Clinical Practice Article

Effect of Borish Delayed Refraction on Myopia

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ABSTRACT

Purpose: To evaluate the impact of Borish Delayed Refraction on myopic refraction.

Study Design: Cross sectional study.

Place and Duration of Study: Renu Vision Care Clinic, Punjab India. from April 2024 to July 2024

Methods: A total of seventy myopic individuals were selected for participation, through convenient sampling, ensuring an equitable gender distribution of 50%. After detailed history and examination, objective and then subjective refraction was performed. To relax accommodation, a modified version of Borish delayed subjective test was used. Fogging allowed prescription of plus powers exceeding +1.00D, enhancing the accuracy of the subjective refraction process. After the application of the Borish delayed method, prescriptions were provided to all seventy subjects for the continued use of corrective spectacles.

Results: The range of refractive error before the Borish Delayed Refraction Test varied from -1.00D to -5.00D, while after the test, it ranged from -0.75 D to -4.00 D. The mean refractive error before the test was -3.0143 ± 1.2D, which reduced to -2.3214 ± 0.99D after the test. A paired t-test was performed for statistical comparison, revealing a significant correlation (p = 0.00) between the pre- and post-test refractive error values.

Conclusion: The Borish Delayed Refraction is potentially useful method for managing myopia. The test offers the possibility for more precise and stable prescriptions by enabling accommodation to relax prior to subjective refraction assessment.

Keywords: Accommodation, Subjective refraction, Myopia, Borish Delayed Refraction.

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INTRODUCTION

The significant rise in myopia prevalence has led to substantial public health concerns.[1] Myopia is more common among urban children aged 11 to 15 years, with its prevalence increasing from 7.5% to 15.0% over the past decade in the 5–15 age group.[2] Similarly, in rural areas, the prevalence has risen from 4.6% to 6.8%, reflecting changes in the rural environment. In North India, schoolchildren experience an annual increase of 3.4% in myopia prevalence.[3]Numerous myopia control studies are being conducted worldwide, focusing on optical, pharmacological, and therapeutic approaches.[4,5] However, an older diagnostic technique—previously not widely practiced—has gained renewed interest. Dr. Irvin Borish's Borish Delayed Refraction Test is now being explored as a potential tool for myopia management.[6] This technique, used during eye examinations, detects latent hyperopia by intentionally blurring vision with positive lens power.[7,8]

A sedentary lifestyle, short working distances, and excessive use of digital devices contribute to myopia progression.[9] Research is ongoing to understand the role of the ciliary body and its interaction with choroidal changes in the onset and progression of

myopia.[10,11] The accommodative system may also play a significant role in myopia development.[12-14] Based on available data, eye care professionals should assess accommodation and convergence in young myopes and at-risk individuals to ensure proper management. Accommodative evaluations are time-consuming and often overlooked in many regions. In India, despite the high prevalence of myopia, comprehensive orthoptic assessments for myopic patients are lacking. In this context, the Borish Delayed Refraction Test serves as a valuable and efficient method for rapid assessment. The goal of this study is to provide a comprehensive analysis of the Borish Delayed Refraction Test and its impact on myopia management, covering methodology, clinical applications, and effectiveness in guiding myopic prescriptions.

METHODS

The study was approved by the Institutional review board/Ethical review board **(EC/NEW/INST/2024/531/271).** This study aims to investigate the use of Borish technique in correction of myopia among young adults aged 18 to 22 years. A total of seventy myopic individuals were selected for participation, through convenient sampling, ensuring an equitable gender distribution of 50%. All procedures adhered to the ethical standards outlined in the Helsinki Declaration of 1975, as amended in 2000, and complied with the ethical guidelines established by the relevant institutional or regional committee on human experimentation.[15] Participants were selected after obtaining informed consent. The sample size was determined using the formula:[16]

$$n=z^2*p(1-p)/d^2$$

Z value is 1.96 for the customary 95% level of confidence. We used 3% error and 95% confidence intervals in this investigation. The proportion (p) was obtained from earlier research. In India, the prevalence of myopia was 10%.[1-3] Thus, p was equal to 0.1.Thus, a sample size of seventy was deemed sufficient for the study.

After detailed history and examination, objective and then subjective refraction was performed. To relax accommodation, a modified version of Borish delayed subjective test was used. Fogging allowed prescription of plus powers exceeding +1.00D, enhancing the accuracy of the subjective refraction process. After the application of the Borish delayed method, prescriptions were provided to all seventy subjects for the continued use of corrective spectacles.

