Contact Lens Update
CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Axial Length Targets for Myopia Control

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Chamberlain P, Lazon de la Jara P, Arumugam B, Bullimore MA. Axial length targets for myopia control. Ophthalmic Physiol Opt. 2021; 41;3: 523-531.

As our knowledge of myopia management improves, so should our knowledge of the instrumentation to measure it. Axial length data have long been important for clinical myopia control research, but the importance of axial length data for treatment of myopia in the clinical setting is just beginning to emerge. As such, clinicians are beginning to measure eye length in young myopic children, and should improve their knowledge related to eye growth accordingly. This article helps the understanding of typical eye growth for myopes and emmetropes and provides some normative data for clinicians to use in their assessment of eye growth.

This manuscript uses data from longitudinal cohort studies of the development of refractive error to compare to eye growth of children who participated in a randomized clinical trial to investigate the effect of a contact lens designed to slow eye growth in children. The information provides a picture of the effect of myopia control on eye growth and provides some normative data from which clinicians can improve their ability to discuss eye growth with parents.

The Orinda Longitudinal Study of Myopia (OLSM), conducted in the United States, and the Singapore Cohort Study of the Risk Factors for Myopia (SCORM) both measured cycloplegic refractive error and a-scan ultrasound of children. OLSM included 6 to 14 year old children who attended at least three visits. Of these children, 16% were myopic (at least -0.75 D in both meridian) and 13% remained emmetropic throughout follow-up. SCORM included 6 to 12 year old children who attended at least three visits. Of these children, 35% were myopic (at least -0.50 D spherical equivalent) and 21% were emmetropic.

Both studies provided equations to predict eye length based on age, and these equations were used to estimate annual eye growth of children with the same age distribution as a randomized clinical trial that examined the effect of a soft contact lens designed to slow eye growth.[1]

Table 1 (available to view in the open access paper here) shows the rate of eye growth by age for emmetropes and myopes in each study. Important points to glean from the table include eye growth slows with age, emmetropic eyes continue to grow, and myopic eyes grow faster than emmetropic eyes. The annual eye growth of myopic children ranged from 0.28 to 0.18 mm per year in the United States and from 0.39 to 0.12 mm per year in Singapore, with the slowest growth recorded for the oldest participants.

Using the OLSM and SCORM equations and the age distribution of the randomized clinical trial, estimates of eye growth over three years were presented in Table 2 and Figure 1 (view paper here). The eyes of myopic

participants grew 0.70 mm in OLSM and 0.63 mm in SCORM. The eyes of emmetropic participants grew 0.24 mm in both OLSM and SCORM. By comparison, in the randomized clinical trial, the control eyes grew 0.62 mm and the treated eyes grew 0.30 mm. It is particularly interesting that the eye growth of all three myopic cohorts corrected with single vision glasses or contact lenses was amazingly similar, and the eye growth of the two emmetropic cohorts was very similar to the eye growth of the cohort undergoing myopia control in the randomized clinical trial.

For use in practice

These modelled data suggest that myopia control treatments may reduce myopic eye growth to the level of emmetropic eye growth, but they are unlikely to completely stop eye growth. Clinicians should not expect eye growth to stop completely while the patient is under treatment. A reasonable amount of eye growth to expect during prime years of myopic eye growth while a participant is on myopia control treatment is 0.1 mm per year, which is equivalent to physiological eye growth expected for emmetropic eyes. Without treatment, the eyes of a myopic patient are expected to grow approximately 0.2 mm. Both of those annual eye growth rates decrease naturally with age.

With these numbers in mind, clinicians will have a better understanding of the expectations for eye growth related to myopia control. This knowledge helps them discuss myopia control with parents and better enables them to justify the need for enhanced or continued myopia control management over the course of the treatment.

REFERENCES

1. Chamberlain P, Peixoto-de-Matos SC, Logan NS, *et al*. A 3-Year Randomized Clinical Trial of Misight Lenses for Myopia Control. *Optom Vis Sci* 2019;96:556-67.