



Slowing myopia with ZEISS MyoCare

Efficacy confirmed across multiple sites, large cohorts, and various ethnic groups

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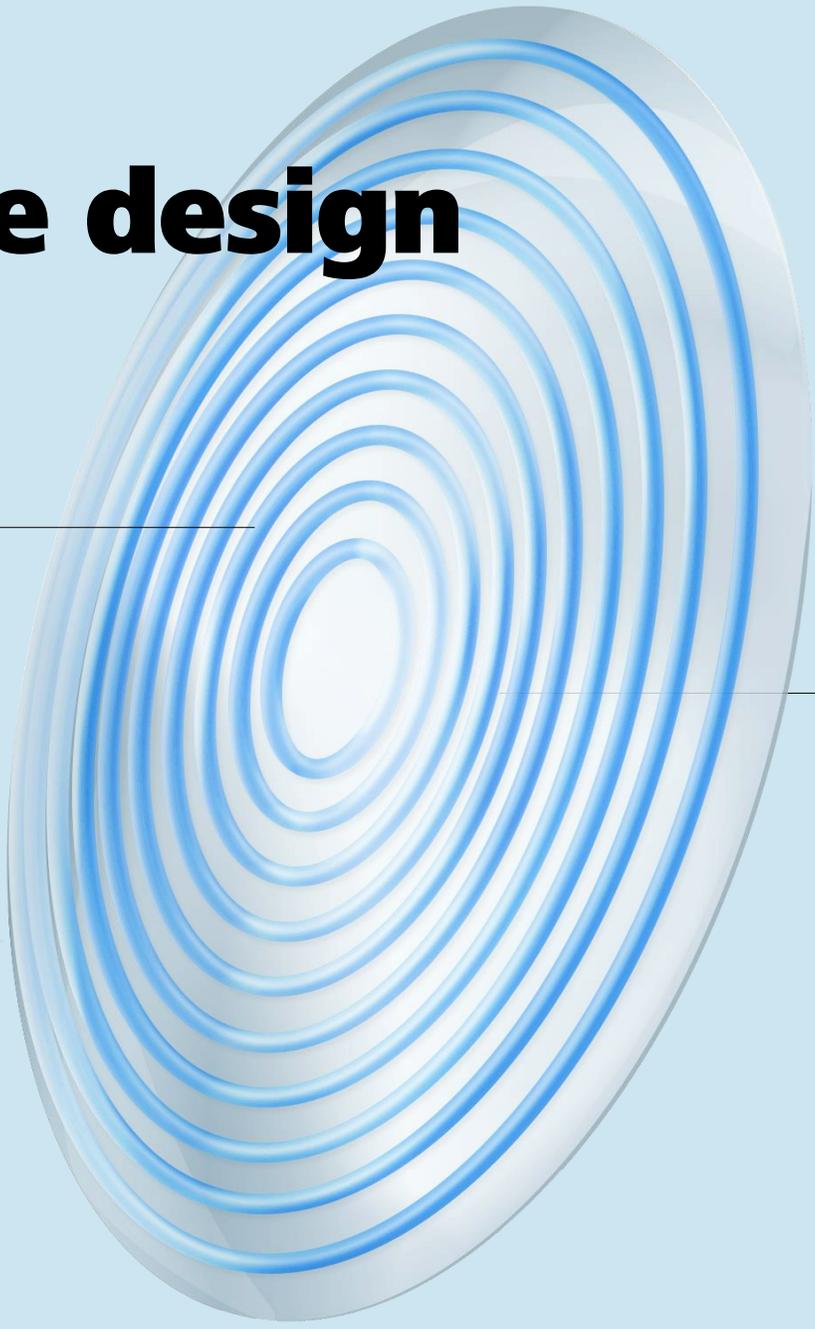
[➤ 05 MyoCare Performance Comparison](#)

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The two pillars of the

ZEISS MyoCare design



Front surface

C.A.R.E.[®] technology

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

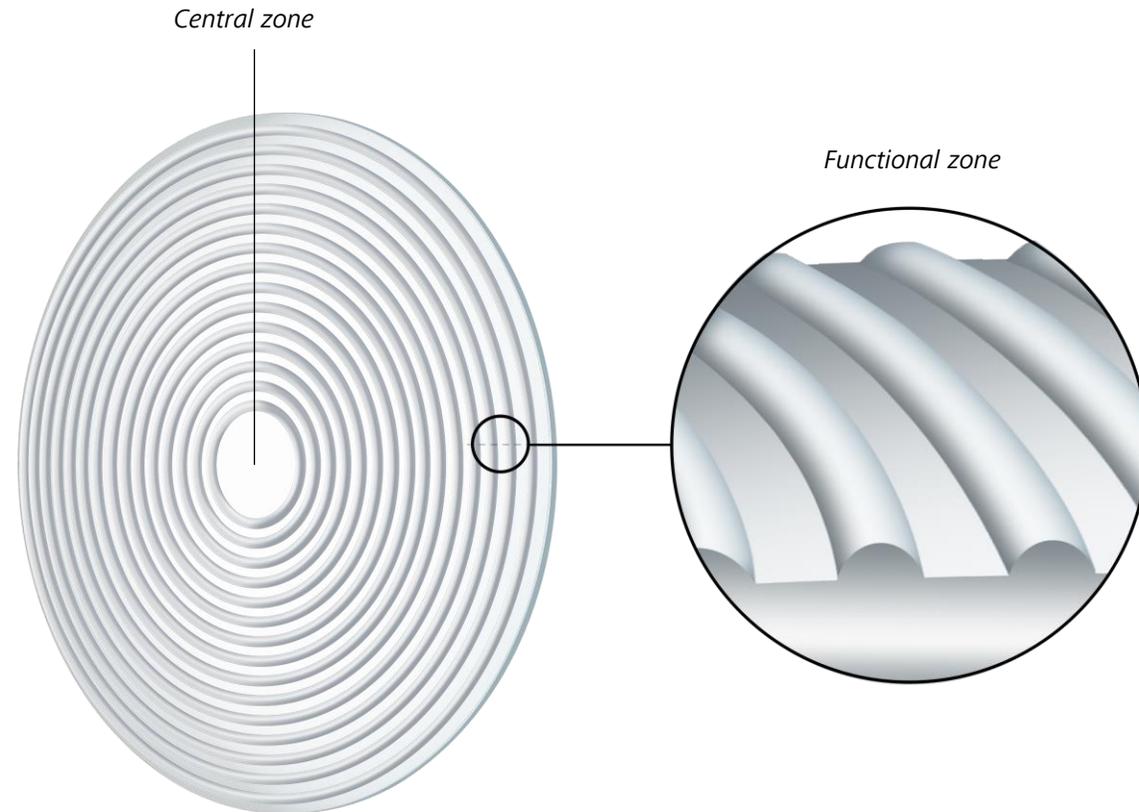
Back surface

ZEISS ClearFocus design

Free-form optimized back surface
managing hyperopic defocus

Key considerations to find the right balance:

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



ZEISS MyoCare design

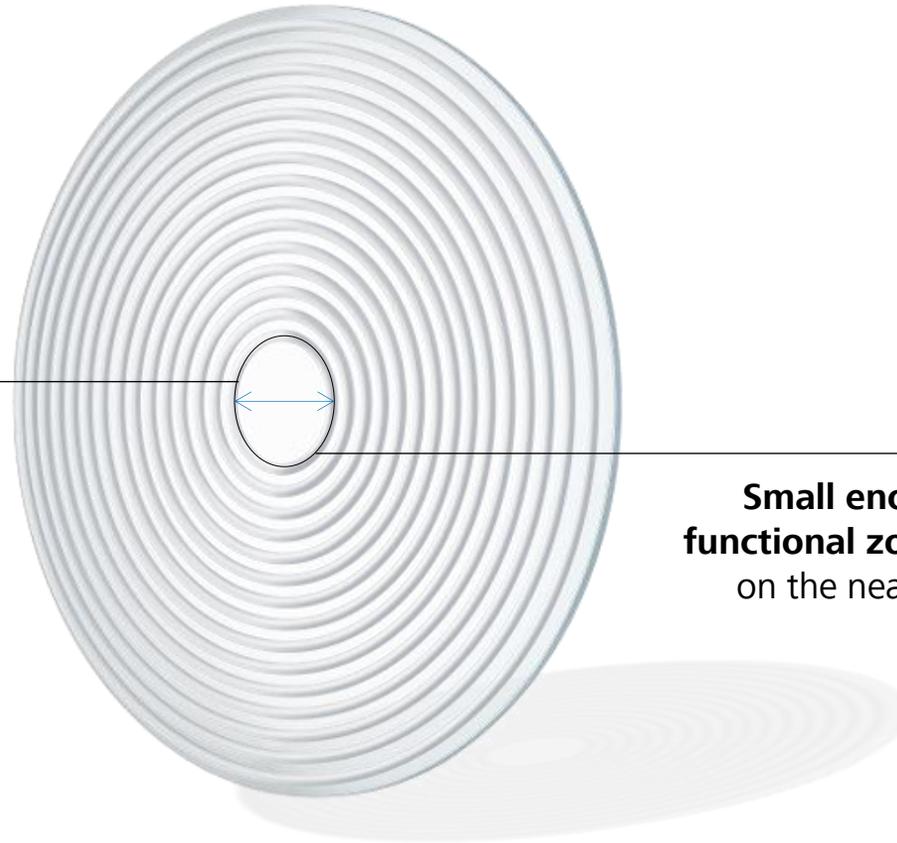
Optimization of the C.A.R.E.® technology, finding the right balance



1 Size of central clear zone

Providing sharp and clear vision with optimal far distance refraction

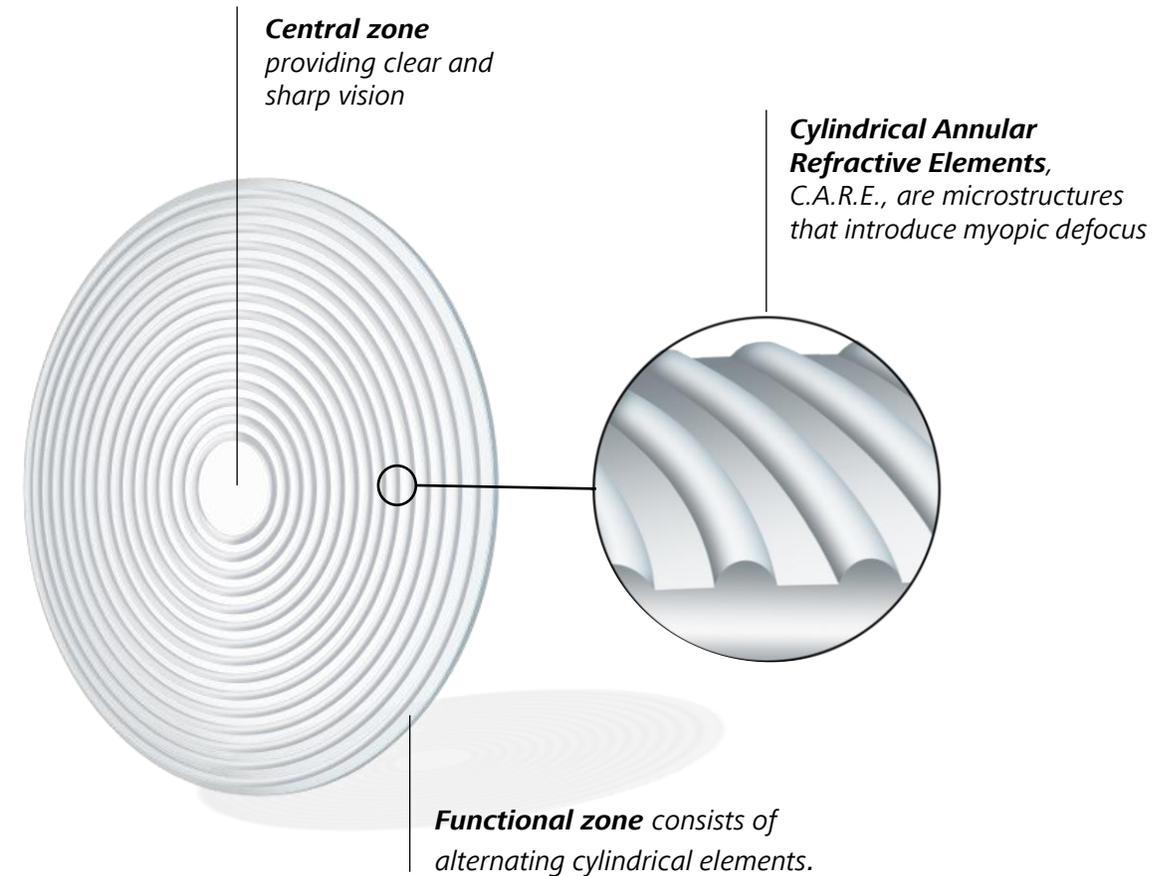
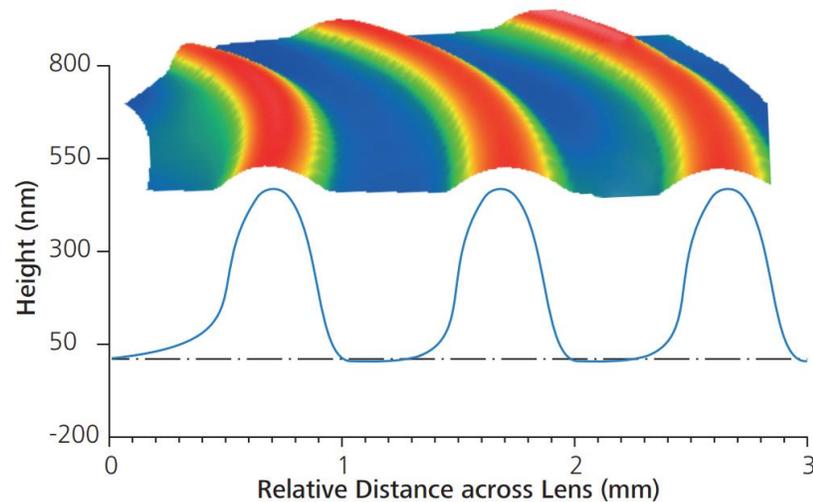
Big enough to enable daily activities.



