

Author Response: Comments on Macular Choroidal Thickness in Children: The Shandong Children Eye Study

The authors thank Takkar et al.¹ for their interest in our study and their letter in which they state that the location of the thickest choroid temporal to the fovea in the children of our study population as compared with the location of the thickest choroid in the subfoveal region in adults might have been due to a stronger ciliary body muscle tone in children as compared with adults.^{2,3} Takkar et al.¹ discuss that the ciliary muscle would exert a pull on the semirigid choroid while accommodating during the optical coherence tomographic examination. Because the optic nerve head disc forms a rigid landmark, the central choroid might have been pulled temporally during the examination of the children in our study. This theory could be proven if the thickest measurement of the choroid was found to gradually move toward the fovea with older age. Following the recommendation by Takkar et al.,¹ we reperformed the statistical analysis and found that the ratio of choroidal thickness measured 500 μm nasal to the fovea divided by the choroidal thickness measured 500 μm temporal to the fovea increased significantly with older age ($P = 0.02$; standardized regression coefficient beta: 0.08) (Fig.). Although, however, the relationship was statistically significant, only a relatively small fraction of the variation in the ratio was explained by age (Fig.). Also, in the eldest age group of the children aged 18 years, the ratio was still lower than 1.0, indicating that also at that age, the choroid was still thicker temporally than nasally. The ratio of choroidal thickness measured 500 μm temporal to the fovea divided by the subfoveal choroidal thickness was not significantly associated with age ($P = 0.61$), which suggested that the age-related increase in choroidal thickness occurred at a similar amount in the

region temporal to the fovea and in the subfoveal region. We therefore appreciate very much the thoughts and suggestions by Brijesh et al.¹ We were, however, not able to fully confirm or reject the suggestions. The hypothesis made by Takkar et al.¹ may touch the field of the Enoch effect, which describes that the retinal photoreceptors are aligned with the center of the exit pupil, and that this alignment is caused by a retinal stretch associated with marked accommodation.⁴ It implies that the posterior pole of the eye is routinely subject to stresses and strains.

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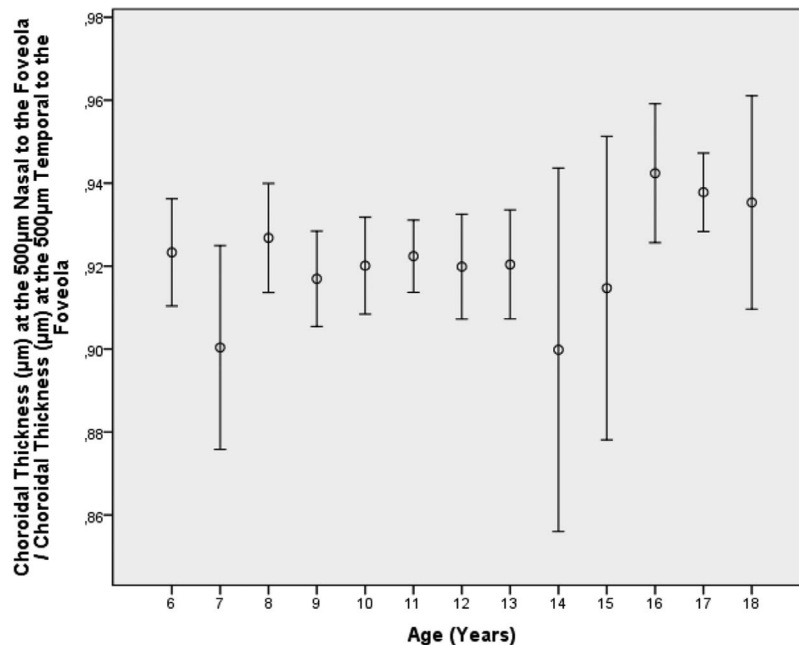


FIGURE. Graph showing the distribution of the ratio of choroidal thickness measured 500 μm nasal to the fovea divided by the choroidal thickness measured 500 μm temporal to the fovea.

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References

1. Takkar B, R K, Azad S. Comments on macular choroidal thickness in children: The Shandong Children Eye Study. *Invest Ophthalmol Vis Sci.* 2016;57:2963.

2. Zhang JM, Wu JF, Chen JH, et al. Macular choroidal thickness in children: The Shandong Children Eye Study. *Invest Ophthalmol Vis Sci.* 2015;56:7646-7652.
3. Shah BM, Sharma P, Menon V, et al. Comparing homatropine and atropine in pediatric cycloplegic refractions. *J AAPOS.* 2011;15:245-250.
4. Enoch JM. Marked accommodation, retinal stretch, monocular space perception and retinal receptor orientation. *Am J Optom Physiol Opt.* 1975;52:376-392.

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