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Commentary

Inhibiting Myopia by (Nearly) Invisible Light? - Author's Reply

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We appreciate Prof. Schaeffel and Smith's well-advised comments (Schaeffel and Smith, 2017) on our paper "Violet light exposure can be a preventive strategy against myopia progression" (Torii et al., 2017).

We understood there were some limitations of the current study and we have written those limitations in the paper. As you mentioned, we recognized the limitation of the goggles utilized for the chick experimental myopia model, and described as "water droplets accumulating inside the covering goggles were difficult to be removed. Therefore, our model was not a pure lens-induced myopia model but contained some "form-deprivation" effects". We are still making an effort to improve the goggles for chick which can be easily reattached for the future study. Please refer the detailed rearing regimen of the chicks described in the Material and Method section (Torii et al., 2017).

Regarding the difference in transmittance of violet light of the plastic goggles, we considered that axial myopia can be directly related to the degree of image degradation produced by diffuser lenses as you mentioned. Therefore, we measured the transmittance of illuminance of the same plastic goggles and found no statistically significant correlation between the transmittance of illuminance of the plastic goggles and the axial length elongation during the experiment.

We also recognized the differences of spectral filtering by the ocular media between animal and human, and wrote in the Discussion section: "the chick experiment and the clinical studies have potential dissociation due to the difference of ocular transmittance and photoreceptor spectrum. There is a need to investigate this point in the future" (Torii et al., 2017). Regarding the transmission of the human ocular media, Boettner and Wolter (Boettner and Wolter, 1962) reported a small amount of near UV can reach the retina and we are actually able to see the light under 400 nm wavelength (Torii et al., 2017, Fig. 4c).

Regarding the clinical study, only retrospective data were available so far although of course RCTs are ideal as you pointed out. Since the age, gender and level of myopia are known to relate to myopia progression, we performed a stepwise multiple regression analysis to examine the factors affecting axial length elongation. Then, we found that the axial length elongation was significantly associated with age, sex and type of lens (non-violet light transmitting eyeglasses or violet light transmitting CL). These negative coefficients for age, sex, and type of lens indicated that axial length elongation was greater among younger ages, wearing UV protective eyeglasses, and male, respectively. This comparison was examined between different materials as well as different spectral transmissions as we wrote to the limitation in Discussion section (Torii et al., 2017). Currently, we are preparing multiple RCTs to confirm our findings described in this article.

Again, we really appreciate your interest and constructive comments to our study. We would like to try to obtain further evidence to establish our hypothesis.

References

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