Small enough to establish an **effective functional zone** projecting myopic defocus on the near periphery close to the fovea.

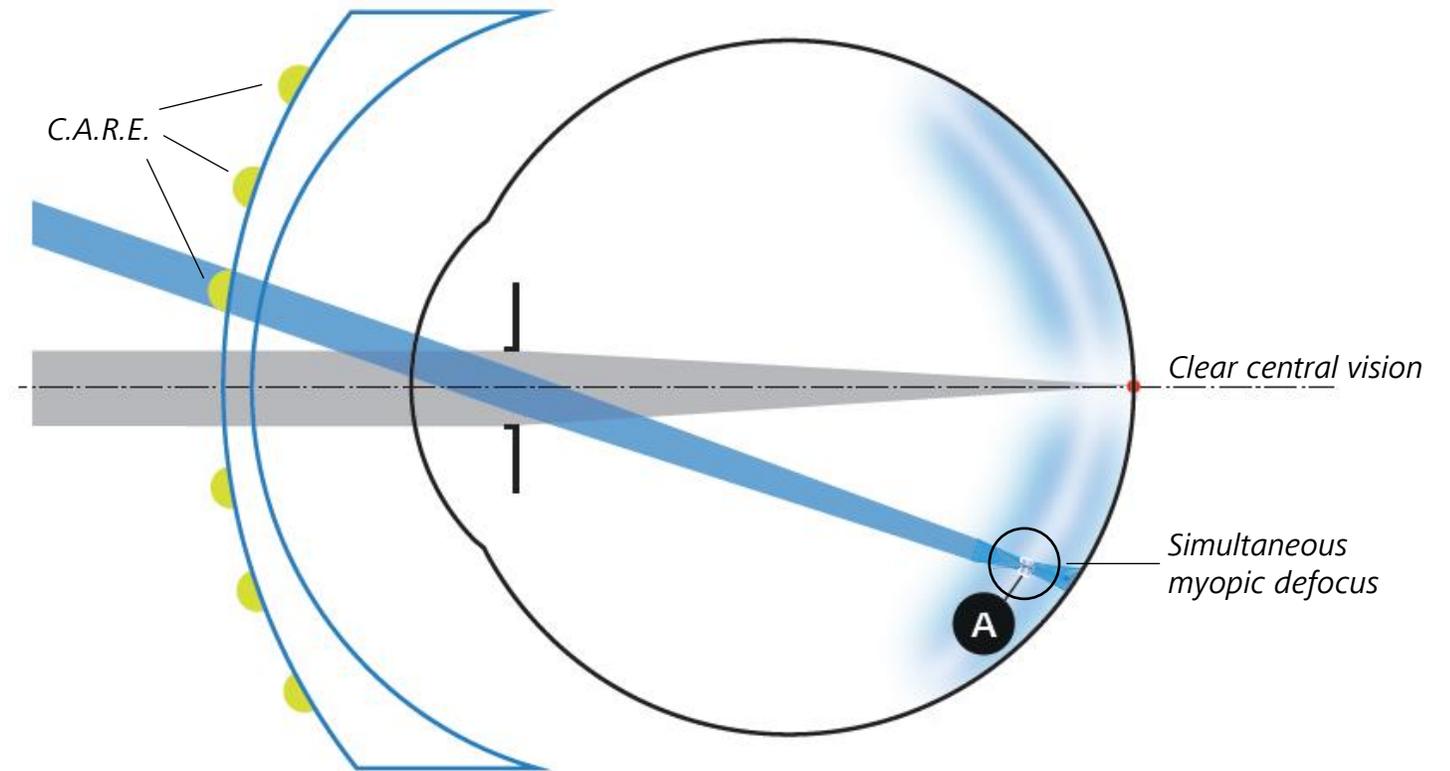
2 Mean additional power of cylindrical annular refractive elements

The microstructures incorporated in MyoCare[®] lenses by ZEISS are realized in a ring-like pattern as cylindrical annular refractive elements (C.A.R.E.).



2 Mean additional power of cylindrical annular refractive elements

Light bundles passing through the C.A.R.E.® elements are not refracted within an ideal and single focus point but **form a caustic (A)** resulting in a **blended distribution of myopic defocus** in front of the retina.



Simplified schematic illustration of a MyoCare lens

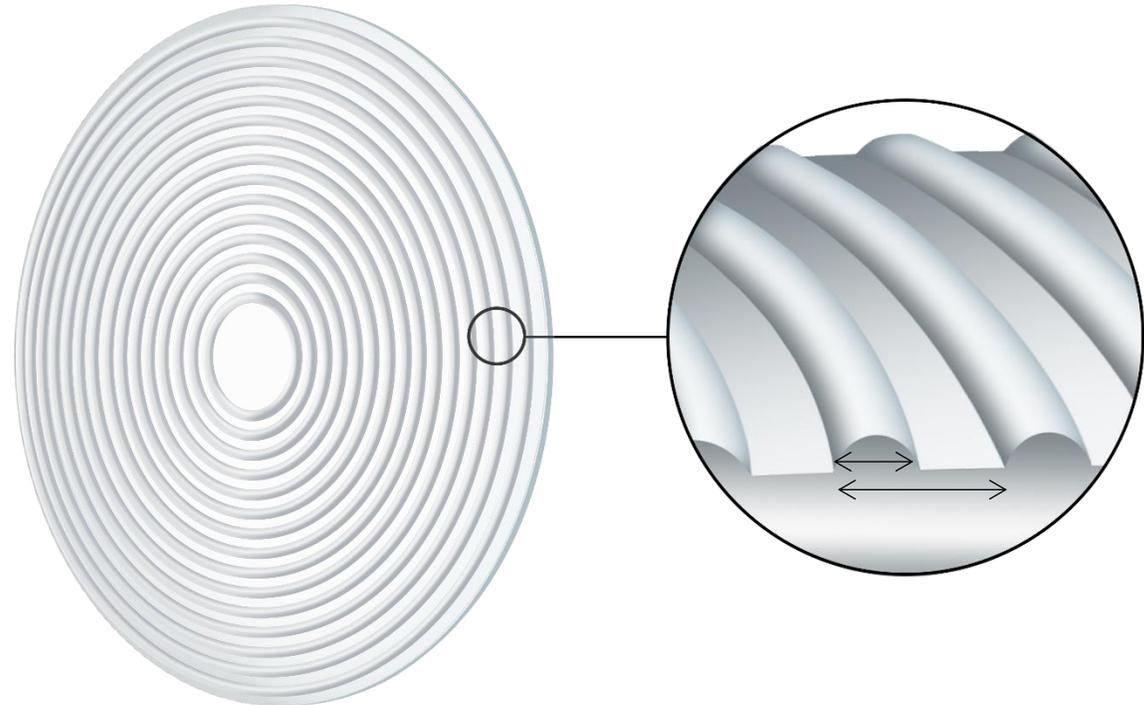
ZEISS MyoCare design

Optimization of the C.A.R.E.® technology, finding the right balance



3 Fill Factor, the key to preserve the wearability

ZEISS MyoCare lenses adopt a fill factor of 0.5, balancing the defocus and correction areas and providing the balance for effectivity and wearability.



ZEISS MyoCare lens portfolio

ZEISS MyoCare & ZEISS MyoCare S



ZEISS MyoCare

(hard design)



Central zone diameter	7mm
Mean additional surface power	+4.6D
Fill factor	0.5

ZEISS MyoCare S

(soft design)



Central zone diameter	9mm
Mean additional surface power	+3.8D
Fill factor	0.5

ZEISS MyoCare design

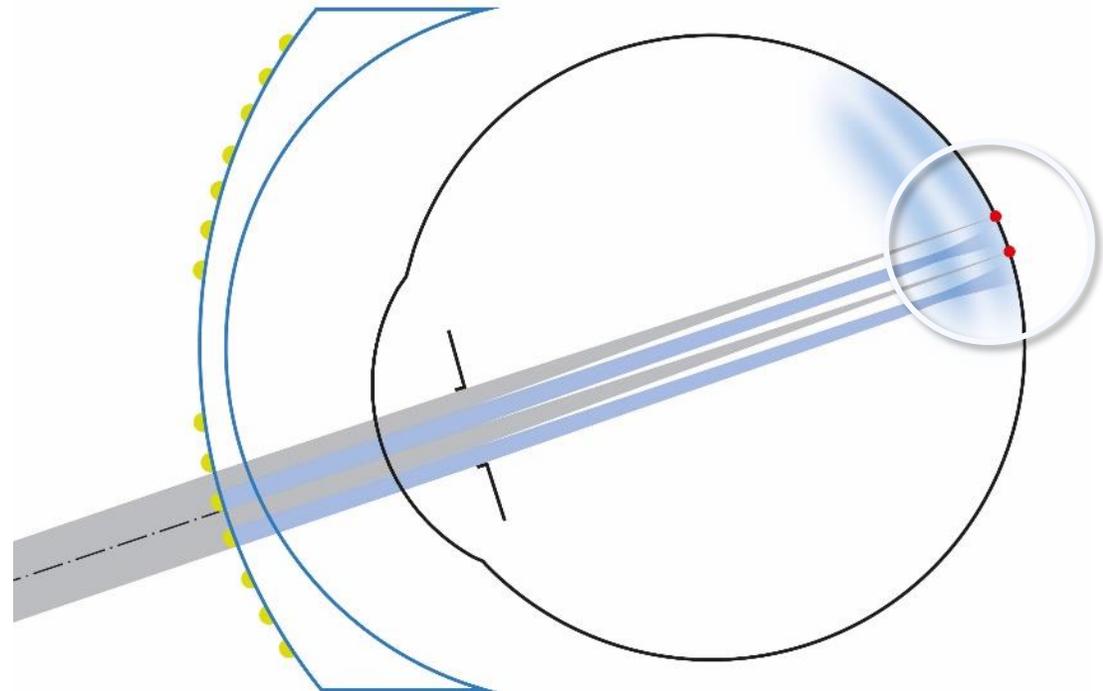
ZEISS ClearFocus design: Meeting the challenge of the moving eye



Point-by-point free form optimized back surface design

Maintains optimal **refractive correction** and the intended **myopic defocus** for all gaze directions

Minimizes the induction of **hyperopic defocus** as opposed to typical spherical single vision lenses.



