

# Multi-Site Observational Study of Defocus Incorporated Multiple Segments (DIMS) spectacle lenses in UK children: 2-year results

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## Background

Defocus Incorporated Multiple Segments (DIMS) spectacles lenses are well tolerated<sup>1</sup> and effective in slowing myopia in Chinese Hong Kong children (HK) compared to single vision (SV) spectacle lenses.<sup>2-4</sup>

**Purpose:** Observational study to explore the effectiveness of DIMS spectacle lenses in controlling myopia over two years in UK children.

- Findings compared to published findings in Hong Kong Chinese children, to evaluate effectiveness between ethnicities.<sup>2</sup>

## Recruitment

- March 2021- December 2021
- Age range: 5-15 years
- Initial refractive status under cycloplegia: Spherical equivalent refraction (SER): -0.50 to -8.50D Anisometropia  $\leq 1.50$ D Astigmatism  $\leq 2.50$ D
- All children were prescribed DIMS Spectacle Lenses

## Methods

- Cycloplegic Autorefraction (SER): Grand Seiko/Shin Nippon, 30 mins post instillation of 0.5% proxymetacaine HCl, 1.0% cyclopentolate HCl
- Axial Length (AL): IOLMaster 500/700
- Wearing schedule questionnaire

## Participant Characteristics

- 105 children, age 10.2 $\pm$ 2.2years
- 46% <10 years; 54% 10-15 years
- 62% White
- 20% Indian Asian
- 7% Chinese
- 11% Other
- 57% female
- 43% male

Average daily wearing time 13 $\pm$ 2 hours (range 7 to 17 hours)

Baseline SER -3.11 $\pm$ 1.60D (Mean $\pm$  Standard Deviation)

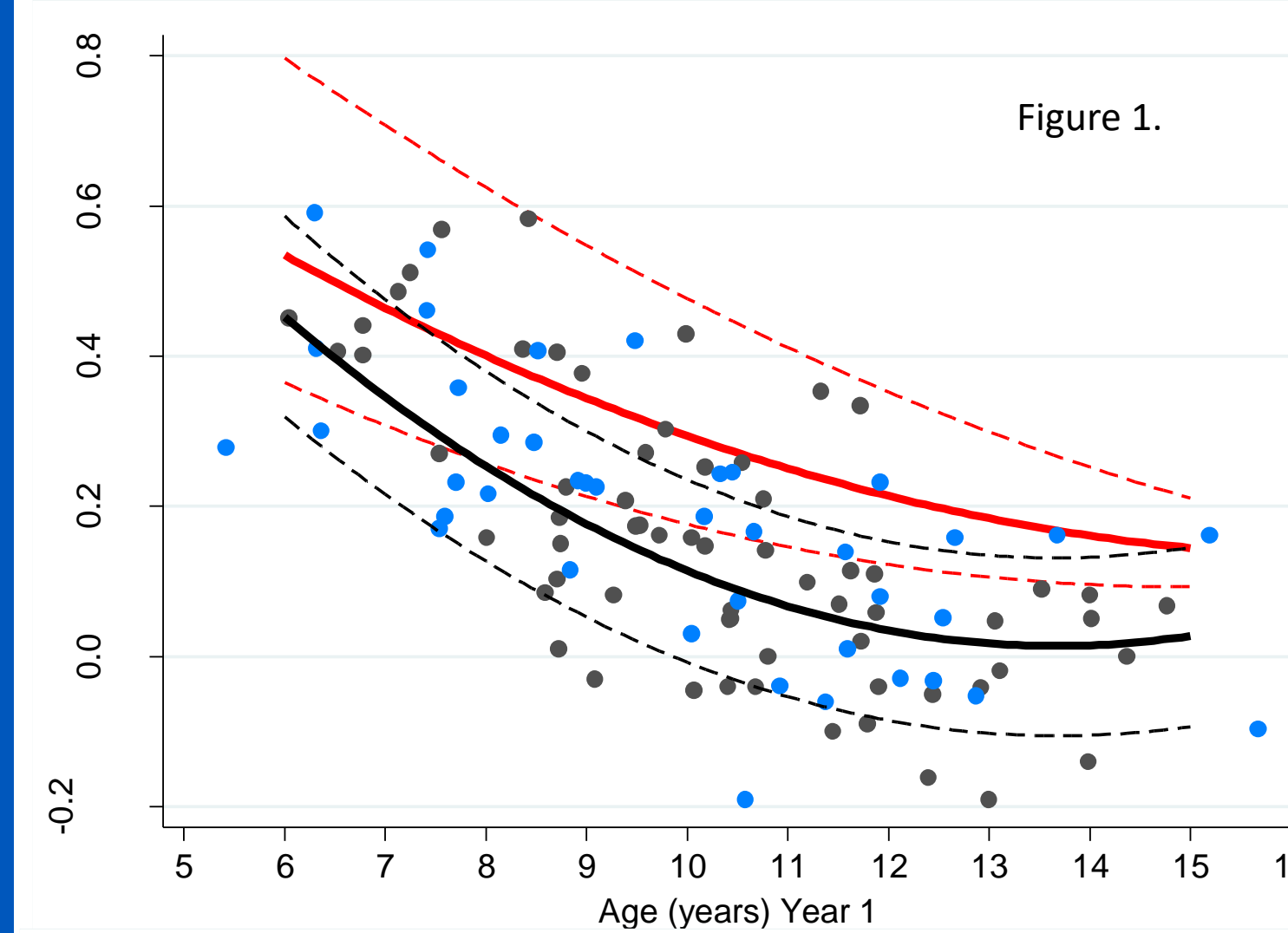
Baseline AL 24.60 $\pm$ 0.93mm (Mean $\pm$  Standard Deviation)

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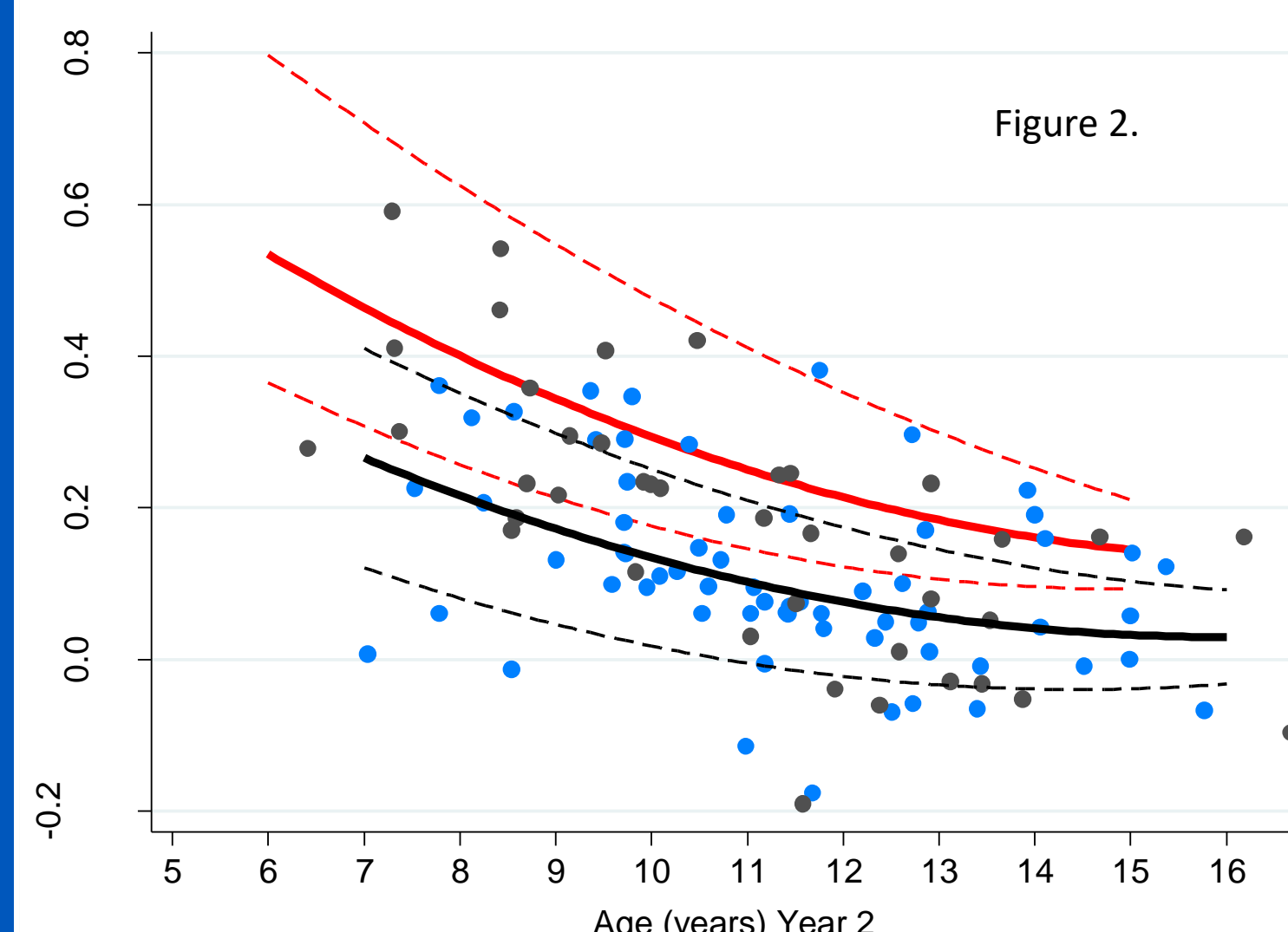
## Full Group Analysis

