

# The Effect of DIMS Spectacle Lenses On Choroidal Thickness In Myopic Children

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## Background

- Myopia, or nearsightedness, is a growing global concern among school-aged children, with increasing prevalence and associated long-term health risks.<sup>1</sup> Defocus Incorporated Multiple Segments (DIMS) spectacle lenses have emerged as a promising intervention for myopia control.<sup>2</sup>
- Our study aims to evaluate the effect of DIMS lenses on subfoveal choroidal thickness (SfChT) in myopic children over one year. By examining changes in SfChT and their relationship to myopia progression control, we seek to understand the physiological mechanisms behind DIMS lenses' effectiveness and potentially identify a biomarker for treatment efficacy.

## Methods

- Participants:** 90 myopic children (aged 8-13 years), divided into two groups: DIMS spectacle lens group (n=48) and control group (n=42) wearing single vision lenses (SVL).

### Inclusion criteria were:

- 8–13 years old.
- SER: -1.00 to -5.00 diopters (D).
- Astigmatism and anisometropia of 1.50 D or less.
- Monocular best corrected visual acuity (VA) of 0.00 logMAR (6/6) or better.

### Exclusion criteria were:

- Strabismus and binocular vision abnormalities.
- Ocular and systemic abnormalities.
- Prior experience of myopia control.

- Choroidal thickness measured using spectral-domain optical coherence tomography at 4, 8, and 12 months.
- Change in spherical equivalent refractive error, axial length and SfChT from baseline was determined.

## Acknowledgements

- The author of the study has received a travel grant from HOYA.

## Results

**Table 1. Baseline data of the participants.**

	DIMS (n=48)	SVL (n=42)	P value
Age (Years)	9.80±1.42	10.10±1.45	0.231
Gender (F/M)	28/20	21/21	0.876
SER (D)	-2.96±0.98	-2.78±0.95	0.332
Axial length (mm)	24.40±0.80	24.50±0.79	0.875
SfChT (µm)	264.80±50.20	262.20±48.41	0.697

F/M= Female/Male; SER= Spherical Equivalent Refraction; SfChT=Subfoveal Choroid Thickness; DIMS= Defocus Incorporated Multiple Segments; SVL= Single Vision Lens

