

Myopia control effect of Defocus Incorporated Multiple Segments spectacle lenses in Indian children with progressive myopia



Poster C-17

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BACKGROUND

- Defocus Incorporated Multiple Segments (D.I.M.S.) technology is a new design of spectacle lens found to reduce myopia progression and has a proven efficacy is established in different ethnicities.¹
- There is dearth of literature regarding the efficacy of this spectacle lens from South Asia, especially India.
- Considering that South Asian eyes show similar growth trajectories to East Asian eyes, it is pertinent to study the effect of such novel lens design on South Asian eyes.

PURPOSE: To study the clinical effectiveness of DIMS spectacle lens versus single vision lenses over two years in an Indian cohort with progressive myopia

METHODS

Inclusion Criteria:

- Age: 7 to 17 years
- Cycloplegic refraction: between -0.5D to -9.00 D
- Astigmatism: ≤ 1.50 D
- Patients with myopia progression ≥ -0.50 D in preceding 6 months

Exclusion Criteria:

- Non-progressors
- New myopes
- No prior experience of myopia control strategy
- Strabismus and binocular abnormalities
- 2-year observational study of 80 children who were fast progressors in preceding 6 months.
- V1: 40 (self-selected) children were prescribed DIMS spectacle lenses; V2: Children monitored at 1 year; V3: Children monitored at year 2
- 40 children completed 1-year and 25 children completed 2 years follow-up.
- A self-selected, age-matched control group of 40 children was also monitored with single vision spectacles for 1 year and 25 children over 2 years.
- Refractive error (cycloplegic autorefraction) using NIDEK ARK -510A and axial length (AL) using NIDEK AL scan were measured at each visit.
- Data were analysed using the statistical analysis software the Jamovi project (2022, Version 2.3.28, R Core Team V4.1). The significance level was set at $p < 0.05$ for all statistical tests.

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RESULTS

Table 1. Demographic data of DIMS and single vision group at V1 visit

	DIMS	Single vision	P-value
Sample size	1 year - 40 children (80 eyes) 2 year - 25 children (50 eyes)	1 year - 40 children (80 eyes) 2 years - 25 children (50 eyes)	
Mean Age (years)	11.4 \pm 3.4	11.2 \pm 2.9	0.796
Gender	Boys - 24, Girls - 16	Boys - 26, Girls - 14	0.64
Mean Refractive error (Diopters)	-3.71 \pm 2.1	-4.18 \pm 1.9	0.194
Mean Axial Length (mm)	24.68 \pm 0.9	24.72 \pm 0.9	0.529
Progression of SER prior to starting DIMS (Diopters)	-0.71 \pm 0.3	-0.7 \pm 0.5	0.768
Progression of Axial length prior to starting DIMS (mm)	0.35 \pm 0.2	0.32 \pm 0.3	0.327

Table 2: Mean SER progression at 1 and 2 years between DIMS and Single vision groups

	Mean SER progression 1 year	Mean SER progression 2 year	P-value
DIMS	-0.25 \pm 0.2	-0.40 \pm 0.4	<0.001
SINGLE VISION	-0.81 \pm 0.4	-1.19 \pm 0.6	<0.001
P value	0.05	<0.001	

Table 3: Mean axial length progression at 1 and 2 years between DIMS and Single vision groups

	Mean Axial length progression 1 year	Mean Axial length progression 2 year	P-value
DIMS	0.12 \pm 0.1	0.17 \pm 0.1	<0.001
SINGLE VISION	0.31 \pm 0.2	0.49 \pm 0.1	<0.001
P value	<0.001	<0.001	

Figure 1: (A) Mean Change in Spherical Equivalent between DIMS & Single vision; (B) Mean Change in Axial Length between DIMS & Single vision

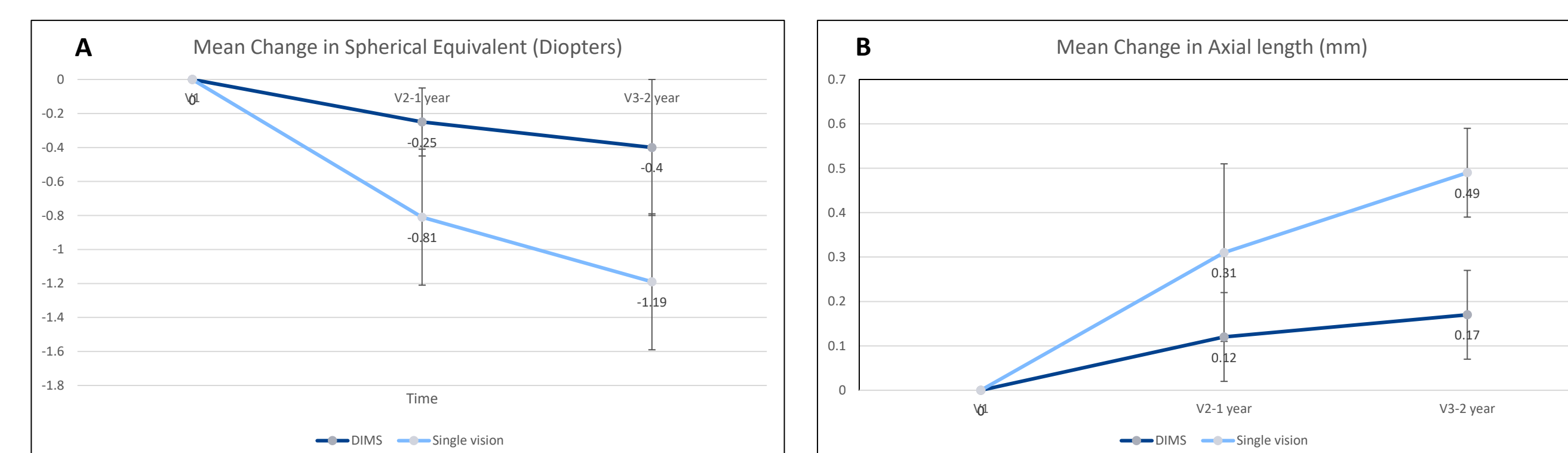
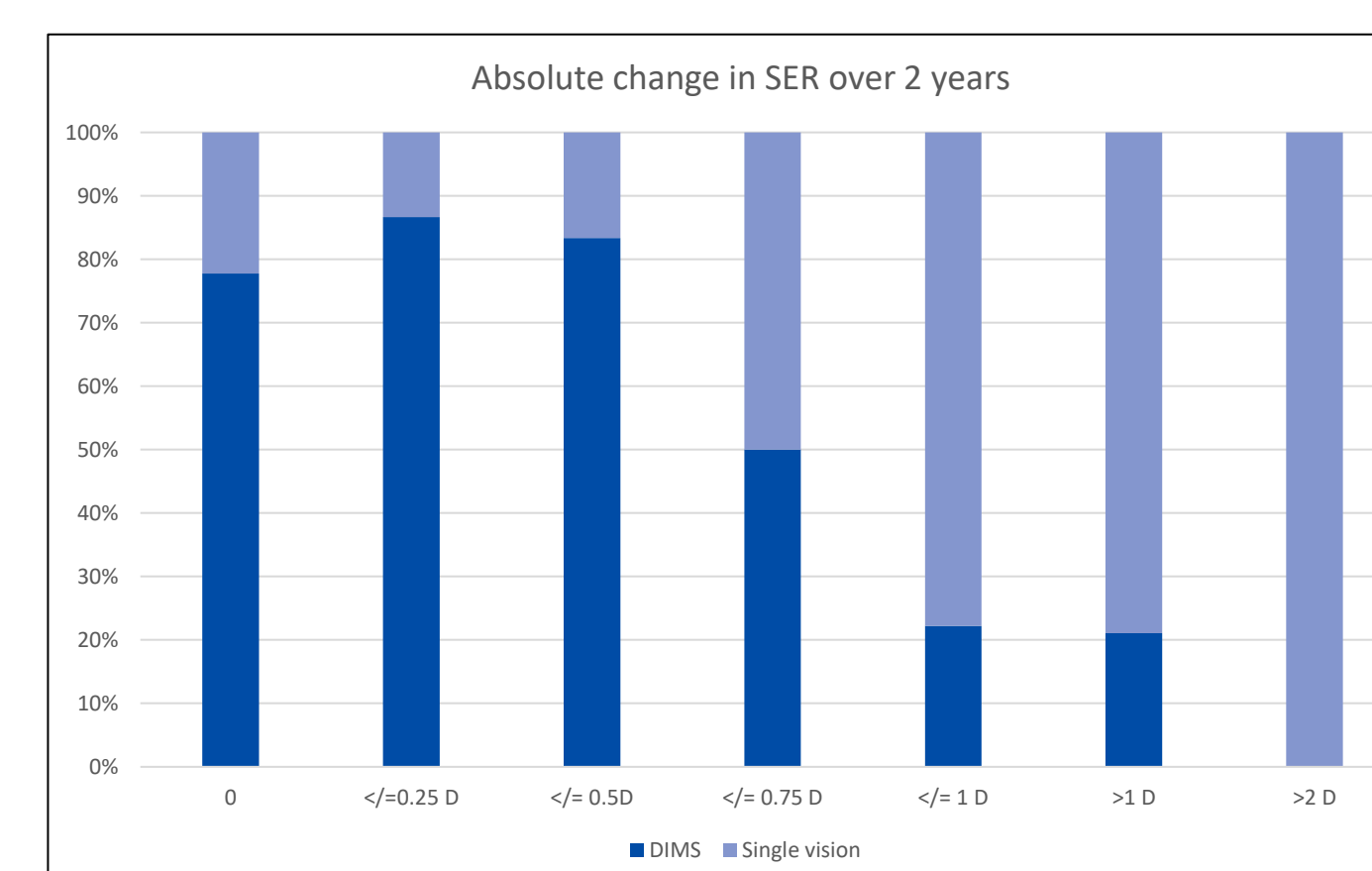


Figure 3: Absolute change in Spherical Equivalent Refraction over 2 years between DIMS and Single vision



DISCUSSION

Study	Age	No. of participants	Follow-up period	Mean Change in refractive error
Lam et al ² , 2020	8-13 years	160 (SV-81 DIMS-79)	2 year	Ref error: -0.41 D Axial length: 0.21mm
Lam et al ³ , 2022	8-13 years	128 (SV-55 DIMS-65)	3 years	Ref error: -0.52D Axial length: 0.31mm
Lam et al ⁴ , 2022	8-13 Years	90	6 years	Ref error: -0.92 D Axial length: 0.60 mm
Liu et al ⁵ , 2023	6-16 years	DIMS-3639 SV-6838	2 years	Ref error: At 1 year -0.27D At 2 years -0.35D
Nadeem et al ⁶ , 2024	6-12 years	DIMS-100 SV-100	2 years	Ref error: -0.32D Axial length: 0.15mm
Present study iOVS ⁷ 2024	7-17 years	50 Children(100eyes) (SV-25 DIMS-25)	1 year	Ref error: -0.24 D Axial length: 0.13mm
Present study	7-17 years	(SV-25 DIMS-25)	2 years	Ref error: -0.40D Axial length: 0.17mm

- At the end of 2 years, 17.5% of eyes in DIMS group had no progression versus 5% in single vision group.
- 75% of eyes had progression < 0.5 D in DIMS group versus 15% in single vision group.

CONCLUSIONS

- DIMS spectacle lenses are effective in slowing myopia progression in an Indian population with documented progressive myopia
- Refractive error: slows myopia progression by 0.79 D in 2 years ($p < 0.001$) Axial length: slows axial length progression by 0.32 mm in 2 years ($p < 0.001$)
- Myopia control is considered to be clinically successful in cases where there is progression of ≤ 0.5 D over 2 years following myopia management treatments. In the present study, 75% of eyes in the DIMS spectacle lens group have clinically successful myopia control.
- To the best of our knowledge, this is the first study investigating effectiveness of optical intervention on patients with progressive myopia.

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