Visit	Change in SER (D) Mean $\pm$ SD	Change in AL (mm) Mean $\pm$ SD
1-year	-0.35 $\pm$ 0.44	0.17 $\pm$ 0.19
2-year	-0.59 $\pm$ 0.57	0.29 $\pm$ 0.28

Table 1. Mean $\pm$  Standard Deviation (SD) change in spherical equivalent refraction (SER, D) and change in axial length (AL, mm) over the 1<sup>st</sup> and 2<sup>nd</sup> year of DIMS spectacle lens wear.



**Year 1**  
Compared to age-matched virtual controls,<sup>5</sup> DIMS spectacle lens wearers showed on average 0.16 $\pm$ 0.13mm less axial elongation over the 1<sup>st</sup> year. 90/105 (86%) showed slower than untreated myopic eye growth.



**Year 2**  
Compared to age-matched virtual controls,<sup>5</sup> DIMS spectacle lens wearers showed on average 0.15 $\pm$ 0.11mm less axial elongation over the 2<sup>nd</sup> year. 94/105 (90%) showed slower than untreated myopic eye growth.

Figures 1 and 2 show the annual change in axial length (AL) from DIMS spectacle lens wearers in the 1<sup>st</sup> and 2<sup>nd</sup> year of the study, respectively (Blue dots=White, Grey dots= Non-White). Mean $\pm$ SD annual change in AL for DIMS spectacle lens wearers (black lines) and modelled age- and population-matched annual change in AL for untreated myopes (red lines).<sup>5</sup>

There was a mean **cumulative 2-year reduction of 0.31 $\pm$ 0.19mm** compared to age-matched untreated myopic eye growth. The reduction in axial elongation in year 1 was not significantly different from that in year 2 (paired t-test=0.14, p=0.89)