**Table 2. Comparison of myopia progression parameters of the groups.**

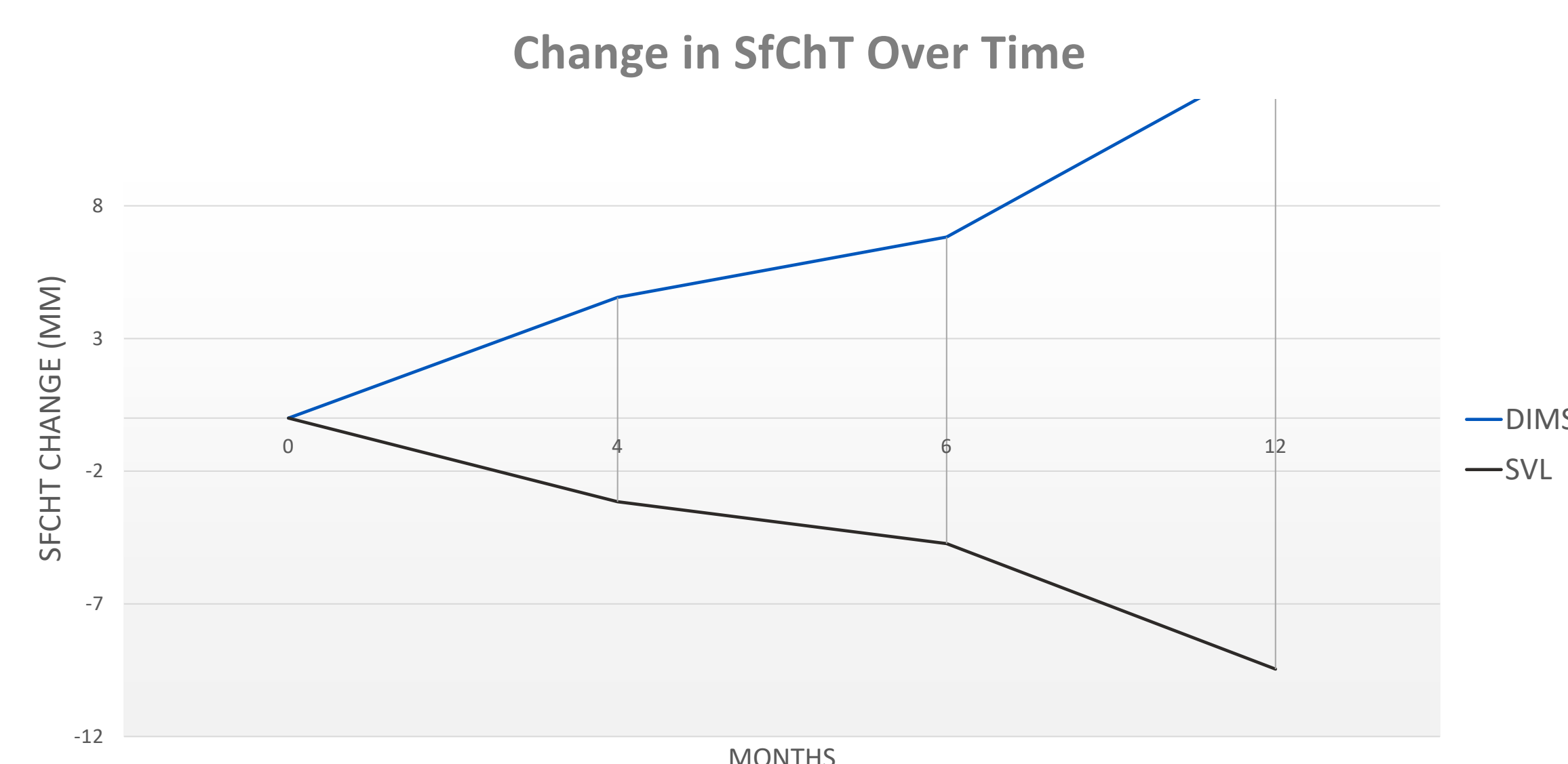
	DIMS (n=48)	SVL (n=42)	P value
Axial length change (mm)			
4-month	0.03±0.01	0.03±0.01	<0.001
6-month	0.10±0.02	0.34±0.01	<0.001
12-month	0.14±0.01	0.52±0.02	<0.001
SER change (mm)			
4-month	-0.13±0.02	-0.24±0.04	<0.001
6-month	-0.17±0.04	-0.37±0.03	<0.001
12-month	-0.24±0.03	-0.64±0.06	<0.001

SER= Spherical Equivalent Refraction ; D= Diopter; DIMS= Defocus Incorporated Multiple Segments ; SVL= Single Vision Lens

**Table 3. Change in subfoveal choroidal thickness during the follow-up.**

	DIMS (n=48)	SVL (n=42)	P value
SfChT change (µm)			
4-month	+4.55±1.98	-3.15±2.48	<0.001
6-month	+6.82±2.41	-4.73±2.21	<0.001
12-month	+13.64±2.62	-9.46±2.55	<0.001

SfChT= Subfoveal Choroid Thickness; DIMS= Defocus Incorporated Multiple Segments ; SVL= Single Vision Lens



## Discussion

- SfChT increased significantly in the DIMS spectacle lens group after 4 and 6 months compared to the SV group.
- At 12 months, choroidal thickness in the DIMS spectacle lens group increased by  $13.64 \pm 2.62 \mu\text{m}$ , while it thinned by  $-9.46 \pm 2.55 \mu\text{m}$  in the SVL group.
- Choroidal changes negatively correlated with axial elongation in both groups, with early changes at 4 months predicting 12-month axial length changes.
- Our 12-month study demonstrates that DIMS spectacle lenses lead to significant and sustained choroidal thickening in myopic children, correlating with reduced axial elongation and myopia progression. These findings are consistent with the two-year randomized clinical trial reported by Chun et al.,<sup>3</sup> which showed a significant choroidal thickening response to DIMS lens wear as early as one-week post-treatment. Their study also found that the choroidal thickening was sustained over the two-year period, with the thickness increasing until 18 months of lens wear and stabilizing thereafter.
- Furthermore, their research indicated that choroidal changes at three months significantly predicted axial length changes at 12 months, supporting our observations of early choroidal changes being predictive of later axial length outcomes.

## Conclusions

D.I.M.S. (Defocus Incorporated Multiple Segments) spectacle lenses lead to significant choroidal thickening in myopic children. Early choroidal changes may be a predictor for long-term myopia progression control. This suggests that incorporating routine choroidal thickness assessments into follow-up protocols for myopic children may enhance our ability to evaluate and optimize myopia progression control strategies

## References

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