Clinical trials with > 1700 children

Single-center randomized
clinical trial

Multi-center randomized
clinical trials

Observational clinical trials

Real-world studies

Two on-going multicenter clinical
trials across China and Europe
Results presented at [ARVO'2024](#)

12-months interim results from a 2-year prospective, multi-center trial with Asian children

Multi-center clinical trial in Asian children



Clinical Trial Sites

Tianjin Eye Hospital Optometric Center
Beijing Tongren Hospital, CMU He Eye Specialist Hospital

Trial Commenced

October 2022

Principal Investigators



Prof Lihua Li,
Tianjin



Min Wu,
Beijing



Cui Yu,
Shenyang

Multi-center clinical trial in Asian children

Multi-center trial in three cities in the north of China



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

Duration: 2 years

Primary outcome: Change in ocular axial length and cycloplegic spherical equivalent refractive error

Clinical trial registration number: NCT05288335

Multi-center clinical trial in Asian children

Inclusion & Exclusion criteria



Inclusion criteria

- 6-13 years
- Objective refractive error, sphere -0.75D to -5.00D, astigmatism ≤ 1.50 D
- Best corrected VA ≥ 1.0 in both eyes
- Sign informed consent



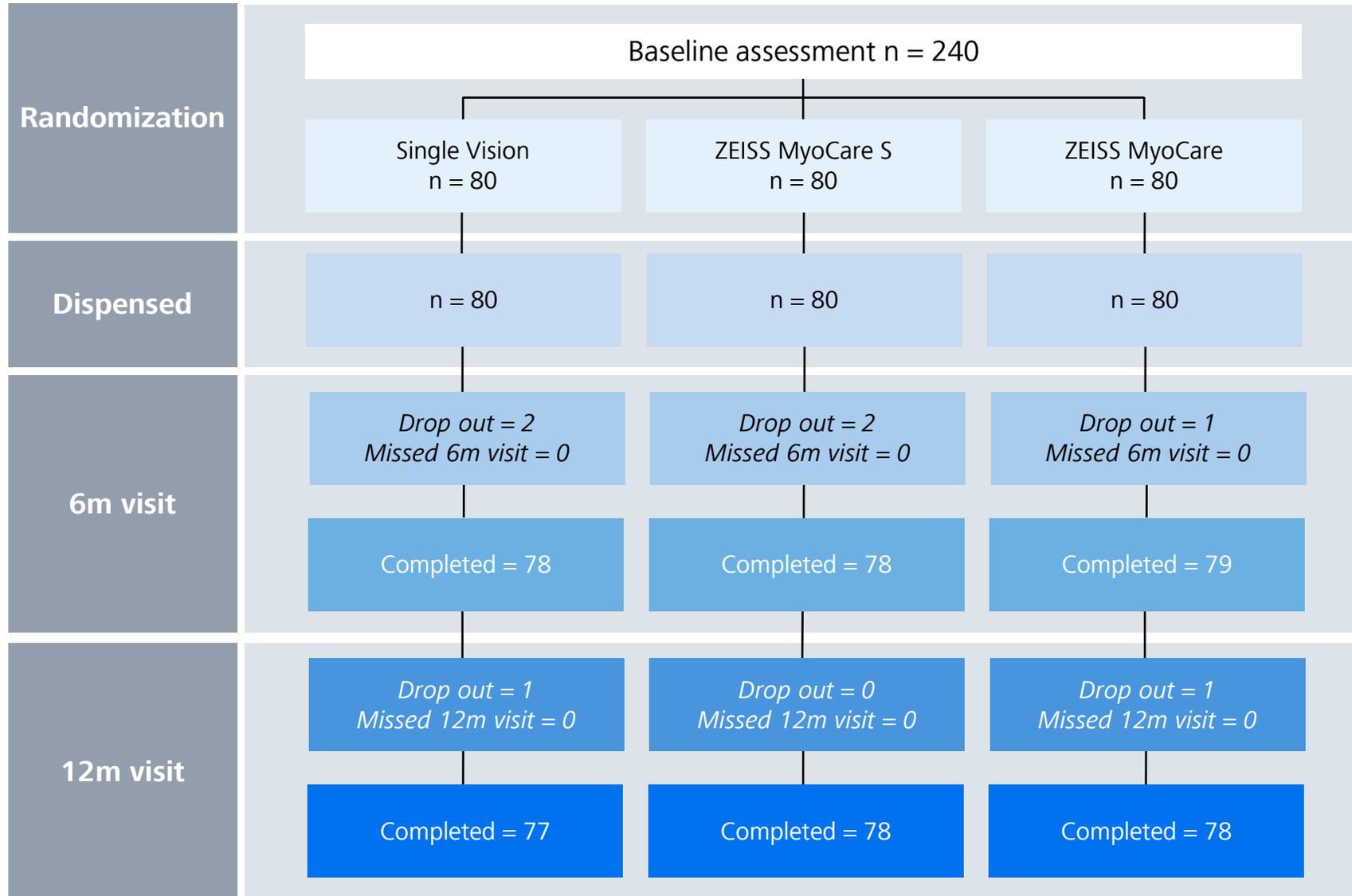
Exclusion criteria

- History of ocular trauma or intraocular surgery
- Significant slit lamp findings
- IOP < 10 mm Hg or > 21 mm Hg; no grade 2 or higher fundus findings
- Ocular diseases, trauma or strabismus
- Systemic diseases
- Use of myopia control products or participation in a clinical trial of a drug within 3 months
- Unable to undergo regular eye exams

Multi-center clinical trial in Asian children



Trial flow



Reasons for drop out:
ZEISS MyoCare S: lost contact-1; exceeded window-1
ZEISS MyoCare: Exceeded window period -1; discomfort -1
SV: switched to other glasses -1; lost contact -1; myopia progressed too fast -1

Multi-center clinical trial in Asian children

Baseline characteristics

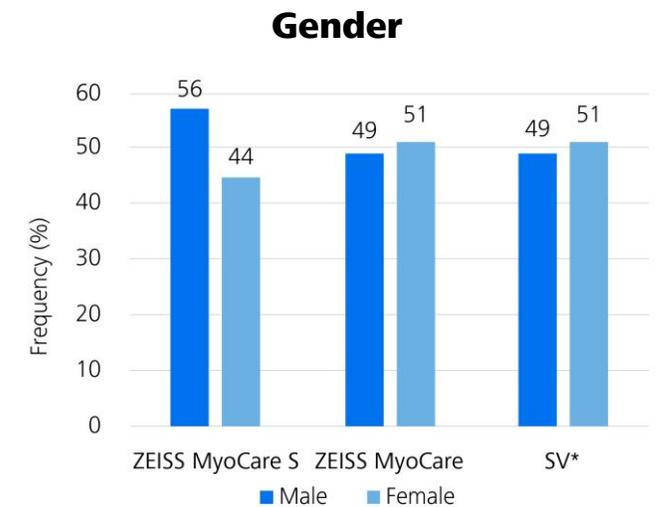
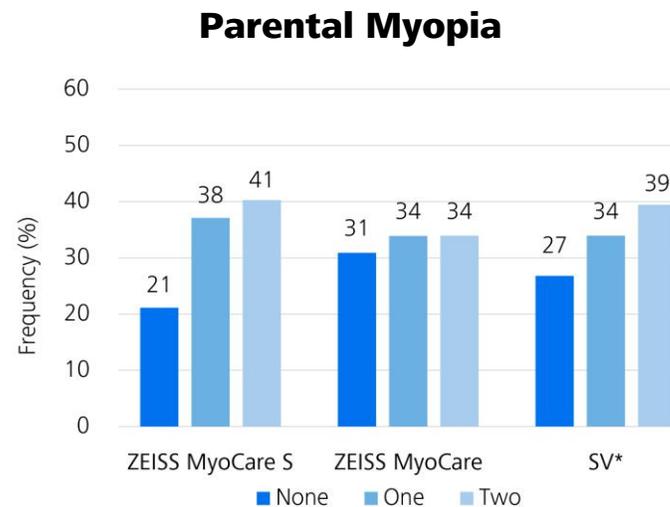


No significant group differences in age, refractive error, and axial length at baseline.

	ZEISS MyoCare	ZEISS MyoCare S	Single Vision (SV)*	<i>p</i> -value*
Age (years)	9.9±1.7	9.8±1.7	9.8±1.6	n.s.
Spherical Equivalent (D)	-2.23±0.98	-2.30±1.06	-2.31±1.01	n.s.
Axial length (mm)	24.44±0.73	24.34±0.74	24.43±0.73	n.s.

Values are reported as mean ± SD.

No significant group differences in gender and parental myopia.



*p-value: p-value, or probability value, is a number describing how likely it is that your data would have occurred by random chance

*n.s.: not significant (Note: Statistical significance refers to the claim that a result from data generated by testing or experimentation is likely to be attributable to a specific cause. A high degree of statistical significance indicates that an observed relationship is unlikely to be due to chance)

*SV: Single Vision lens

Efficacy compared to controls

12-month interim results from a 2-year prospective, multi-center trial in Asian children

Multi-center clinical trial in Asian children



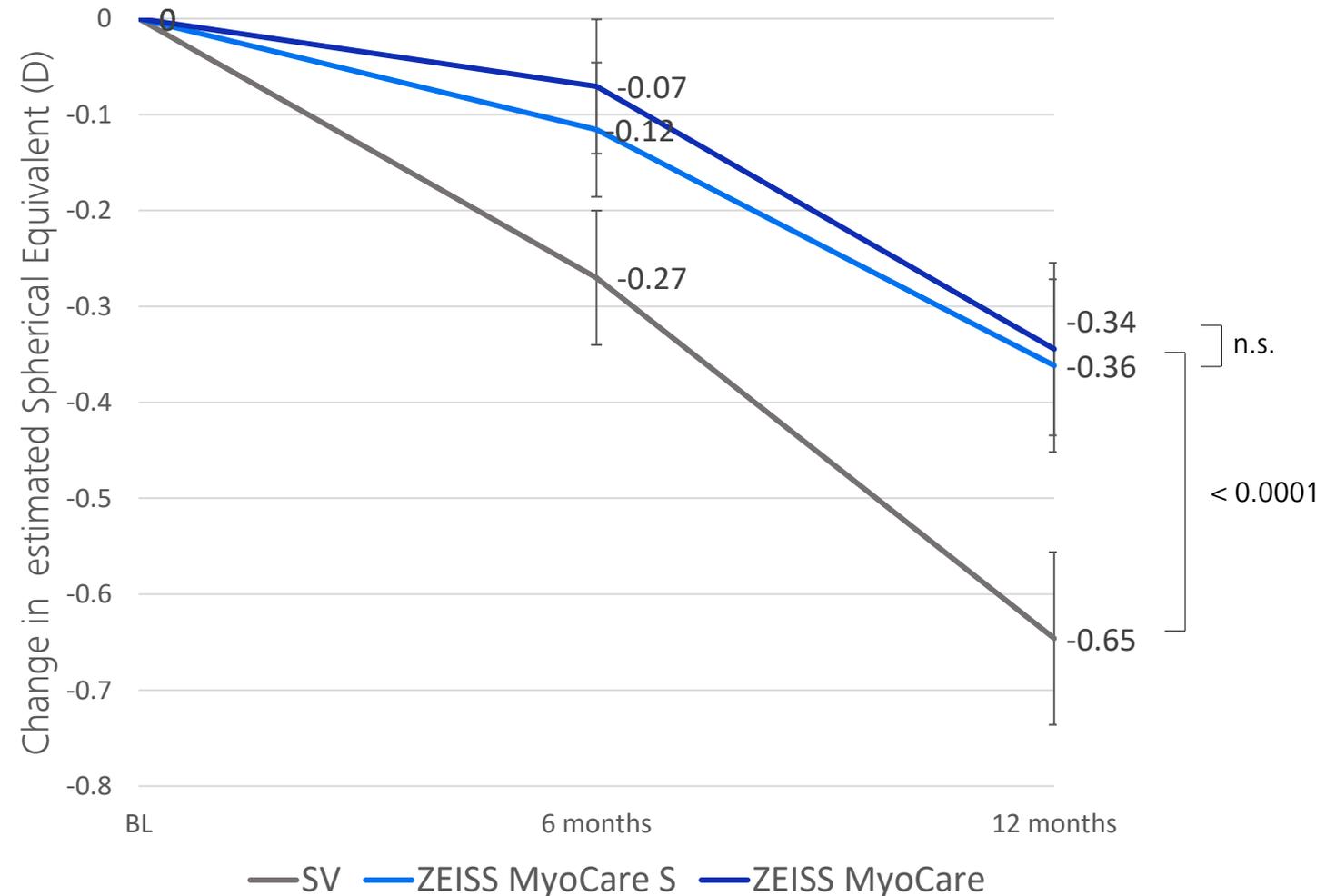
12-Month efficacy compared to single vision spectacles – Spherical equivalent

ZEISS MyoCare and ZEISS MyoCare S significantly slowed myopia progression by

ZEISS MyoCare 0.31D (48%)

ZEISS MyoCare S 0.29D (45%)

on average compared to ZEISS single vision lenses.



