokeratology and myopia control spectacles in a real-world setting in China. Cont Lens Anterior Eye. 2024 Jun;47(3):102167.  
Bullimore MA, Liu M. Efficacy of the Euclid orthokeratology lens in slowing axial elongation. Cont Lens Anterior Eye. 2023 Oct;46(5):101875.

# ZEISS MyoCare and ZEISS MyoCare S. Summary.



- **Both ZEISS MyoCare and ZEISS MyoCare S** lenses demonstrating sustained slowing of myopia.
- **Fewer children demonstrated fast progression**

# ZEISS MyoCare and ZEISS MyoCare S.

Is age-related still relevant? NO.



**No age-related differences for MyoCare® and MyoCare® S.**

**Recommendation for countries where both products available:**

- Start with MyoCare®.
- No need to switch at an older age to MyoCare® S.
- MyoCare® S is an option for children who might have adaptation issues.





Seeing beyond

# Give your child a better outlook on life.



## ZEISS MyoCare portfolio.

A new spectacle lens design  
aimed to manage myopia  
progression in children.

[zeiss.com](https://zeiss.com)

**DuraVision  
Chrome UV**  
Available on  
**Jun 1<sup>st</sup>, 2025**





Seeing beyond