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Study Group:

ABSTRACT

TITLE: The effect of combination of white and monochromatic light on eye growth of normal chicks

ABSTRACT BODY:

Purpose: To examine the effect of combination of white and monochromatic light on eye growth of normal chicks

Methods: White Leghorn chicks aged 4 days (n = 3 in each group, three groups in total) were raised in a cabinet of 80 x 60 x 125 cm under three different lighting. They were white (685 nm), white (635 nm) and red (630 nm), white (635 nm) and blue (450 nm). The average luminance in these three environments were around 250 lux. The ratio of these light combination was 50:50. The corneal parameters and refractive errors were measured before and after 14 days of exposure. The corneal parameters were measured by high frequency A-scan ultrasonography while the refractive errors were examined by slit-lamp biomicroscopy. Percentage changes in the corneal parameters and refractive errors relative to the baseline were calculated and compared among different groups by two-way ANOVA and Fisher's least significant difference (LSD) post hoc test.

Results: After 14 days of exposure, the percentage increase in anterior chamber depth (ACD), lens thickness, vitreous chamber depth (VCD), retinal thickness and axial length were found to be significantly greater in chicks raised under white and red light when compared with those under white light only (p < 0.001). Besides, more myopic shift was shown in the chicks under white and red light (p < 0.05). However, the choroid did not demonstrate the thinning as expected but significant thickening was found (mean: choroidal thickness ± SEM, white vs. white and red, 204.3 ± 4.33 μm vs. 226.8 ± 5.18 μm). Chicks raised in white and blue light had a smaller increase in ACD, lens thickness, VCD and axial length when compared with chicks under white light only (p < 0.001). Significant thinning of the retina was found (percentage change of the retinal thickness ± SEM, white vs. white and blue, -6.1 ± 1.2% vs. -11.6 ± 0.7%, p = 0.001). Changes in refractive errors and choriodal thickness were comparable to the chicks under white light only.

Conclusions: Combination of the white and monochromatic light provided two peak wavelengths across the spectrum. It significantly affected the eye growth of normal chicks. Greater elongation of eyeball was found in the chicks under white and red light than those under white light only whereas ocular growth was slower in the chicks under white and blue light. Monochromatic light seems to play a role in modulating the ocular growth in chicks.

(No Image Selected)

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AWARDS: