

INPLASY PROTOCOL

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None declared.

The Effects of Accommodation on Biological Parameters of Crystalline Lens in Humans: A Meta-Analysis

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Review question / Objective: The purpose of this study was to investigate the effects of accommodation on the biological parameters of human lens. The selected research method was RCT or self-controlled trial, and the control group was in a non-accommodation state.

Eligibility criteria: (1) The study type is RCT or self-controlled trial; (2) The language of the literature is limited to Chinese or English; (3) Subjects: human (age, gender, race and refractive status are not limited); (4) Intervention: any measures that can cause accommodation; (5) Outcome indicators: LT, LD, ACR, PCR, LCP and TCSA.

Information sources: CNKI, CBM, VIP, Wan-Fang, PubMed, Web of Science, EMBASE and the Cochrane Library from inception.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 June 2022 and was last updated on 21 June 2022 (registration number INPLASY202260085).

INTRODUCTION

Review question / Objective: The purpose of this study was to investigate the effects of accommodation on the biological parameters of human lens. The selected research method was RCT or self-controlled trial, and the control group was in a non-accommodation state.

Condition being studied: The accommodation of mechanism in humans is still unclear, and presbyopia and myopia, which are closely related to the mechanism, are the most common ophthalmic diseases, covering almost all people. It is important to explore the mechanism of accommodation for the treatment of presbyopia and myopia. With

the progress of science and technology, great progress, such as OCT, MRI and A-scan ultrasonography, has been made in the exploration of the intraocular structure in vivo, but there is still a great controversy about the changes of some biological parameters of the lens during accommodation. The accommodation of mechanism in humans is still unclear, and presbyopia and myopia, which are closely related to the mechanism, are the most common ophthalmic diseases, covering almost all people. It is important to explore the mechanism of accommodation for the treatment of presbyopia and myopia. With the progress of science and technology, great progress, such as OCT, MRI and A-scan ultrasonography, has been made in the exploration of the intraocular structure in vivo, but there is still a great controversy about the changes of some biological parameters of the lens during accommodation. The accommodation of mechanism in primates (mainly in human) is still unclear, and presbyopia and myopia, which are closely related to the mechanism, are the most common ophthalmic diseases, covering almost all people. It is important to explore the mechanism of accommodation for the treatment of presbyopia and myopia. With the progress of science and technology, great progress has been made in the exploration of the intraocular structure in vivo, but there is still a great controversy about the changes of some biological parameters of the lens during accommodation. So far, there is not any a meta-analysis on the changes of biological parameters of crystalline lens during accommodation, so it is of great significance to fill in the gaps in this aspect.

METHODS

Search strategy: English search terms: Humans Homo sapiens, Man (Taxonomy), Man, Modern, Modern Man, Human, (Lens, Crystalline), (Lens, Eye), Crystalline Lens, Eye Lens, (Lenses, Intraocular), Intraocular Lenses, (Lens, Intraocular), Intraocular Lens, Implantable Contact

Lens, (Contact Lens, Implantable), (Lens, Implantable Contact).

Participant or population: Human (age, gender, race and refractive status are not limited).

Intervention: Any measures that can cause accommodation.

Comparator: Non-accommodation (focus at infinity or a distance of at least 5 meters).

Study designs to be included: RCT or self-controlled trial.

Eligibility criteria: (1) The study type is RCT or self-controlled trial; (2) The language of the literature is limited to Chinese or English; (3) Subjects: human (age, gender, race and refractive status are not limited); (4) Intervention: any measures that can cause accommodation; (5) Outcome indicators: LT, LD, ACR, PCR, LCP and TCSA.

Information sources: CNKI, CBM, VIP, Wan-Fang, PubMed, Web of Science, EMBASE and the Cochrane Library from inception.

Main outcome(s): Anterior curvature radius; lens center position; lens diameter; lens thickness; posterior curvature radius; total cross-sectional area.

Quality assessment / Risk of bias analysis: Methodological Index for Non-randomized Studies (MINORS).

Strategy of data synthesis: The Forest plots and funnel plots were drawn by STATA15.0 software. Weighted mean difference (WMD) and its 95% confidence interval (CI) were used to estimate the measurement data. Statistically, $P < 0.05$ indicates a significant difference and vice versa. Heterogeneity test criteria: when $I^2 \leq 50\%$ and $P > 0.10$, it indicates that the heterogeneity is small, and the fixed effect model is used to combine the effect size; when $I^2 > 50\%$ and $P \leq 0.10$, it indicates that the heterogeneity

is large, and random effect model combines the effect size.

Subgroup analysis: According to the literature's different types of apparatus or other characteristics, different subgroup categories were formed.

Sensitivity analysis: Sensitivity analysis: When there is a large heterogeneity, it is necessary to explore the sources of heterogeneity through sensitivity analysis and verify the stability and reliability of the results of this meta-analysis.

Language: English and Chinese.

Country(ies) involved: China.

Keywords: accommodation, biological parameters, crystalline lens.

Contributions of each author:

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