RESULTS

The Borish Delayed Refraction Test was conducted on 70 patients aged 18 to 24 years in a clinical setting. Data analysis was performed using IBM SPSS 2020, and the Shapiro-Wilk test confirmed that the data followed a normal distribution. The range of refractive error before the Borish Delayed Refraction Test varied from -1.00D to -5.00D, while after the test, it ranged from -0.75 D to -4.00 D. The mean refractive error before the test was -3.0143 ± 1.2 D, which reduced to -2.3214 ± 0.99D after the test. A paired t-test was performed for statistical comparison, revealing a significant correlation (p = 0.00) between the pre- and post-test refractive error values. Figure 1 shows the pre-Borish and post-Borish comparison. Borish delay fogging technique shows valuable technique in prescribing myopic correction.

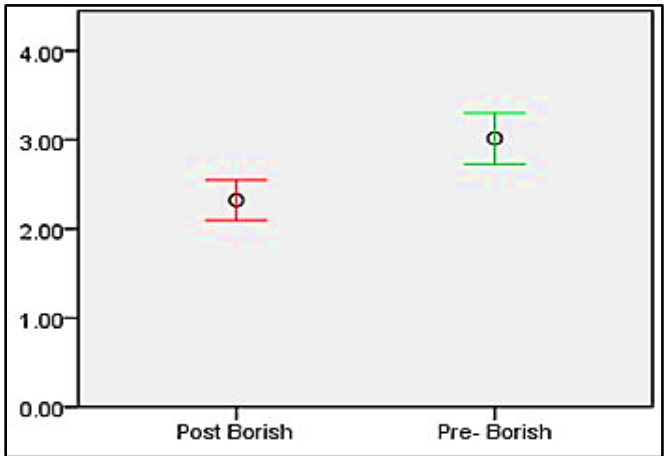

Figure 1: Shows dioptric power in X meridian and impact of Borish technique in Y meridian and this fig shows that post Borish's test myopic power reduced.

DISCUSSION

The present study emphasizes the use of optical fogging techniques to instantly relieve accommodative spasm. To lessen the potential effects of accommodation during the refraction process, the Borish Delayed technique is useful. The findings of the present study align with those of Patel et al, who concluded that instead of using cycloplegic refraction to control accommodation in children, a modified Borish Delayed Refraction Test can be employed as an

optical method to relax accommodation in patients.[17] It can eliminate the negative effects of cycloplegic medication in children. Dalal et al emphasizes the necessity of cycloplegic refraction, given that myopia is a leading cause of visual impairment worldwide.[18] In routine clinical practice, the Cyclodamia fogging technique should be employed to differentiate cases of excessive accommodation effectively.

The exact cause of accommodative spasm remains unclear, and its treatment can be challenging.[19] While cycloplegic drugs can help confirm the presence of accommodative spasm and accurately measure the refractive error, achieving relief from persistent spasm can be difficult.[20,21] A modified fogging approach, as described in this study, offers a simple and cost-effective treatment option for patients experiencing accommodative spasm.[22]

This study provides a rigorous methodological framework for assessing myopia in young adults, emphasizing ethical considerations, precise sample size calculations, and effective optical correction techniques. The findings will contribute to a better understanding of myopia management in this demographic, ultimately informing public health strategies aimed at reducing the prevalence of this refractive error.

The study has several limitations, including its cross-sectional design, small sample size, and convenient sampling, which may affect generalizability. It focuses on short-term refractive changes without assessing long-term impact or comparing results with cycloplegic refraction. The age restriction (18–22 years) and controlled clinical setting limit broader applicability. Additionally, manual refraction methods may introduce examiner bias. Future research with larger, diverse samples and longitudinal follow-ups is needed for stronger validation.

CONCLUSION

The Borish Delayed Refraction is potentially useful method for managing myopia. The test offers the possibility for more precise and stable prescriptions by enabling accommodation to relax prior to subjective refraction assessment.

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Patient's Consent: Researchers followed the guide lines set forth in the Declaration of Helsinki.

Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval: The study was approved by the Institutional review board/Ethical review board **(EC/NEW/INST/2024/531/271).**

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Authors Designation and Contribution

Renu Thakur; Professor: *Concepts, Design, Literature Search, Data Acquisition, Manuscript Preparation, Manuscript Editing, Manuscript Review.*

Sachitanand Singh; Assistant Professor: *Literature Search, Data Analysis, Statistical Analysis, Manuscript Preparation, Manuscript Editing, Manuscript Review.*