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Evaluating Bates Eye Exercises for Improving Visual Outcomes Among Children With Myopia

A Blended Analysis of Effectiveness and Lived Experiences

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Abstract

Childhood myopia is a refractive condition commonly associated with axial elongation, blurred distance vision, and an increased lifetime risk of ocular complications when it progresses to high myopia. Bates eye exercises remain popular in some communities because they are inexpensive, non-invasive, and easy to introduce in schools. Typical practices include palming, relaxed blinking, shifting attention, near-far viewing, and gentle eye or body movements. However, claims that these exercises reverse myopia or permanently remove the need for spectacles are not supported by contemporary evidence. This article evaluates Bates eye exercises through a blended perspective that integrates objective visual outcomes with the lived experiences of myopic children. Effectiveness should be assessed through cycloplegic spherical equivalent refraction and axial length, supported by uncorrected and best-corrected visual acuity, accommodative measures, symptoms, adherence, and adverse events. Recent systematic evidence indicates that eye exercises have limited or no clinically meaningful effect on preventing or controlling myopia progression. Short-term relaxation, reduced visual discomfort, improved blinking awareness, or enjoyment may nevertheless be reported and should be examined without misclassifying them as refractive improvement. Qualitative inquiry can reveal acceptability, perceived comfort, school participation, family expectations, spectacle-related stigma, and the burden of repeated practice. A blended design is valuable because it explains why children may value an intervention even when refractive outcomes remain unchanged. Bates exercises may be studied as an adjunctive wellness activity, but they must not replace accurate refraction, prescribed spectacles, outdoor time, regular follow-up, or evidence-based myopia-control options.

Keywords: Bates eye exercises, childhood myopia, visual outcomes, lived experiences, mixed methods, school eye health

Introduction

Myopia occurs when light entering the relaxed eye is focused in front of the retina, usually because the eye has grown too long relative to its optical power. A child can generally see nearby objects more clearly than distant writing, faces, or classroom displays. Properly prescribed spectacles or contact lenses restore clear vision but do not necessarily slow the underlying progression. Increasing myopia and axial length (AL) are clinically important because high myopia raises the lifetime risk of retinal detachment, myopic macular degeneration, glaucoma, and other sight-threatening disease. Global projections have intensified concern about prevention, early detection, and effective control (Holden et al., 2016).

The World Health Organization (WHO) identifies uncorrected refractive error as a leading cause of vision impairment and emphasizes school screening, referral, refraction, and access to spectacles (WHO, 2024). Alongside these services, families may seek low-cost practices such as Bates eye exercises. Their popularity creates a legitimate research question, but evaluation must separate subjective comfort, temporary changes in focusing, test familiarity, and true modification of refractive development. A child feeling relaxed after an exercise is meaningful, yet it is not equivalent to reduced myopia.

The Bates Method and Its Proposed Rationale

The Bates method originated from the belief that visual problems result largely from strain and abnormal patterns of eye use. Modern versions vary and may combine palming, frequent blinking, shifting attention between targets, near-far viewing, gentle swinging, visualization, and relaxation. Because programmes differ in duration, supervision, and technique, the label does not describe one standardized intervention. Historical practices involving direct viewing of bright sunlight should never be used; children must not look at the sun because retinal injury can occur.

Some components may plausibly influence comfort without changing ocular anatomy. Blinking can support the tear film during prolonged screen or reading tasks. Scheduled pauses may interrupt continuous near work, and relaxed attention can reduce perceived eyestrain. Near-far tasks can transiently engage accommodation and binocular coordination. These effects concern symptoms or visual function under particular conditions. They do not establish that exercises shorten AL, flatten corneal power, or reverse the structural basis of common childhood myopia. A systematic review of eye exercises found insufficient evidence for improving refractive errors while recognizing established roles for orthoptic exercises in specific binocular disorders, which are different clinical problems (Rawstron et al., 2005).

Evidence for Effectiveness

The most comprehensive recent review directly challenges claims of myopia control. Lin et al. (2024) synthesized 11 controlled studies involving 921 participants. Eye exercises were not superior to control for visual acuity or refractive error, and most studies had methodological concerns or high risk of bias. The authors concluded that eye exercises have limited to no efficacy in preventing or controlling myopia progression. This conclusion is particularly relevant to Bates programmes because changes in an eye-chart score can occur through learning, squinting, lighting, motivation, or temporary accommodation without representing a durable refractive change.

Research on Chinese acupoint eye exercises, although not identical to the Bates method, illustrates the difficulty of interpreting this field. In a randomized controlled trial (RCT), standard exercises produced a statistically significant but probably clinically unimportant immediate reduction in accommodative lag; the study did not establish long-term control of myopia (Li et al., 2015). A three-year cohort reported a modest association with slower progression, but observational designs remain vulnerable to differences in health awareness, outdoor exposure, near-work habits, and adherence (Liang et al., 2020).

Tang et al. (2023) reviewed 17 studies and found an apparent protective association in unadjusted analyses, but the association was not statistically significant after adjustment across the main multivariable results. Heterogeneity was high, technique was often performed incorrectly, and causal inference was limited. In contrast, Lin et al. (2024) focused on controlled trials and found no clinically persuasive control of refractive progression. Taken together, the evidence permits investigation of comfort or acceptability but does not justify promising that Bates exercises will eliminate spectacles or slow axial growth.

Evidence-based myopia management follows a different pathway. The International Myopia Institute (IMI) recommends risk assessment, accurate refraction, visual correction, monitoring, and discussion of validated optical or pharmacological strategies according to the child and setting (Gifford et al., 2019). A living systematic review found that several interventions, including atropine and selected optical approaches, can slow progression, although effects, certainty, adverse events, and availability vary (Lawrenson et al., 2023). Outdoor time is particularly important for reducing the risk of onset, while its effect after myopia has developed may be more limited. No current intervention guarantees permanent arrest or reversal.

