

The Relation Between Overnight Orthokeratology Lens Decentration and Axial Elongation

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Background

- ❖ Natural decentration of up to 1 mm of both rigid and soft lenses is common.
- ❖ The same is true of overnight orthokeratology lenses, despite their reverse geometry back surface design.
- ❖ Here we review comprehensively data from published studies of the relation between Euclid Emerald lens decentration and axial elongation.

Search

- ❖ A comprehensive systematic search was performed in March 2023 using Medline, EMBase, and Google Scholar with the following search terms:

orthokeratology
AND myopi*
AND (axial or elong*)
NOT (review or meta).

- ❖ Of the 526 articles screened, 40 included axial elongation data for children fitted with the Euclid Emerald design.
- ❖ Seven examined the relation between lens decentration and elongation, representing data on 1,484 patients.
- ❖ All calculated decentration from corneal topography referenced to the pupil center.

Disclosure:

Mark Bullimore is a consultant for Alcon Research, Bruno Vision Care, CooperVision, EssilorLuxottica, Euclid Vision, Eyenovia, Genentech, Johnson & Johnson Vision, Lentechs, Novartis, and Vyluma.

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Results

Study	Treatment Duration (months)	Design	N	Mean Lens Decentration (mm)	Correlation Between Decentration and Axial Elongation	Decentration Direction
Lin et al. ¹	12	Retrospective	352	0.52	0.25	—
Wang et al. ²	12	Prospective	267	0.62	0.28	Inferotemporal quadrant
Chen et al. ³	24	Retrospective	116	0.64	0.34	
Zhang et al. ⁴	12	Retrospective	251	0.84	0.29	51% inferotemporal quadrant
Lin et al. ⁵	12	Retrospective	200	0.62	0.99 for quartiles	Inferotemporal quadrant (214°)
Ding et al. ⁶	12	Retrospective	268	0.74	0.23	59% inferotemporal quadrant
Li et al. ⁷	12	Prospective	30	0.67	0.20 mm if > 0.7 mm 0.35 mm if < 0.7 mm	67% inferotemporal quadrant

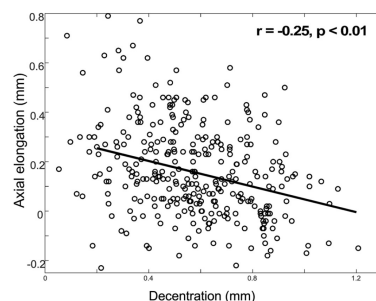


Figure 1. Example of the relation between axial elongation and lens decentration. From Lin et al.¹

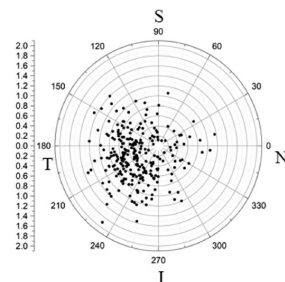


Figure 2. Example of the distribution of magnitude and direction of lens decentration. From Ding et al.⁶

Summary

- ❖ While overnight orthokeratology lens decentration may influence vision, all seven studies found increased lens decentration was significantly associated with slower axial elongation while only accounting for ~10% of the variance.

References

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