Myopia control efficacy in Asian versus European eyes with spectacle lenses incorporating cylindrical annular refractive elements (CARE)

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Purpose

- It is established that among all races, the East-Asian race has a higher prevalence and greater progression of myopia.[1,2] If race/ethnicity influences onset and progression, does it also have implications for myopia control treatments? Previous analyses indicate treatments are efficacious across races; however, there were no direct comparisons for a specific treatment across races.[3]
- We aimed to determine if spectacle lenses (SPL) incorporating cylindrical annular refractive elements (CARE) were equally effective in slowing myopia in both Asian and European children.

Methods

- 1-year data from two ongoing, multi-centre randomised clinical trials (mRCT) in China (Asia) & Europe. All children aged 6 -13 yrs, spherical equivalent refractive error (SE) from -0.75D to -5.00D and astigmatism ≤ 1.50D.

Asia: n=240
ZEISS MyoCare (CARE) and MyoCare S have mean surface power of +4.6D and +3.8D respectively. Control assigned to single vision (SV) SPL.
(NCT 05288335)

Europe : n=234
Control group assigned to SV SPL
(NCT05919654)

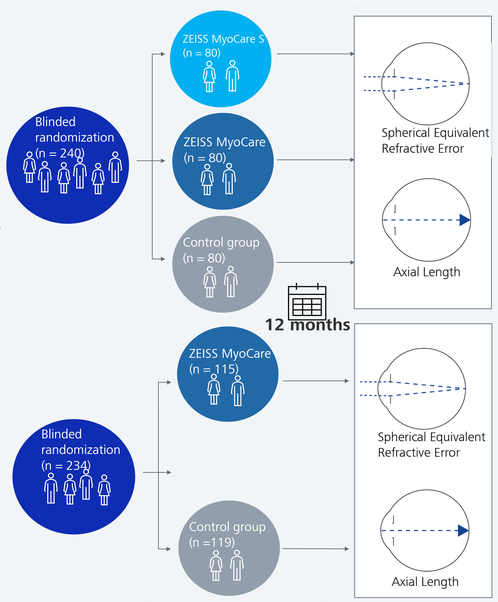

***Figure 1**. Overview of the randomized controlled clinical trials (RCT)*

- 1-year progression for SE and axial length (AL) progression determined.
- Differences between groups (CARE & SV SPL) and race (Asian & European) assessed using linear mixed models (LMM). Race was added as a fixed factor and trial site as random intercept. Difference in progression between CARE &SV SPL by race was added as an interaction term.
- Statistical significance was set at p<0.05.

Results

Baseline
Comparison of biometric characteristics show no differences between Asian and European children.

Table 1. Baseline characteristics

Characteristic	Europe		China		p-Value
	N	Mean±SD	N	Mean±SD	
Age	234	10.5± 1.9	160	10.2±1.6	0.239
SE (D)	234	-2.2±0.9	160	-2.3±1.0	0.346
Axial Length (mm)	233	24.3±0.7	160	24.4±0.7	0.117
Male: Female %	234	56: 44	160	49: 51	0.195
Younger (6-9) vs older (10-13) %	234	43: 57	160	46:54	0.574

1-year progression

- With SV SPL, progression was slower in Europeans vs Asians. (SE:-0.65±0.40D vs -0.41±0.41D; AL:0.32±0.17mm vs 0.23±0.15mm).
- With CARE SPL, progression was slower than SV SPL for both races. (Absolute diff between CARE & SV SPL: 0.29D vs 0.21D in Asians vs Europeans, AL: 0.13mm for both groups).

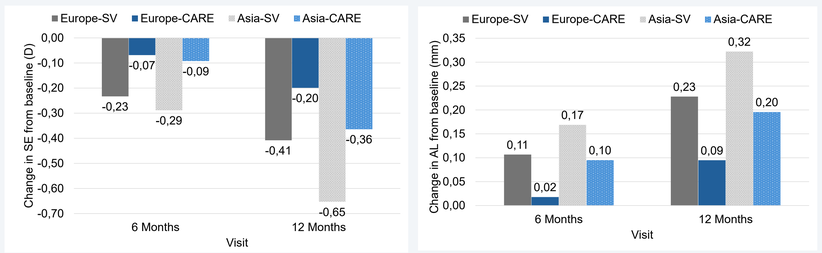

***Figure 2**. 1 year progression between race and SPL groups*

LMM Model

- SE and AL progression was ↑ with SV SPL & Asians, but ↓ with older age at baseline & males (p<0.05).
- Increasing time from baseline was also associated with ↑ AL progression but was of lower magnitude.
- Difference in progression between CARE & SV SPL by race was not different, indicating that CARE was effective in slowing myopia equally across both populations.

Table 2. Progression by race/lens group

Adjusted 1-year difference in progression (CARE-SV)	Europe	China	Interaction of race*group p-Value
SE (D) (mean,95% CI)	0.21 (0.11 to 0.32)	0.29 (0.17 to 0.41)	**0.348**
AL (mm) (mean, 95%CI)	-0.13 (-0.17 to -0.09)	-0.13 (-0.17 to -0.08)	**0.955**

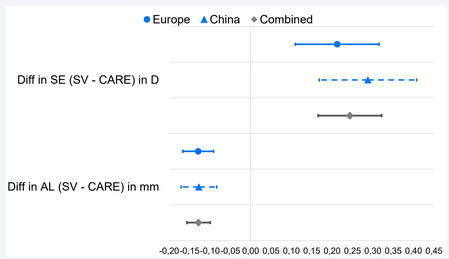

***Figure 3**. Difference in 1-year progression between CARE & SV SPL by race*

Discussion

- In this analysis, comparing data across European versus Asian children with myopia, there were no differences between the groups for baseline parameters, however, 1- year progression was higher with SV SPL and Asian race.
- In both the races, myopia progressed slower with CARE compared to SV SPL. The difference in progression between SV and CARE SPL was not different between Asian vs Europeans indicating that efficacy of CARE was similar across the races. Interestingly, the absolute mean difference between CARE and SV SPL was similar across the two races at 0.21D vs 0.29D for SE and 0.13mm for AL.
- The strength of this analysis is the large sample size and the inclusion of a comparator group wearing SV SPL. In addition, the study considered a representation of children normally considered for myopia control strategies. However, this analysis was post-hoc and the trials were not designed to study the effect of race on the efficacy of CARE spectacles and hence not all races/ethnic groups were considered.

Conclusion

Considerable advances have been made in developing solutions to slow myopia and include specially designed spectacle lenses such as CARE. It is crucial to determine if these solutions can be applied broadly across populations. Our results indicate that CARE spectacles effectively slow myopia in both Asian and European children with myopia.

References

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