Multi-center clinical trial in Asian children



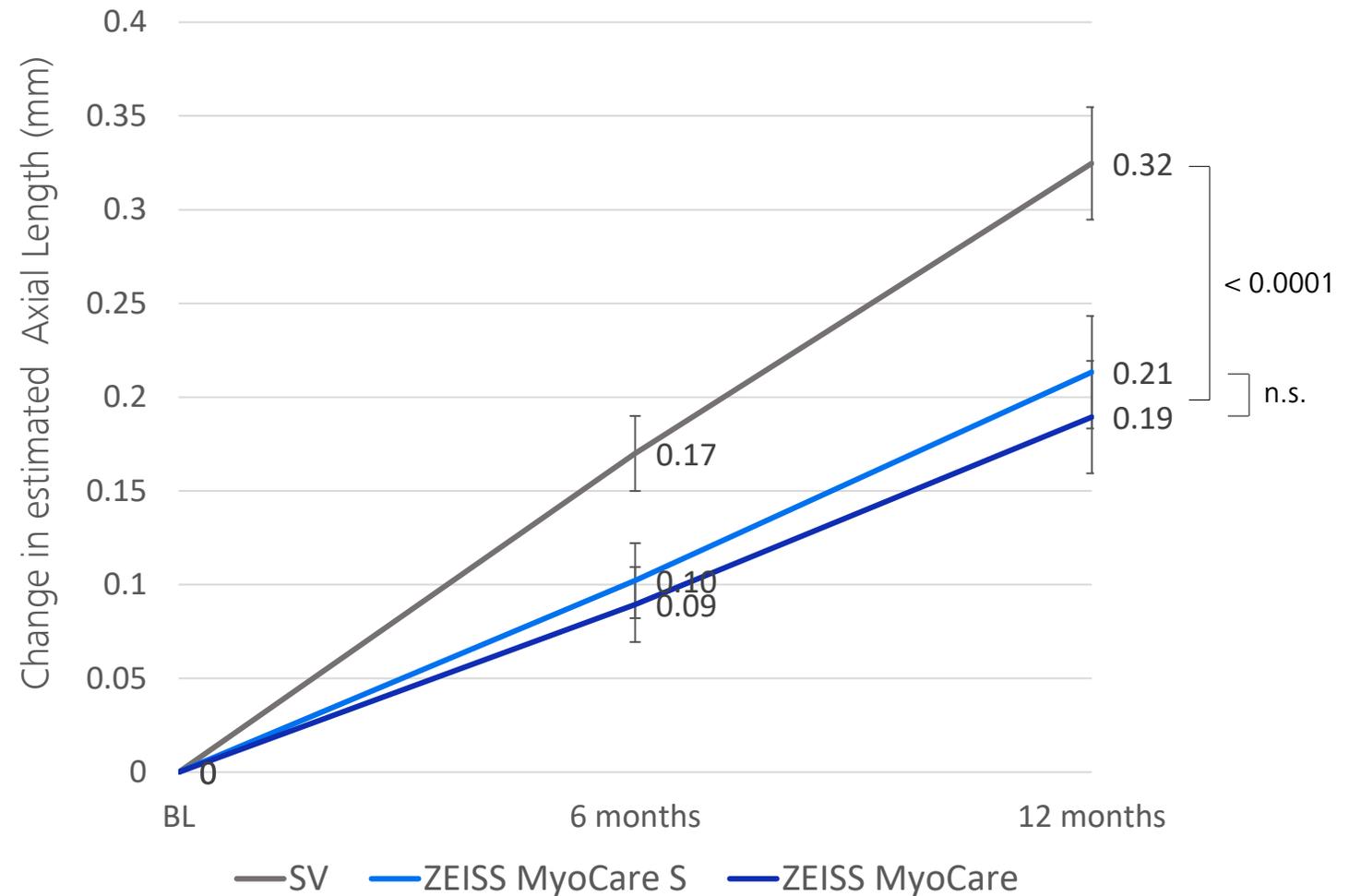
12-Month efficacy compared to single vision spectacles - Axial length

ZEISS MyoCare and ZEISS MyoCare S significantly slowed down axial elongation by

ZEISS MyoCare 0.13 mm (41%)

ZEISS MyoCare S 0.11 mm (34%)

on average compared to ZEISS single vision lenses.



Chen, X., et al. (2024, May 5-9). Slowing myopia progression with cylindrical annular refractive elements (CARE) – 12-month interim results from a 2-year prospective multi-center trial [Conference presentation abstract]. The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Seattle, WA, United States.

Linear mixed model, adjusted for site, group, parental myopia and age.

Multi-center clinical trial in Asian children

Progression of -0.75D or worse



Progression of myopia categorised as :

Fast: -0.75D and worse

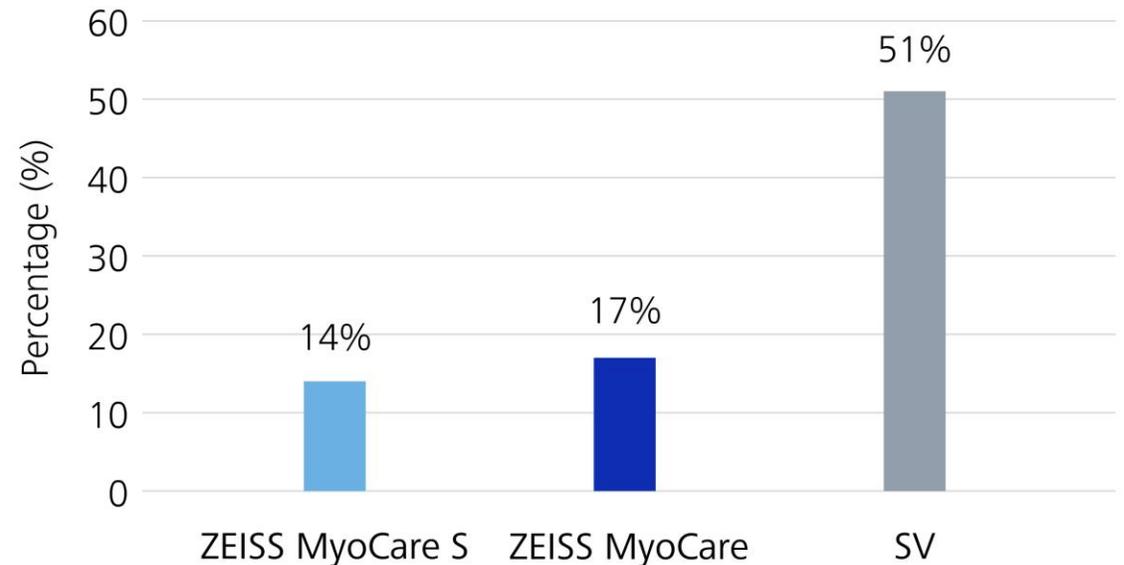
Slow to Moderate: less than -0.75D

Over 12 months, the risk for fast progression

was significantly lower with ZEISS MyoCare S and ZEISS MyoCare ($p = 0.01$)

than with ZEISS single vision lenses.

Progression of -0.75D or worse



17% and 14% of ZEISS MyoCare and ZEISS MyoCare S wearers experienced **fast progression** compared to 51% of children wearing single vision lenses.

Multi-center clinical trial in Asian children

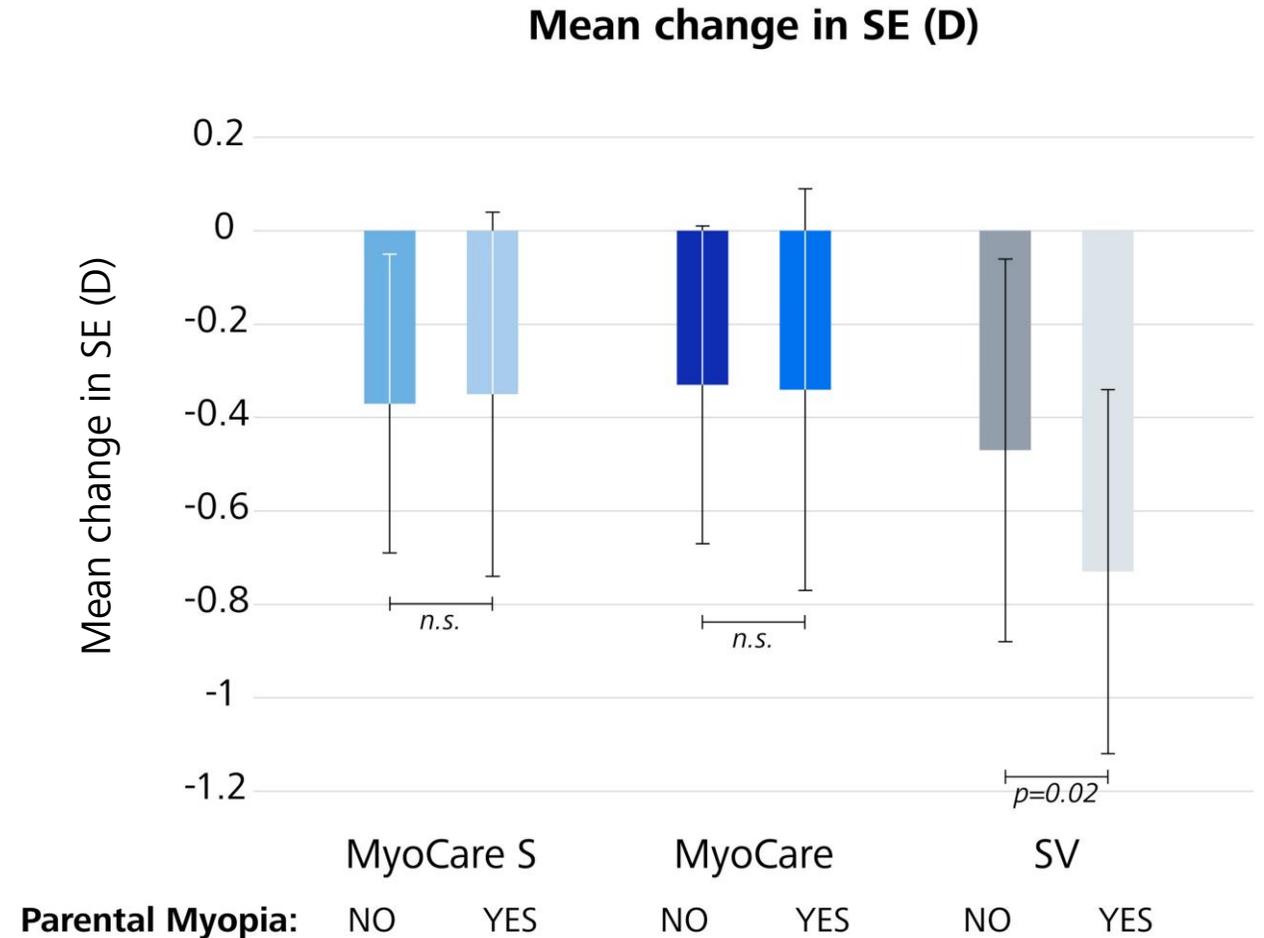
Impact of parental myopia on 12-month efficacy



Parental myopia is associated with both a **greater risk of myopia onset** and **faster myopia progression**.

At 12 months, in children with parental myopia wearing ZEISS single vision lenses myopia progressed faster, while

ZEISS MyoCare and ZEISS MyoCare S slowed myopia progression **across all groups, irrespective of the presence or absence of parental myopia.**



Efficacy compared to emmetropic progression

12-month interim results from a 2-year prospective, multi-center trial in Asian children

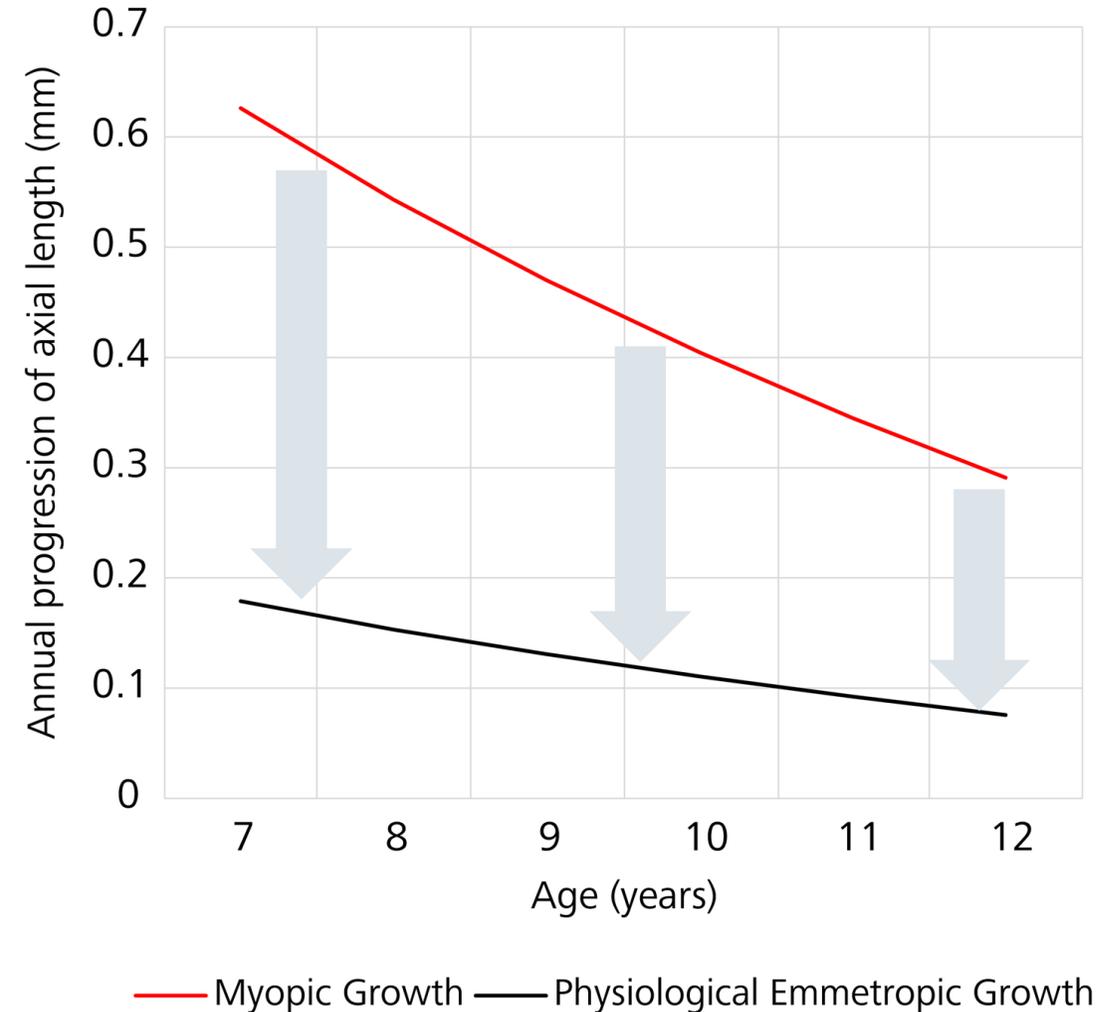
Efficacy compared to emmetropic progression

Treatment objective for myopia management



As children grow, their eyes also grow – an important part of physiological vision development.

