We Can't Predict Future Axial Elongation in Myopic Children with Confidence

Alex Nixon[1], Xu Cheng[1], Youssef Toubouti, Mark Bullimore[2], Noel Brennan[1]
1. Johnson & Johnson Vision 2. University of Houston

Background

- Past progression is the most commonly used criterion for deciding whether to provide myopia control treatment. [1]
- We have previously demonstrated that the prior year's refractive progression is a poor predictor of the subsequent year's progression. [2,3]
- Here we test whether previous year's axial elongation can be used to predict the subsequent year's axial elongation

Method

- We used a sample of 100 right eyes from control populations (age 8-15 yrs) of published studies by Cheng et al, for whom axial length measurements, obtained with optical biometry, were available at baseline, 1 and 2 years
- Univariate comparison between fist year progression and second year progression was performed using Deming regression
- Second year progression was modelled in univariable and multivariable analysis with first year progression, age, sex, and race

Results

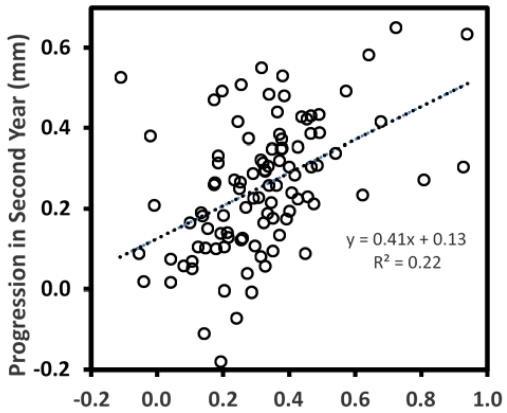

Figure 1: Deming regression of second versus first year progression

	SS	F	p
P1	0.58	27.10	<0.0001
age	0.29	11.80	0.0009
race	0.00	0.01	0.934
sex	0.06	2.36	0.128
BAL	0.09	3.62	0.06
Total SS	2.66		

*P1, first year progression; BAL, baseline axial length

Table 1: Univariate regression predicting 2nd year progression

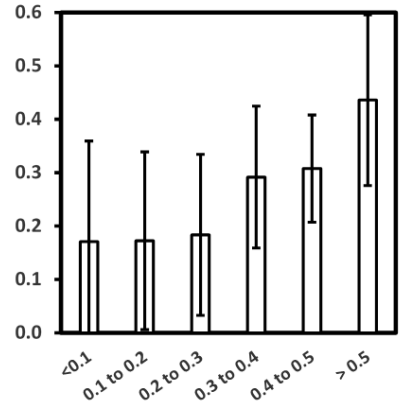

Figure 2: Mean second year progression (± SD) estimates, plotted for different first year progressions intervals

Conclusion

- This is the first time, to our knowledge, that optical biometry has been used to compare 1st and 2nd year progression.
- The robust repeatability of optical biometry measurements (95% limits of agreement ≤ 0.05mm) suggests that the observed modest correlation between the first year progression and subsequent year progression is due to considerable variation in individual year-to-year progression rather than measurement variance.
- Use of past progression to determine the need for myopia control treatment would delay treatment to at-risk children and misrepresent empirical efficacy. This analysis suggests that the dominant treatment clinical paradigm for determining when to treat children with myopia control is flawed.
- Based on these data, the low predictability of future of progression and the risk of progressing to high myopia support that all myopic children 12 years and under should be treated to slow progression

References

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