Measuring Visual Outcomes Correctly

A rigorous evaluation should predefine a primary outcome that reflects refractive progression. Cycloplegic spherical equivalent (SE), expressed in diopters (D), reduces error from active accommodation and is preferable to non-cycloplegic screening for research conclusions. Optical biometry should measure AL because elongation is closely related to progressive myopia. These outcomes should be collected by masked examiners at baseline and at clinically meaningful follow-up points, ideally six months or longer. Short post-exercise measurements cannot answer whether myopia progression has slowed.

Uncorrected visual acuity (UCVA) may show how well a child sees without correction, while best-corrected visual acuity (BCVA) helps detect amblyopia or ocular disease and confirms the potential for clear vision with correction. Secondary outcomes can include accommodative lag and facility, convergence symptoms, tear-film or discomfort measures, headaches, adherence, outdoor time, near-work distance, continuous near-task duration, and adverse events. Spectacle prescription should remain stable unless clinically indicated, and any change should be documented. Because myopia naturally progresses at different rates, a concurrent control group and random allocation are preferable to a simple pre-test and post-test design.

Understanding Lived Experiences

Objective measurements alone do not explain whether children accept an intervention or how it affects school life. Interviews or focus groups can explore what children believe the exercises do, how their eyes feel, whether sessions interrupt classes, and whether they experience the practice as calming, boring, embarrassing, or enjoyable. Children may describe less strain after a break, increased awareness of blinking, or a sense of personal control. Such accounts should be respected as experiences rather than converted automatically into claims of refractive improvement.

Myopia also has social and emotional dimensions. Children may struggle to read the board before diagnosis, lose or damage spectacles, feel different from peers, or worry that glasses make them less attractive. Others value spectacles because they improve classroom confidence and participation. Higher myopia severity has been associated with poorer health-related quality of life (HRQoL) in children and an impact on their parents (Han et al., 2023). Systematic evidence indicates that spectacle correction can improve educational, psychological, and quality-of-life outcomes among children with uncorrected refractive error (Pirindhavellie et al., 2023). Exercise programmes must therefore never encourage spectacle avoidance.

Qualitative sampling should include children with different ages, genders, refractive levels, adherence patterns, and responses. Child-friendly interviews can use open questions, drawings, or activity timelines. Parents and teachers can provide contextual information, but their views should not replace the child's voice. Analysis should attend to positive and negative cases rather than reporting only favourable comments. Reflexive documentation is important because children may tell adults what they think is expected.

Value of a Blended Analysis

A blended or mixed-methods design connects numerical outcomes with experience. In a sequential explanatory model, the trial is analysed first and qualitative participants are then selected to explain patterns such as high adherence without refractive improvement, symptom relief despite stable SE, or withdrawal because the sessions are burdensome. Integration can occur through a joint display that compares changes in SE, AL, symptoms, and adherence with themes from interviews. The final interpretation should identify convergence, complementarity, and disagreement.

This approach prevents two common errors. First, a modest improvement in comfort is not dismissed merely because refraction is unchanged. Second, enthusiastic testimony is not treated as proof that myopia has reversed. Quality of life (QoL), acceptability, and self-efficacy are legitimate outcomes, but they answer different questions from AL or cycloplegic SE. Contemporary reviews also emphasize the need for appropriate, age-sensitive HRQoL measures in paediatric refractive-error research (Wu et al., 2024).

Safety Ethics and Interpretation

School-based research requires guardian consent, child assent, confidentiality, adverse-event monitoring, and referral pathways for reduced vision or ocular disease. Exercise sessions should avoid pressure on the globe, unhygienic touching, pain, dizziness, prolonged occlusion, or exposure to intense light. Children should stop and report discomfort. Hand hygiene and competent supervision are essential. Participation should never affect grades, privileges, or access to routine eye care.

Investigators should provide a standard explanation that exercises are experimental for myopia control. Children must continue prescribed spectacles and ophthalmic or optometric follow-up. The comparison group should not be denied correction or established care. Reports should disclose the intervention manual, adherence, co-interventions, missing data, and all prespecified outcomes. Conclusions must distinguish statistical significance from clinical importance and avoid language such as cure, reversal, spectacle-free, or permanent improvement unless objective evidence supports it.

Implications for School Health Practice

School nurses and teachers can support vision screening, referral, spectacle use, comfortable reading distance, adequate lighting, regular breaks from sustained near work, and outdoor activity. They can also help children discuss teasing, discomfort, or practical problems with glasses. If Bates exercises are offered, they should be framed as brief relaxation or visual-break activities rather than treatment for refractive error. Families should receive the same message so that a low-cost complementary activity does not delay effective correction or myopia-control consultation.

Monitoring should focus on outcomes that matter: clear corrected vision, progression of SE and AL, classroom functioning, symptoms, adherence, safety, and child-reported experience. The purpose of a blended evaluation is not to force agreement between clinical measurements and personal accounts. Its strength lies in showing precisely where they differ and how both forms of evidence can inform acceptable, safe, and scientifically responsible school eye-health programmes.

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Conclusion

Bates eye exercises may provide a structured visual break, relaxation, or temporary relief of eyestrain for some myopic children, but current evidence does not show that they reliably improve refractive error or control axial progression. A strong evaluation must prioritize cycloplegic SE and AL while also measuring visual acuity, symptoms, adherence, safety, and HRQoL. Qualitative inquiry adds the child's perspective on comfort, burden, beliefs, and school participation. These findings should be integrated without confusing perceived benefit with anatomical change. Bates exercises may be examined as an adjunctive wellness practice, never as a replacement for spectacles, regular eye examination, outdoor time, or evidence-based myopia management.

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