

Efficacy of Repeated Low-Level Red-Light Therapy for Slowing the Progression of Childhood Myopia: A Systematic Review and Meta-analysis

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Abstract

Purpose: To evaluate the long-term efficacy and safety of repeated low-intensity red light (RLRL) treatment for childhood myopia.

Design: Systematic review and meta-analysis **METHODS:** We searched PubMed, Web of Science, CNKI, and Wanfang from inception to February 8, 2023. We used the RoB 2.0 and ROBINS-I tools to assess the risk of bias and then used a random-effect model to calculate the weighted mean difference (WMD) and 95% CIs. The primary outcomes were WMD in spherical equivalent refractive error (SER), WMD in axial length (AL), and WMD in subfoveal choroid thickness (SFChT). Subgroup analyses were performed to investigate the sources of heterogeneity based on variation in follow-up and study design. The Egger and Begg tests were used to assess publication bias. Sensitivity analysis was used to verify the stability.

Results: This analysis included 13 studies (8 randomized controlled trials, 3 non-randomized controlled trials, and 2 cohort studies) involving 1857 children and adolescents. Eight studies met the meta-analysis criteria, and the WMD for myopia progression between RLRL and the control group was 0.68 diopters (D) per 6 months (95% CI = 0.38 to 0.97 D; I² = 97.7%; P < .001) for SER change; -0.35 mm per 6 months (95% CI = -0.51 to -0.19 mm; I² = 98.0%; P < .001) for AL elongation; and 36.04 μm per 6 months (95% CI = 19.61 to 52.48 μm; I² = 89.6%; P < .001) for SFChT change.

Conclusions: Our meta-analysis shows that RLRL therapy may be effective for delaying the progression of myopia. The evidence is low certainty, and larger and better randomized clinical trials with 2-year follow-ups are needed to improve the existing state of knowledge to inform medical guidelines more comprehensively.