The objective for myopia management is to **slow the rate of eye growth** from myopic to **emmetropic growth**.



Efficacy compared to emmetropic progression

ZEISS MyoCare and ZEISS MyoCare S

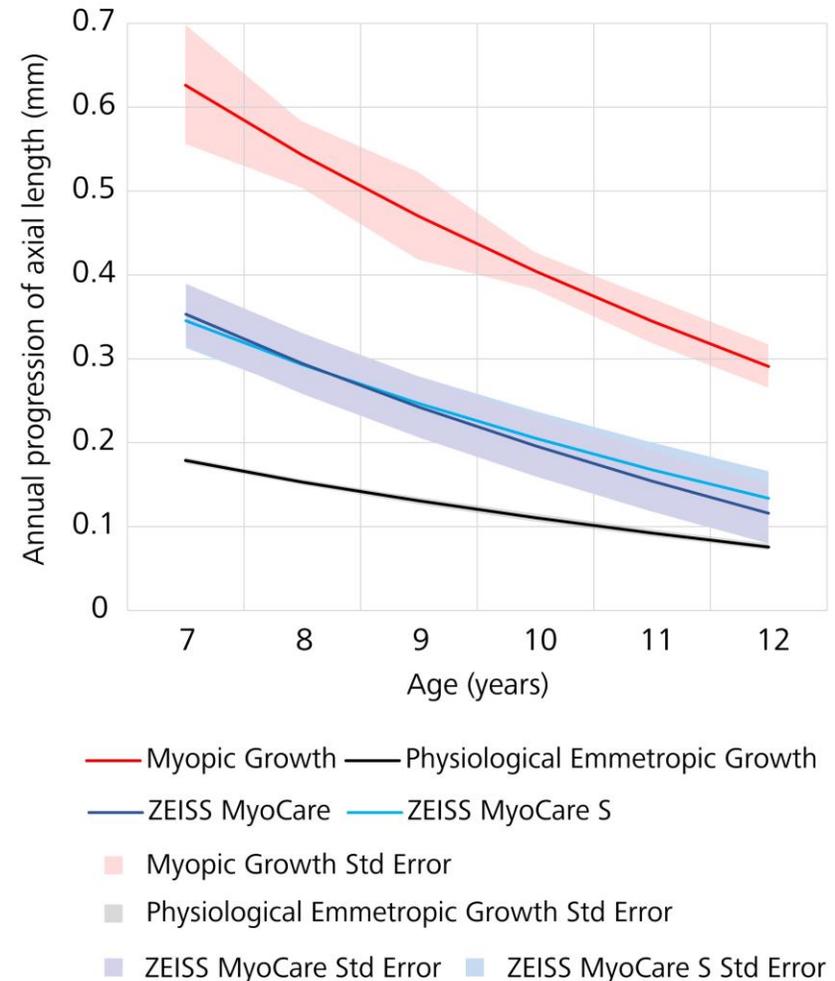


Both ZEISS MyoCare and ZEISS MyoCare S **slow myopic eye growth** to come closer to **emmetropic growth**.



ZEISS MyoCare shows an average emmetropic progression ratio for axial length of **70%***.

ZEISS MyoCare S shows an average emmetropic progression ratio for axial length of **68%**.



**EPR for ages 7-12 yr old children as sample size for ages 6 and 13 was small. When the entire sample of 6 to 13 years were considered, EPR for ZEISS MyoCare was 71%.

Ohlendorf, A., et al. (2024, May 5-9). Myopia control efficacy through Emmetropic Progression Ratio: 1-year of spectacle wear with cylindrical annular refractive elements (CARE) [Conference presentation abstract]. The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Seattle, WA, United States.

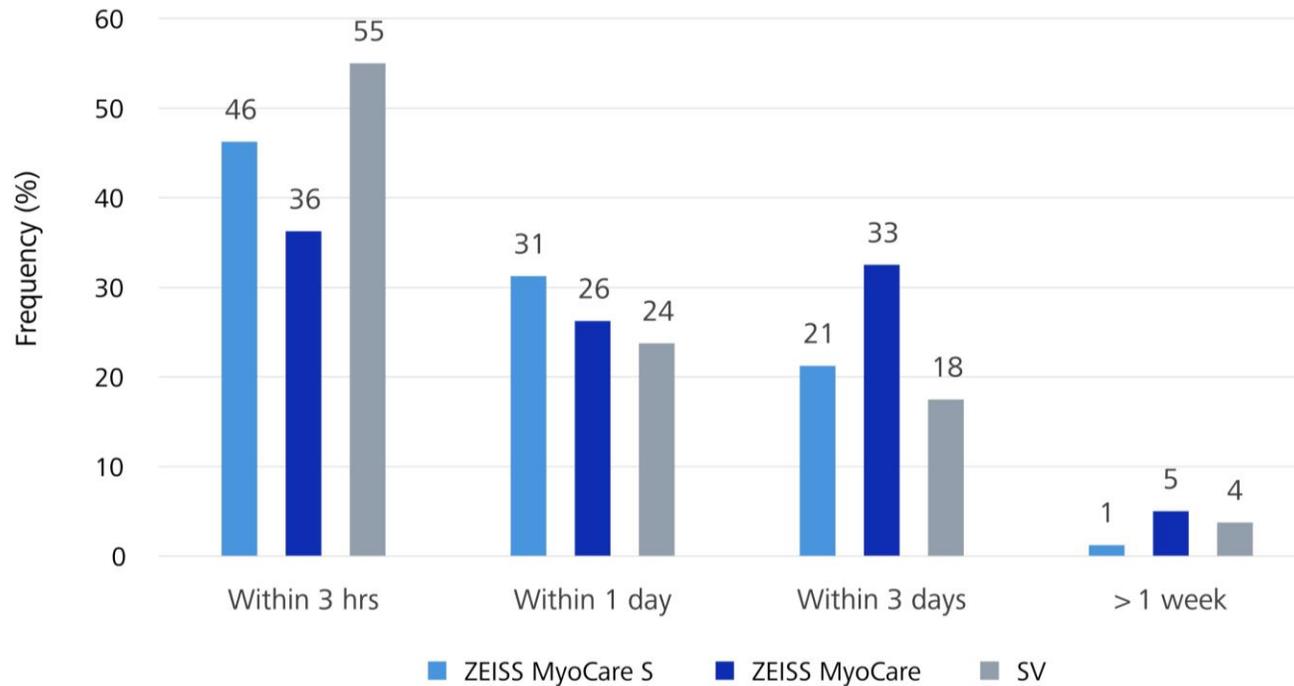
Wearability of ZEISS MyoCare and ZEISS MyoCare S

12-month interim results from a 2-year prospective, multi-center trial in Asian children

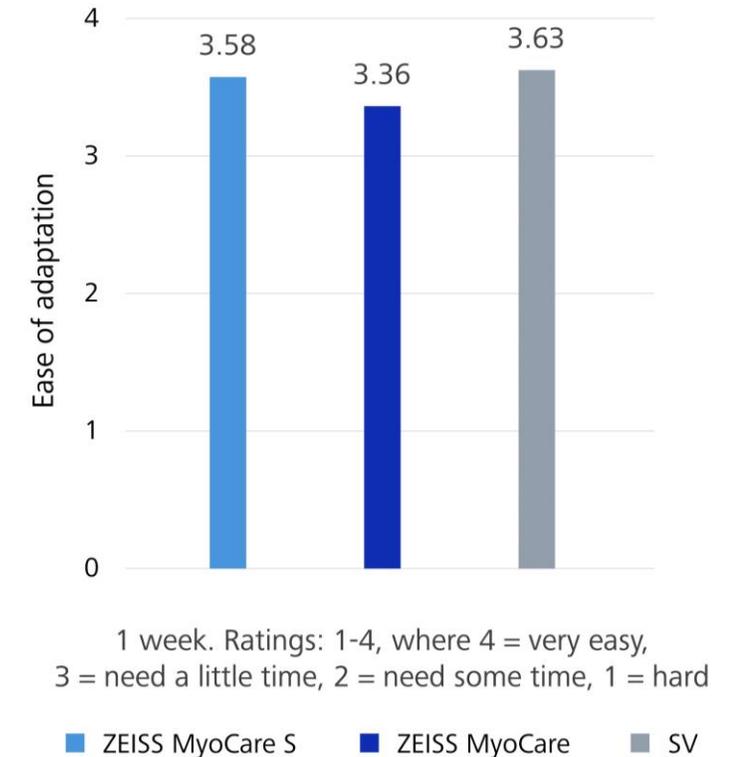
Wearability of ZEISS MyoCare and ZEISS MyoCare S Adaptation



Time to adaptation



Ease of adaptation



More than 95% of children adapted to the ZEISS MyoCare designs within 3 days.

Adaptation was rated to be generally very easy, with some needing a little time.

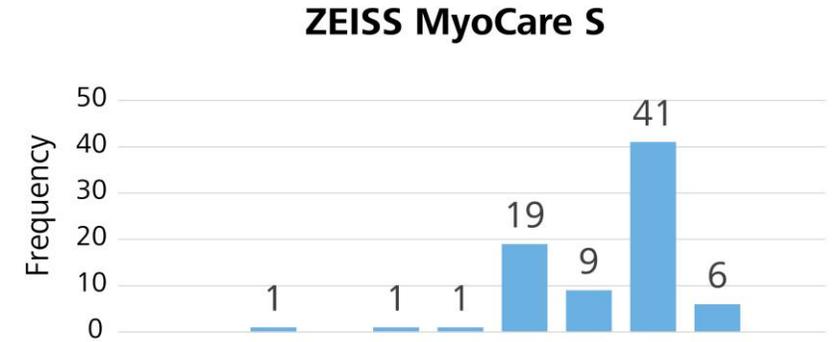
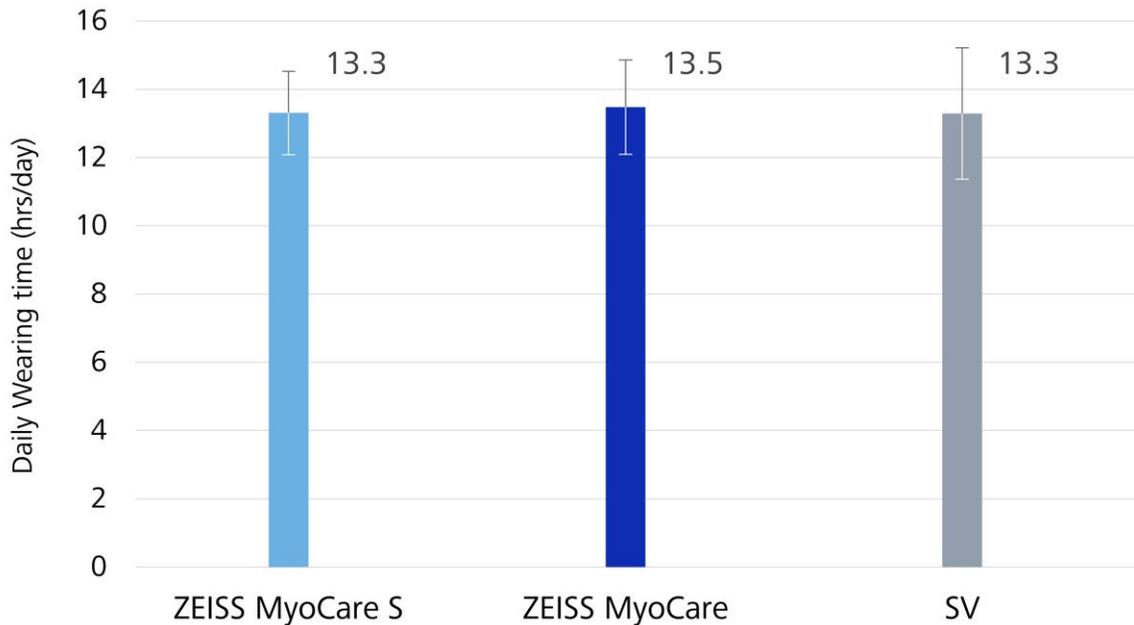
Wearability of ZEISS MyoCare and ZEISS MyoCare S

Wearing time and compliance



Average wearing time (hours/day) was high across all groups

with **98%** reporting spectacle wear of **≥ 12 hours/day**.



Rifai, K., et al. (2024, May 5-9). Subjective acceptance of spectacle lenses with cylindrical annular refractive elements (CARE) in Chinese children with myopia [Conference presentation abstract]. The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Seattle, WA, United States.

Wearability of ZEISS MyoCare and ZEISS MyoCare S

Vision ratings

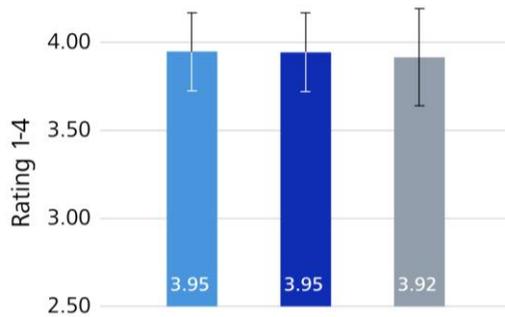


After 3 months of wear; Ratings 1-4 where 4= very good, 3= good, 2= average, 1=poor

■ MyoCare S ■ MyoCare ■ SV



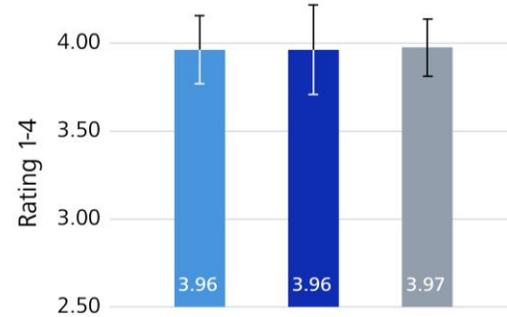
Distance Vision



92% confirmed that their **distance vision** is **very good**.



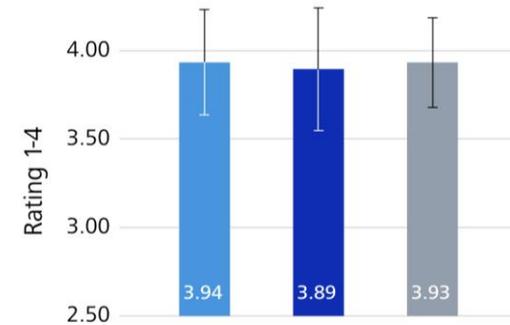
Near Vision



94% confirmed that their **near vision** is **very good**.



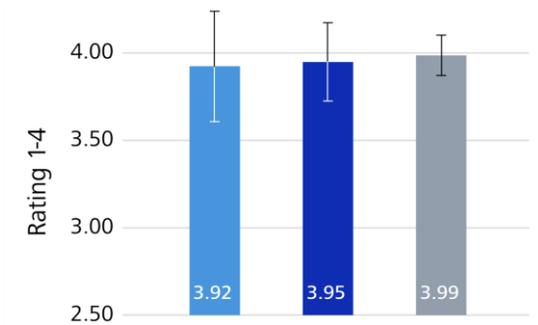
Doing sports



90% confirmed that their **vision while walking or doing sports** is **very good**.



Going up and down stairs



91% confirmed that their **vision while going up and down the stairs** is **very good**.

Rifai, K., et al. (2024, May 5-9). Subjective acceptance of spectacle lenses with cylindrical annular refractive elements (CARE) in Chinese children with myopia [Conference presentation abstract]. The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Seattle, WA, United States.

**6-months interim results from a 2-
year prospective, multi-center trial
with Caucasian children**

Multi-center clinical trial in Caucasian children



Clinical Trial Sites

Six independent ophthalmology clinics in Spain and Portugal

Trial Commenced

October 2022

Principal Investigator



Prof Cristina
Alvarez-Peregrina

Multi-center clinical trial in Caucasian children

Multi-center trial in 5 cities in Spain and Portugal



Bilbao, Madrid, Murcia, Sevilla, Lisboa

Objective: To evaluate the efficacy of C.A.R.E lenses in slowing myopia in a prospective, randomized, multi-center clinical trial

Duration: 2 years

Primary outcome: Change in ocular axial length and cycloplegic spherical equivalent refractive error

Clinical trial registration number: NCT05919654

Multi-center clinical trial in Caucasian children

Inclusion & Exclusion criteria



Inclusion criteria

- 6-13 years
- Objective refractive error, sphere -0.75D to -5.00D, astigmatism < 1.50D
- Progression of at least -0.50D over the past year
- Best corrected VA \geq 1.0 in both eyes
- Sign informed consent

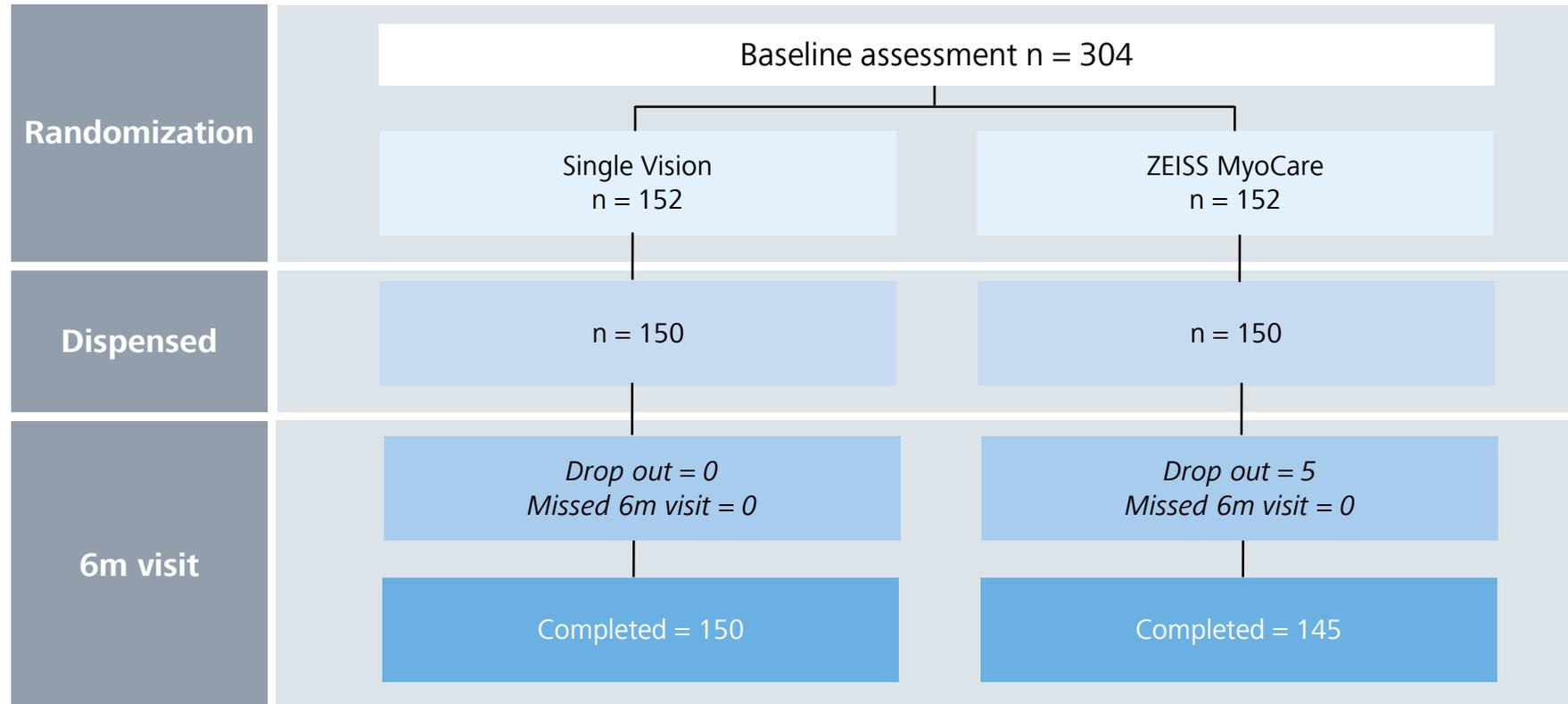


Exclusion criteria

- Presence of ocular pathology or a history of ocular and systemic abnormalities
- Strabismus or binocular vision problems
- History of eye surgery
- Having previously used some method to control myopia
- Having contraindications for the application of drugs for cycloplegia/corneal anesthesia

Multi-center clinical trial in Caucasian children

Trial flow



Reasons for drop out:
ZEISS MyoCare: Lost to follow-up

Multi-center clinical trial in Caucasian children

Baseline characteristics



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

	ZEISS MyoCare	SingleVision (SV)*	<i>p-value*</i>
Age (years)	10.0±2.0	9.9±1.9	n.s.
Spherical Equivalent (D)	-2.24±1.05	-2.20±1.03	n.s.
Axial length (mm)	24.24±0.75	24.19±0.73	n.s.

Values are reported as mean ± SD.

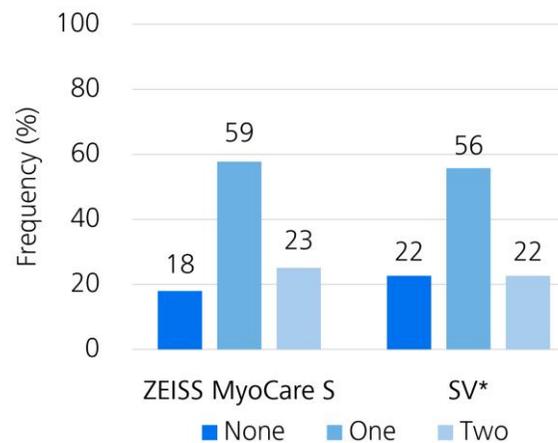
No significant group differences in gender and parental myopia.

*p-value: p-value, or probability value, is a number describing how likely it is that your data would have occurred by random chance

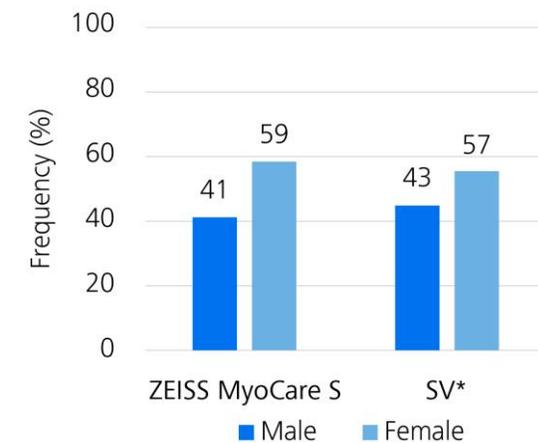
*n.s.: not significant (Note: Statistical significance refers to the claim that a result from data generated by testing or experimentation is likely to be attributable to a specific cause. A high degree of statistical significance indicates that an observed relationship is unlikely to be due to chance)

*SV: Single Vision lens

Parental Myopia



Gender



Efficacy compared to controls

6-month interim results from a 2-year prospective, multi-center trial in Caucasian children

Multi-center clinical trial in Caucasian children

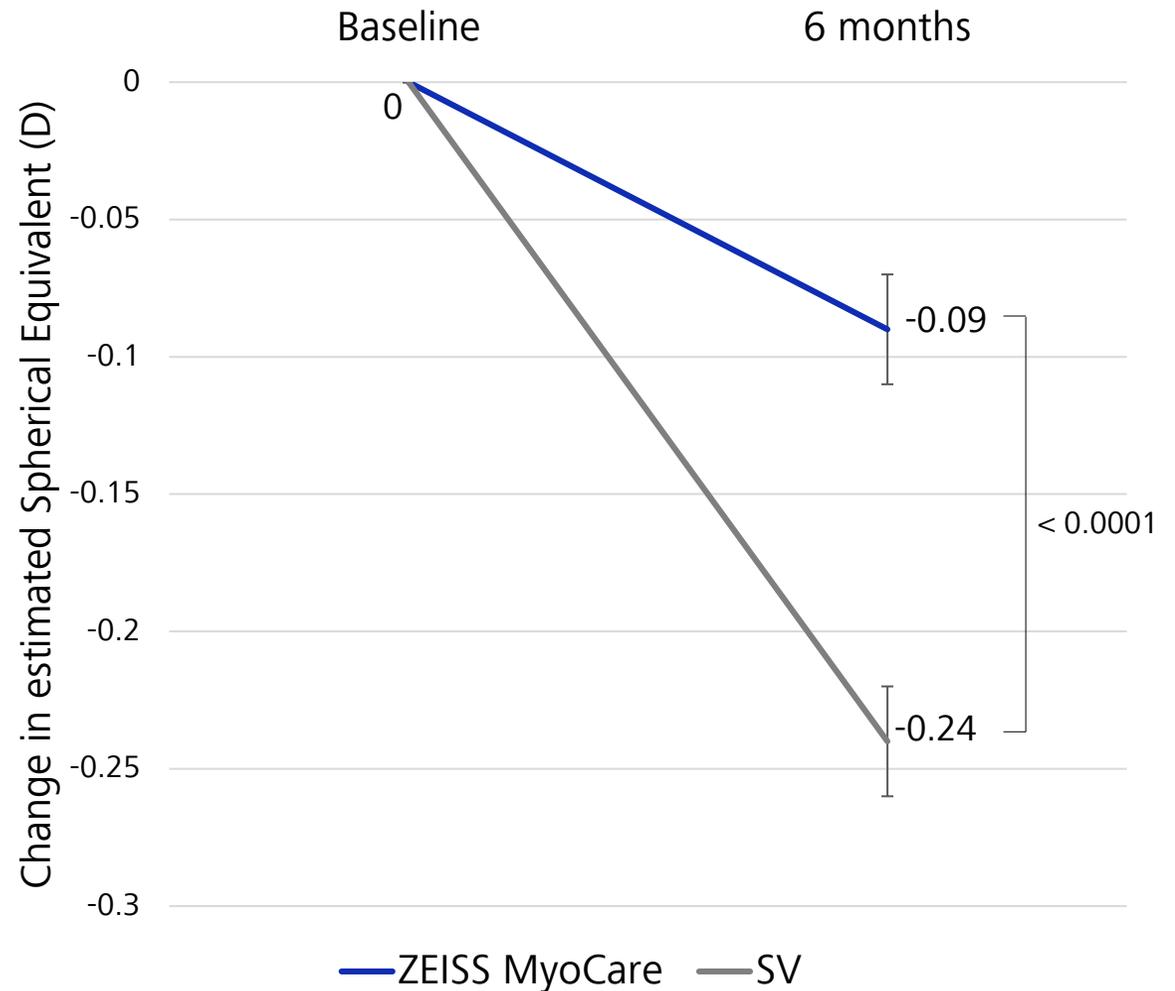
6-Month efficacy compared to single vision spectacles - Spherical equivalent



ZEISS MyoCare **significantly slowed myopia progression** by

ZEISS MyoCare 0.15D (63%)

on average compared to ZEISS single vision lenses.



Interim analysis on 88% of the children (n=138 wearing SV and n=130 with MyoCare) who had completed the 6-month visit to the date of ARVO abstract submission. Alvarez-Peregrina, C., et al. (2024, May 5-9). Efficacy of a next-generation design of ophthalmic lenses for myopia control: Six-month results of the CEME Study [Conference presentation abstract]. The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Seattle, WA, United States.

Linear mixed model, adjusted for lens type, age, and baseline SE.

Multi-center clinical trial in Caucasian children

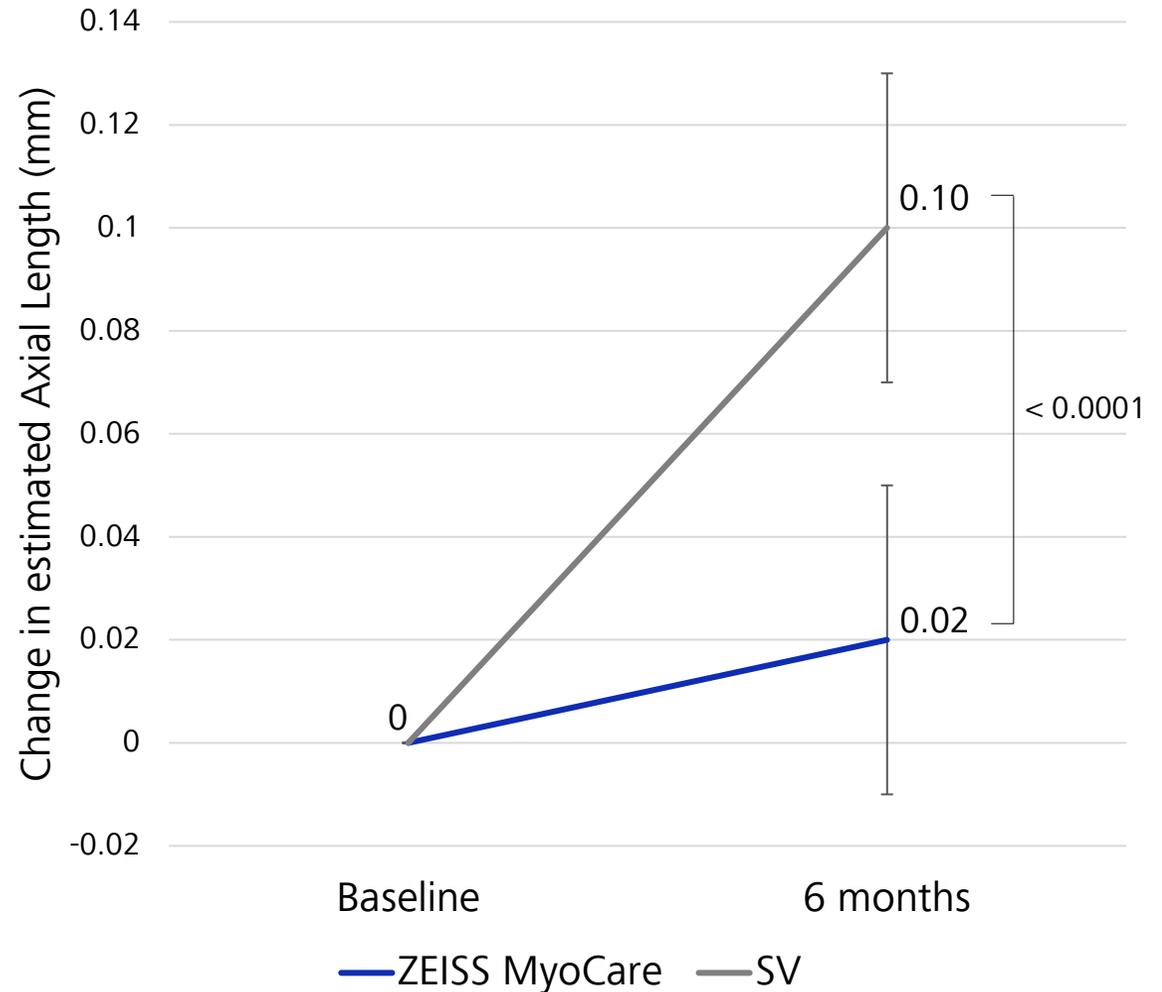


6-Month efficacy compared to single vision spectacles - Axial length

ZEISS MyoCare **significantly slowed down axial elongation** by

ZEISS MyoCare 0.07 mm (77%)

on average compared to ZEISS single vision lenses.



Interim analysis on 88% of the children (n=138 wearing SV and n=130 with MyoCare) who had completed the 6-month visit to the date of ARVO abstract submission. Alvarez-Peregrina, C., et al. (2024, May 5-9). Efficacy of a next-generation design of ophthalmic lenses for myopia control: Six-month results of the CEME Study [Conference presentation abstract]. The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Seattle, WA, United States.

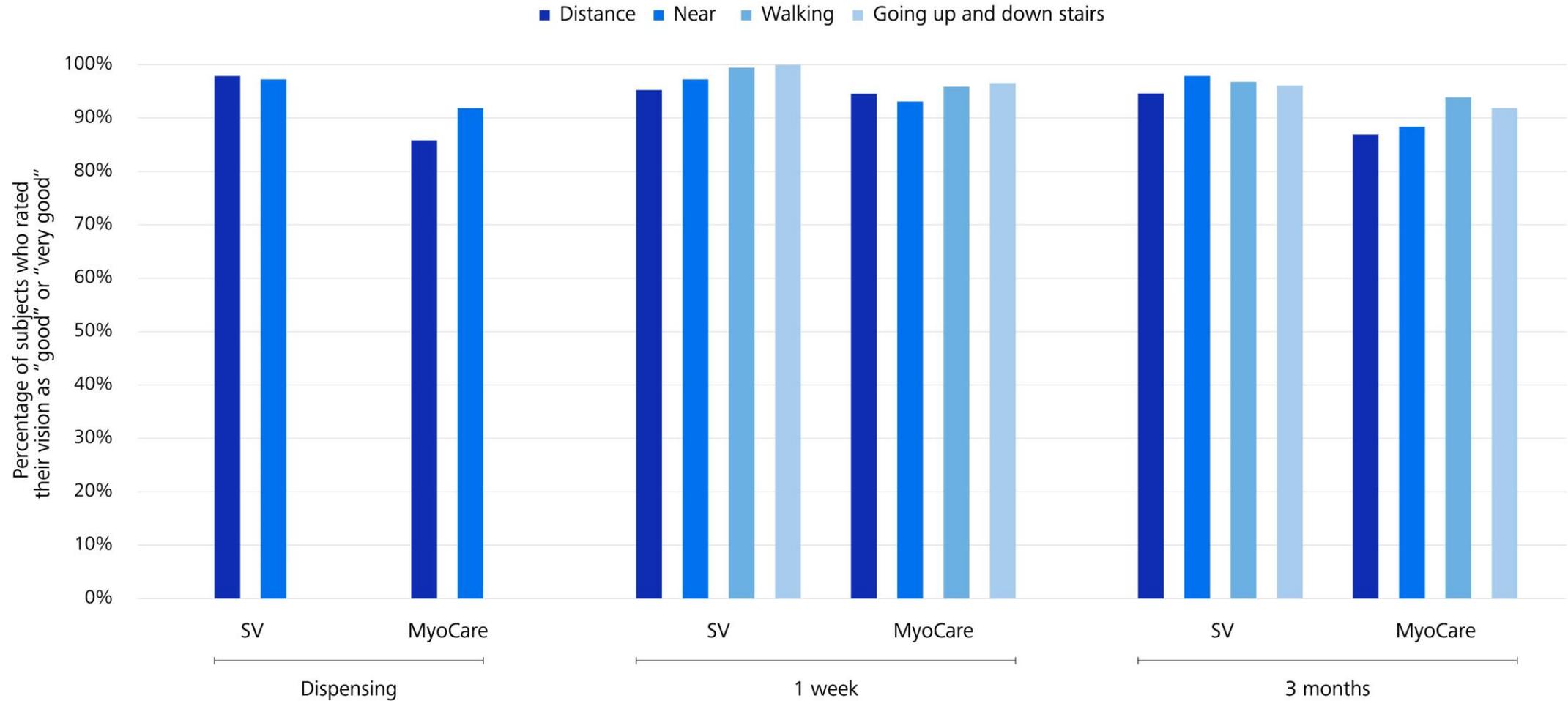
Linear mixed model, adjusted for lens type, age, and baseline AL.

Wearability of ZEISS MyoCare

6-month interim results from a 2-year prospective, multi-center trial in Caucasian children

Wearability of ZEISS MyoCare

Vision ratings



Alvarez-Peregrina C., et al. (2024, April 12-14). *Vision, confort y tiempo de adaptacion a un nuevo diseno de lente oftalmica para el control de miopia* [Conference presentation abstract]. OPTOM 2024, Madrid, Spain.



ZEISS MyoCare performance comparison

How do ZEISS Myocare lenses perform when compared to other multi-segment lenses

Benchmarking efficacy

US FDA guidelines



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 over 3 years.
0.1mm change in axial length corresponded to a 0.24D change in myopia.)

Comparison of Efficacy

Meta-analysis, 64 trials



To obtain comparative efficacy of the different myopia progression interventions, the data of 64 clinical trials across numerous myopia control interventions (i.e. atropine, multifocal soft contact lenses and spectacle lenses, Ortho-K, peripheral plus spectacle lenses, RGP etc.) was analysed to investigate the absolute value in spherical equivalent change and axial length change at 1 year and 2 years. (Lawrence JG et al 2023)

1 Spherical equivalent (SE) change at 1 year:

Greatest benefit in SE change with Atropine (HDA, MDA, LDA), and then peripheral plus spectacles (PPSL includes MiyoSmart and Stellest)

2 Axial length (AL) change at 1 year:

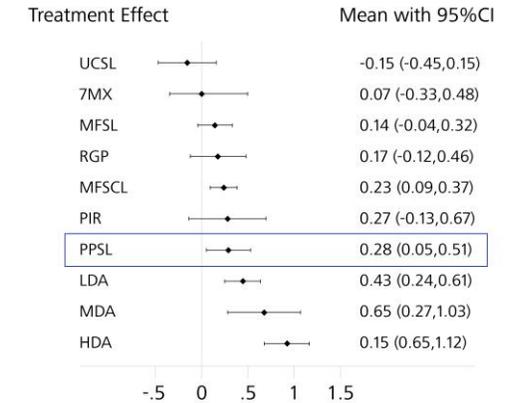
Greatest benefit in AL change with Atropine, Ortho K, then peripheral plus spectacles (PPSL includes MiyoSmart and Stellest)

1 year effect size with peripheral plus spectacle lenses (PPSL) compared to controls

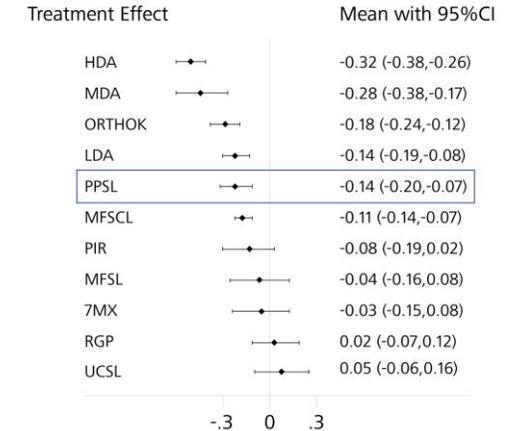
→ 0.28D less progression with spherical equivalent (95% CI: 0.05 to 0.51D)