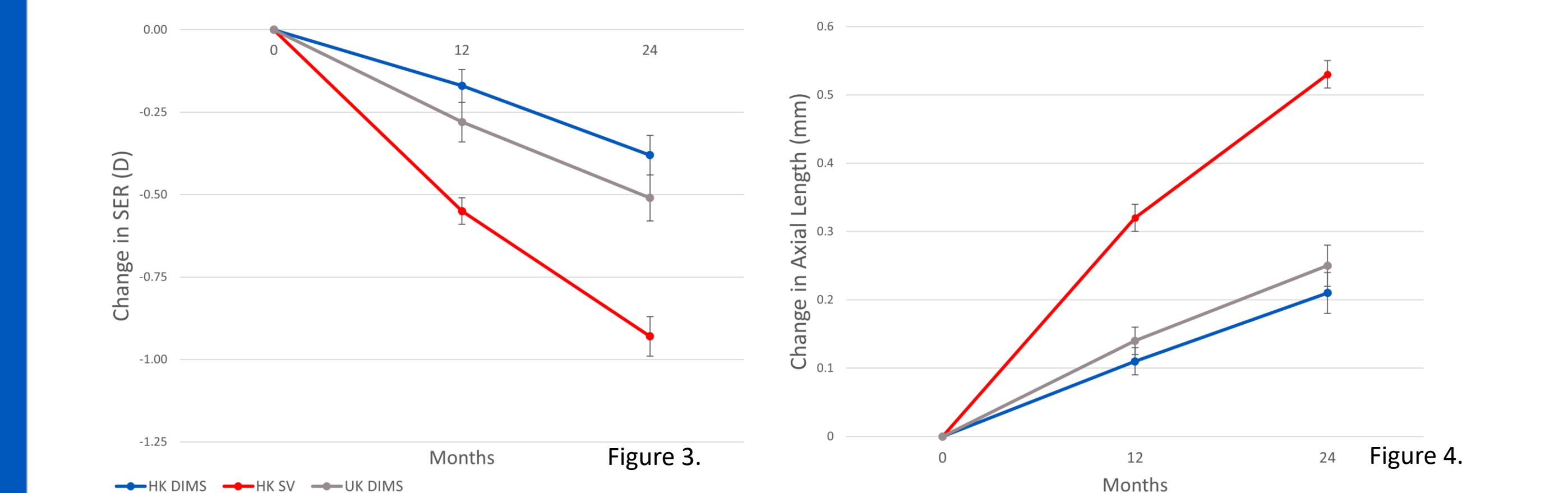
## Sub-Group Analysis Between Ethnicities

- Changes in AL and SER from a subgroup within the present study (matched in baseline age and refractive error) were compared with the same measures from published data on Hong Kong Chinese (HK) children wearing DIMS spectacle lenses to compare effectiveness between ethnicities. HK children wearing single-vision (SV) lenses are displayed for reference.
- Sub-group n=59, baseline age 8-13 years, baseline SER -1.00 to -5.00D, astigmatism  $\leq 1.50$ D.

## Sub-Group Analysis Between Ethnicities cont'd

Visit	DIMS UK	DIMS HK	Mean Difference	One Sample t-test
Change in SER (D), Mean $\pm$ SE				
1-year	-0.28 $\pm$ 0.06	-0.17 $\pm$ 0.05	-0.11	t=-0.17, p=0.07
2-year	-0.51 $\pm$ 0.07	-0.38 $\pm$ 0.06	-0.13	t=-0.38, p=0.06
Change in AL (mm), Mean $\pm$ SE				
1-year	0.14 $\pm$ 0.02	0.11 $\pm$ 0.02	0.02	t=0.11, p=0.16
2-year	0.25 $\pm$ 0.03	0.21 $\pm$ 0.02	0.03	t=0.21, p=0.22

Table 2. Mean $\pm$  standard error (SE) of the change in spherical equivalent refraction (SER,D) and axial length (AL, mm) over year 1 and year 2 for the age- and refractive error-matched sub-group of UK DIMS spectacle lens wearers from the present study and Hong Kong Chinese (HK) DIMS spectacle lens wearers. There were no statistically significant differences between change in SER or AL between the groups at year 1 and year 2 (one sample t-tests, all p> 0.06).



Figures 3 and 4 show mean change in spherical equivalent refraction (SER, D) and axial length (AL, mm) from baseline to 24 months for the sub-group of UK children wearing DIMS (grey), HK children wearing DIMS (blue) and HK children wearing SV (red) for reference. Error bars represent the standard error of the means.

- Compared with the expected age-normative myopic eye growth, DIMS spectacle lenses effectively slowed eye growth in most wearers in both the 1<sup>st</sup> and 2<sup>nd</sup> year of wear.
- The average reduction in axial elongation was sustained over the two-year period.
- DIMS spectacle lenses performed equally well among UK and Hong Kong Chinese children.

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