Stockholm Myopia Study: baseline results & first follow-up data on peripheral image quality in schoolchildren

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Introduction

- Peripheral defocus has been linked to the development of **nearsightedness (myopia)**: a hyperopic peripheral image could trigger the eye to grow too long.
- Additionally, **near-work** has long since been thought to increase the risk for myopia.

Aim: to understand whether accommodation affects peripheral defocus and image quality in children.

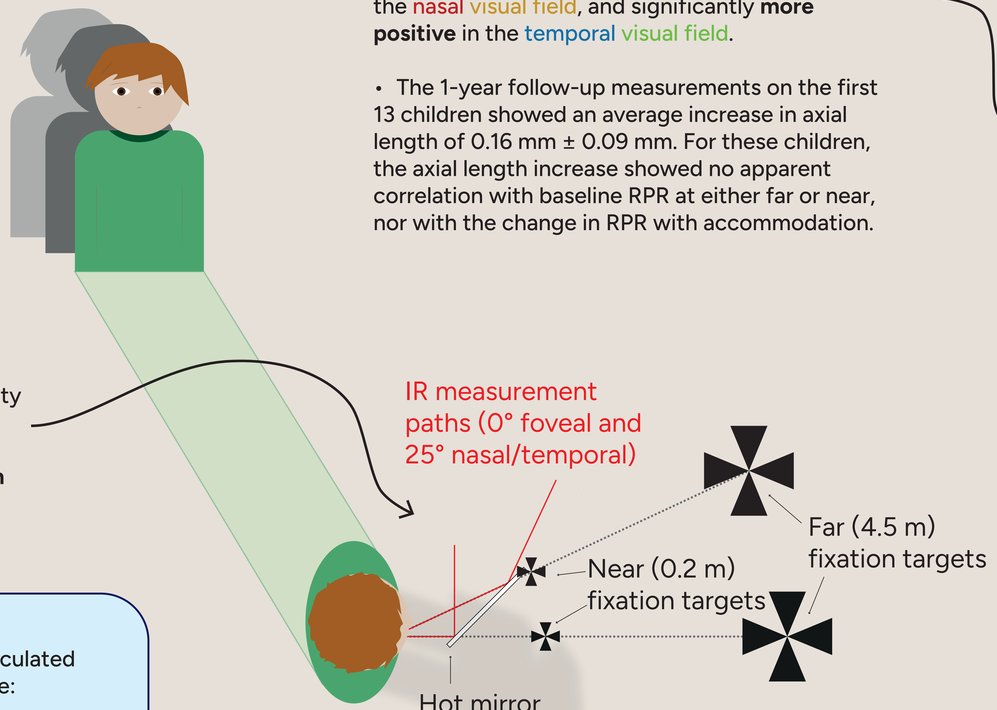
- The study uses a **novel dual angle wavefront sensor** measuring simultaneously in the foveal and peripheral visual fields, marking its first use in pediatric RPR measurements.

Methods

The Stockholm Myopia Study is an ongoing longitudinal study.

Children aged 6- to 11-years-old
- 31 children at baseline (average cycloplegic refraction +0.61 D ± 1.14 D)
- 13 children (so far) at 1-year follow-up

Central and peripheral retinal image quality (25° nasal/temporal visual field) was measured with a dual-angle wavefront sensor for **two different accommodation levels** (0.22 D and 5 D).

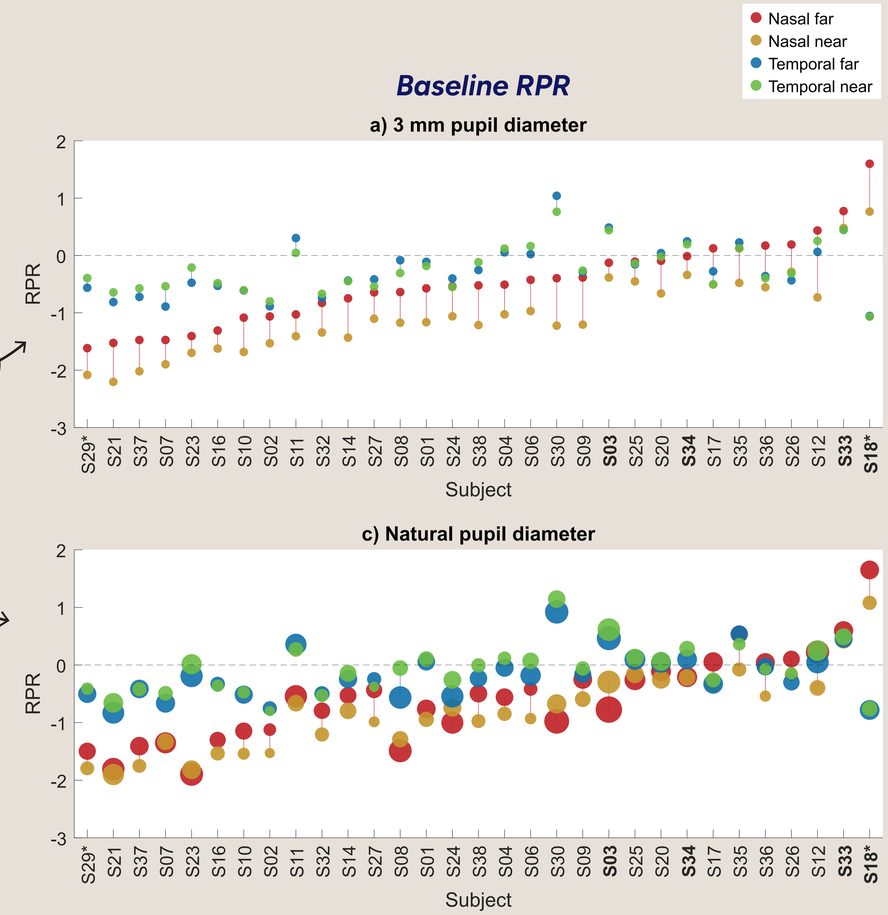


Relative peripheral refraction (RPR) calculated from peripheral and foveal mean sphere:

$$RPR = M_{peripheral} - M_{foveal}$$

Results: RPR with and without accommodation

- For the majority, RPR was negative (myopic) for the far target at baseline, in both the temporal and nasal visual field.
- For *3 mm scaled pupils*, RPR became significantly **more negative** with increased accommodation in the nasal visual field, but did not change significantly in the temporal visual field.
- For *natural pupils*, RPR became significantly **more negative** with increased accommodation in the nasal visual field, and significantly **more positive** in the temporal visual field.
- The 1-year follow-up measurements on the first 13 children showed an average increase in axial length of 0.16 mm ± 0.09 mm. For these children, the axial length increase showed no apparent correlation with baseline RPR at either far or near, nor with the change in RPR with accommodation.



Conclusion

RPR is affected differently in the temporal and nasal visual field by accommodation, with nasal RPR becoming more negative, and temporal RPR becoming slightly more positive. This is in agreement with similar measurements on adults.

Acknowledgment

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