→ 0.14mm less growth in axial length (95% CI: 0.07 to 0.20mm)

1 Spherical equivalent change at 1 year (reference: CONT)



2 Axial length change at 1 year (reference: CONT)



7MX: 7-methylxanthine; **HDA:** high-dose atropine; **LDA:** low-dose atropine; **MDA:** moderate-dose atropine; **MFSCl:** multifocal soft contact lenses; **MFSL:** multifocal spectacle lenses; **ORTHOK:** orthokeratology; **PIR:** pirenzepine; **PPSL:** peripheral plus spectacle lenses; **RGP:** rigid gas-permeable contact lenses; **UCSVL:** undercorrected single vision spectacles

Extracted from Figure 3, Lawrenson JG, Shah R, Huntjens B, et al. Interventions for myopia control in children: a living systematic review and network meta-analysis. Cochrane Database Syst Rev. 2023 Feb 16;2(2):

Comparison of Efficacy

Meta-analysis, 64 trials vs Myocare and MyoCare S



It is shown that the 1 year effect size with peripheral plus spectacle lenses are:

→ 0.28D less progression with spherical equivalent (95% CI: 0.05 to 0.51D)

→ 0.14mm less growth in axial length (95% CI: 0.07 to 0.20mm)

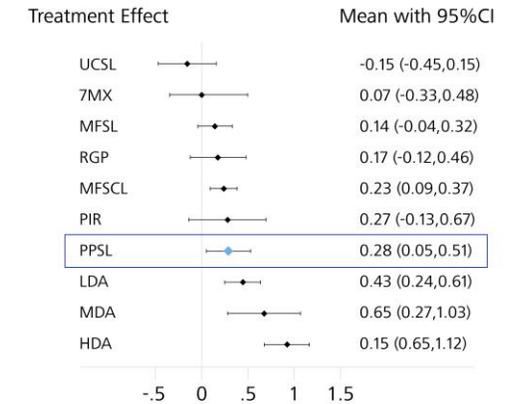
So how does the performance of MyoCare and MyoCare S compare to the peripheral plus spectacles in the Meta-analysis data?

	PPSL	MyoCare	MyoCare S
Spherical Equivalent	0.28D	0.31D	0.29D
Axial Length	0.14mm	0.13mm	0.11mm

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).

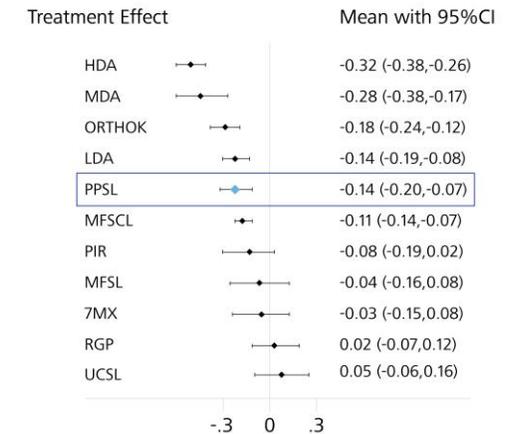
1

Spherical equivalent change at 1 year (reference: CONT)



2

Axial length change at 1 year (reference: CONT)



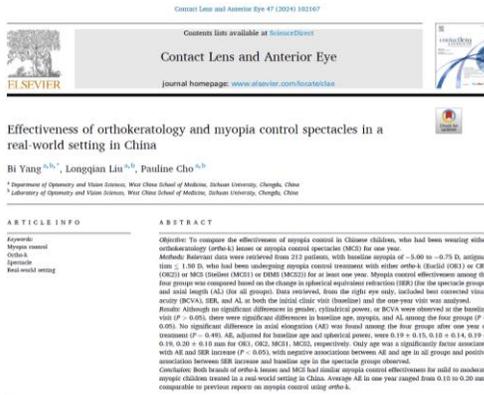
Extracted from Figure 3, Lawrenson JG, Shah R, Huntjens B, et al. Interventions for myopia control in children: a living systematic review and network meta-analysis. Cochrane Database Syst Rev. 2023 Feb 16;2(2):

Comparison of Efficacy

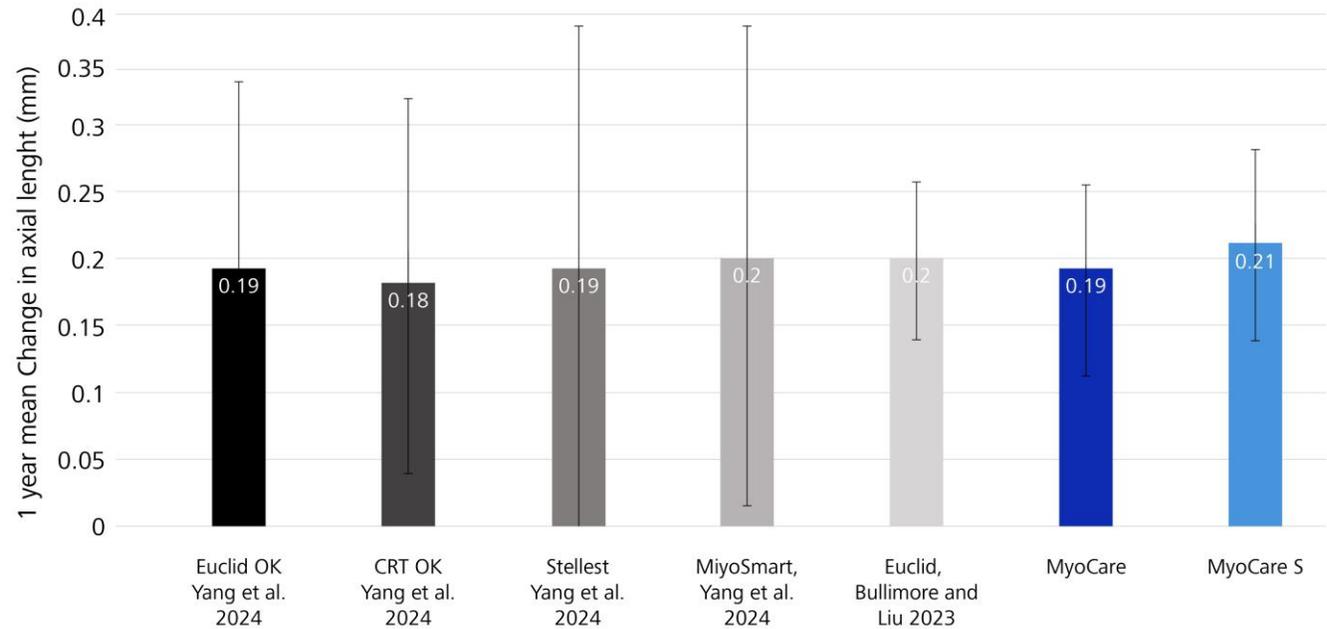
Real world evidence and meta evidence



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 MyoCare lenses is similar to others**



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



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.

Issues with use of relative efficacy (Percent)



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

Scenario 1: LOW progression

Single Vision Lenses

Myopia control lenses

Annual Progression:
0.50D

Annual Progression:
0.25D

Difference: 0.25D

= **50%** relative efficacy

Scenario 2: HIGH progression

Single Vision Lenses

Myopia control lenses

Annual Progression:
0.60D

Annual Progression:
0.35D

Difference: 0.25D

= **42%** relative efficacy

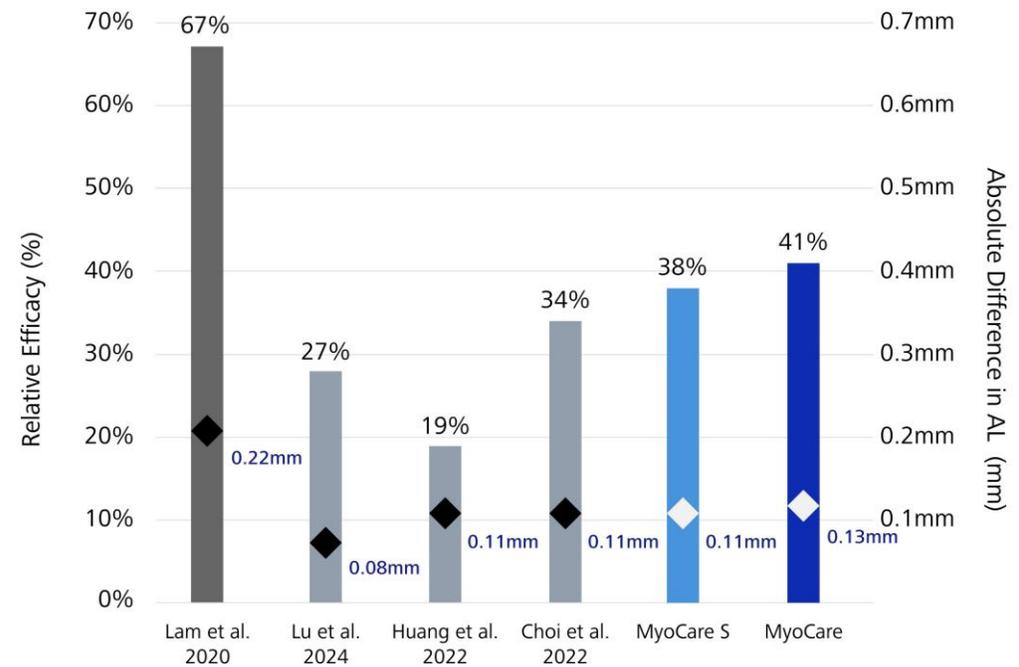
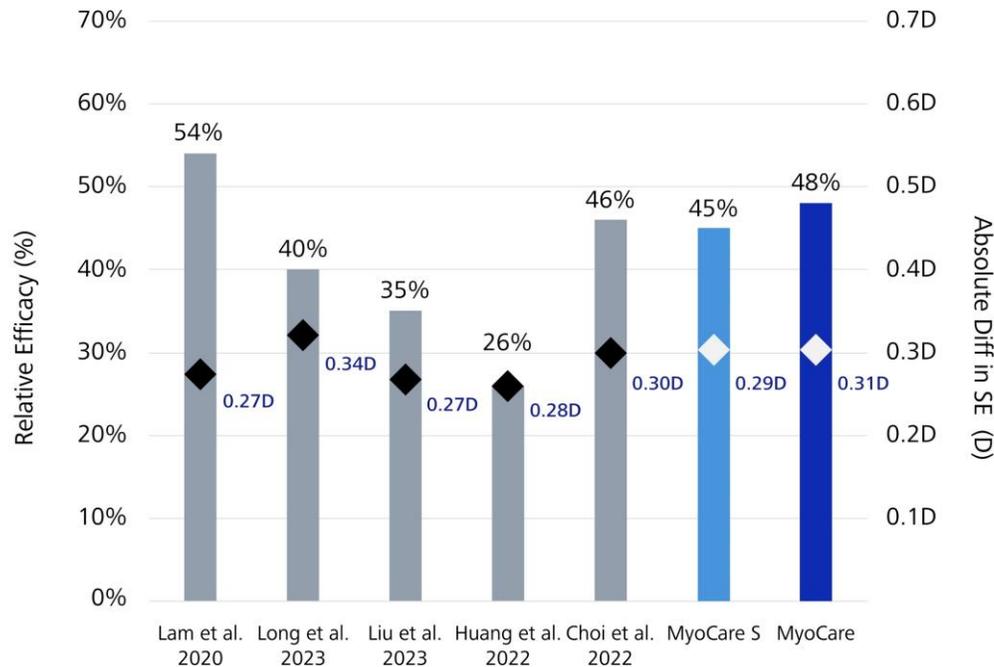
When progression is low, relative efficacy provides a higher value
Different trials yield different percent values

Issues with use of relative efficacy (Percent)



1 year progression - DIMS

Initial performance of DIMS based on relative efficacy not reflected in subsequent trials. MyoCare and MyoCare S demonstrating similar performance



Choi KY, Chun RKM, Tang WC, et al. JAMA Netw Open. 2022 Jan 4;5(1), e2143781 | Huang Z, Chen XF, He T, Tang Y Sci Rep. 2022 Dec 24;12(1) | Lam CSY, Tang WC, Tse DY, et al Br J Ophthalmol. 2020 Mar;104(3):363-368):22311. | Long W, Chen K, Yu S et al. Optom Vis Sci. 2023 Jan 1;100(1):111-116 | Liu J, Lu Y, Huang D, Yang J et al. Ophthalmology. 2023 May;130(5):542-550.

Summary

ZEISS MyoCare portfolio

Efficacy confirmed across multiple sites, large cohorts, and ethnic groups



Results from two on-going multicenter trials in Asian and Caucasian children show that ZEISS MyoCare and ZEISS MyoCare S spectacle lenses **slow the progression of myopia** as compared to ZEISS single vision spectacle lenses across all sites involving large samples and **in both Asian and Caucasian children.**



Seeing beyond