

# INPLASY

## Effectiveness of low levels of red light in alleviating myopia in children and adolescents: a meta-analysis of randomized controlled clinical trials

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### ADMINISTRATIVE INFORMATION

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**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202410099

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 January 2024 and was last updated on 23 January 2024.

### INTRODUCTION

**Review question / Objective** To explore the effectiveness of low levels of red light in treating low to moderate myopia in children and adolescents.

**Condition being studied** Myopia is a condition in which the focus of the eye falls before the retina after the refraction of parallel light rays through the refractive system of the eye. Nearsightedness has become a worldwide public health problem, especially in some East Asian regions, with a prevalence of up to 90% among children. In the past 20 to 30 years, the prevalence of myopia has been increasing and the onset of the disease is occurring at an earlier age. Myopia has become recognized as the sixth leading cause of vision loss, and more importantly, most myopia-related complications are beginning to appear in children

and adolescents, including retinal detachment, myopic retinopathy, and glaucoma. Therefore, effective treatment to control the development of myopia is essential to maintain eye health. Recent studies have found that red light exposure can induce hyperopia and may be effective in delaying the progression of myopia. Red light refers to visible light waves with a wavelength of 600 to 700 nanometers. Because red light has a strong effect on mitochondrial function, it has been widely used in clinical settings to treat a variety of diseases, including dermatology, orthopedics, obstetrics and gynecology. Photoreceptor cells in the retina inside the eye are rich in mitochondrial structures. In recent years, red light irradiation has developed into a new application for myopia intervention. In order to accurately assess whether low red light exposure can slow the progression of myopia in children and adolescents.

## METHODS

**Search strategy** We searched PubMed, Cochrane Library, EMBASE, Web of science, using medical subject terms and free words, with "myopia", "low level red light therapy" as keywords..

**Participant or population** Myopic children and adolescents.

**Intervention** low levels of redlight.

**Comparator** Single-focus frame glasses.

**Study designs to be included** Randomized controlled clinical study.

**Eligibility criteria** Relevant articles that met the following criteria were included in the study :(1) the type of study included was a randomized controlled trial (RCT); (2) The study sample was myopic patients less than 18 years old without organic lesions; (3) Study on the effect of low level red light on myopia progression;(4) Data such as axial length measurement and myopia refraction;Studies with the following conditions were excluded :(1) articles with duplicate data; (2) a review, Retrospective study, Post Hoc Analysis, editorial review, or case report; (3) study samples of cataracts, glaucoma, amblyopia and other eye diseases; (4) insufficient data; (5) the follow-up time was less than 6 months.

**Information sources** We searched PubMed, Cochrane Library, EMBASE, Web of science, using medical subject terms and free words, with "myopia", "low level red light therapy" as keywords.

**Main outcome(s)** Myopia diopter myopia, axial progression.

**Additional outcome(s)** Low level red light effect in children and adolescents with high myopia.

**Quality assessment** Review Manager(version 5.4; Cochrane Collaboration) for data analysis. We used weighted mean difference (WMD) of AL, SE and 95% confidence intervals (ci) to assess myopia progression.Heterogeneity was 2 assessed using I. If  $I^2 \geq 50\%$ , random effects model was used for meta-analysis, otherwise fixed effects model was used. Sensitivity analyses were performed to investigate sources of heterogeneity, and there were not enough studies (<10) to analyze publication bias.

**Strategy of data synthesis** We used weighted mean difference (WMD) of AL, SE and 95% confidence intervals (ci) to assess myopia progression.We used weighted mean difference (WMD) of AL, SE and 95% confidence intervals (ci) to myopia progression.

**Subgroup analysis** Subgroup analysis are conducted based on patients with high myopia were included in the studythe patient's age, marital.

**Sensitivity analysis** If the combined result of the remaining literature does not differ significantly after the deletion of any one article, it means that the result is robust as determined by sensitivity analysis.

**Country(ies) involved** China.

**Keywords** low level red light treatment; Myopia; Randomized controlled clinical trials;meta-analysis.

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