Efficacy of Multifocal Gas Permeable Lenses on Progressive Myopia and Axial Length Elongation: A Retrospective Review

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Introduction

Converging evidence from clinical studies have shown myopic inhibiting effects from optical treatments that induce myopic defocus and higher order aberrations (HOAs), such as overnight orthokeratology (OrthoK) and multifocal soft contact lenses (MFSCL).

Multifocal gas permeable contact lenses (MFGPCL) offer better visual correction to children with **high myopia and astigmatism**, while creating **similar optical profiles** to that of MFSCL.

Purpose

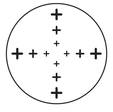
This retrospective review study aimed to investigate the **anti-myopia efficacy and visual performance of MFGPCL** in clinical settings.

Methods

Thirty-six eyes of **eighteen patients** (11 female, 7 male) were empirically fit with **MFGPCL** at the Myopia Control Clinic, University of California, Berkeley.

The average age was **10.27 ± 3.73** (min 2.9, max 16) years and had a follow-up duration of **no less than 12 months**. A **subgroup** of eight eyes of four patients **< 7 years old** (5.14±1.81 years) were analyzed.

The lens used was Valley Contax Golden Eye AFM (Aspheric Front Multifocal), worn as the primary form of visual correction. The add power of the lenses ranged from +1.50D to +2.50D.



Refractive error (RE) from autorefraction and **axial length (AL)** data were analyzed annually.

Results

The patients' **baseline myopia** was -7.98±2.67D, with -2.74±1.51D astigmatism, and **baseline axial length** 26.11±1.37mm.

A **subgroup** of patients **< 7 years old** had average **baseline myopia** of -8.56±2.95D, with -2.81±1.97D of astigmatism, and **baseline axial length** of 23.33±1.91mm.

	All Patients		< 7 Years Old (overall change in 2yrs)	
	Δ RE (D)	**Δ AL (mm)**	**Δ RE (D)**	**Δ AL (mm)**
Year 1	-0.48±0.60	0.40±0.26		
Year 2	-0.43±0.56	0.25±0.21		
Year 3	-0.54±0.62D	0.19±0.19		
Overall change			-1.06 ± 0.93	1.11 ± 0.19

Table 1. Average change of spherical equivalent refractive error (RE) and axial length (AL) annually for patients and a subgroup of patients less than 7 years old.

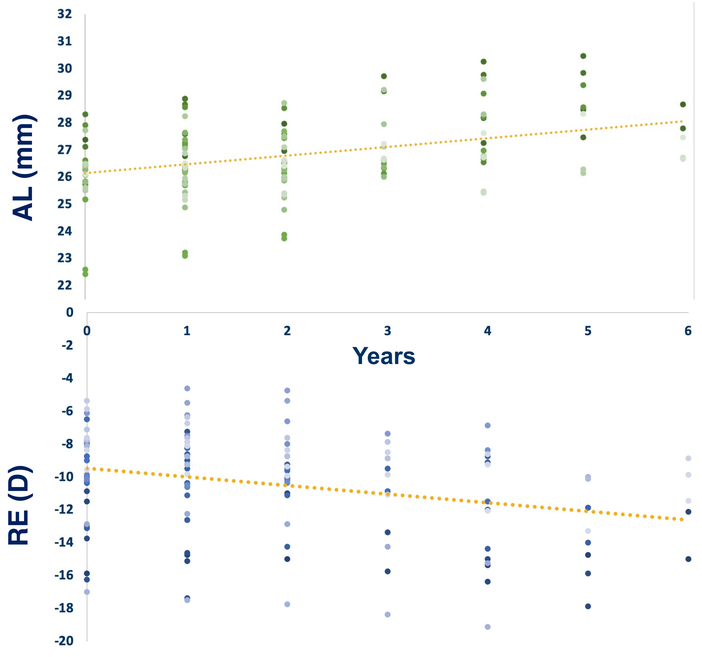


Figure 1. AL (top) data and RE (bottom) data for all subjects with average trendlines for over up to 6 years.

The **duration** of MFGPCL wear was average 3.97±1.52 years (min 1.31 and max 6.4 years)

100% of patients **adapted** quickly to the **comfort and visual correction** of MFGPCL since **initial dispense**.

No serious adverse events were reported in a total of 112 patient years.

Discussion

This retrospective review shows that

- The adaptation and visual performance of MFGPCL in children with high myopia and high astigmatism were excellent, with great long-term compliance to lens wear and superior safety profile;
- Children with earlier onset and/or higher baseline myopia tend to have faster progression and larger axial elongation, even with MFGPCL treatment, comparing to those enrolled in MFSCL studies (ref);
- Future studies investigating the potential synergistic effect of MFGPCL and low dose atropine should be considered for children with higher risk of fast progression and retinal complications.

Conclusion

MFGPCL offered **great visual correction, easy adaptation, and long-term tolerability** to patients with **high, progressive myopia** combined with **high astigmatism,** who were not ideal candidates for MFSCL.

Faster **axial length elongation was seen in the subgroup,** likely attributable to their younger age and more significant physiological axial growth.

References

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