Impact of Myopia Control Spectacle Lenses (MC) on Photopic Contrast Sensitivity Compared to Single Vision Spectacle lenses

Muteb Alanazi, MS, PhD, FAAO, **Alla Alshetwi**, OD
Optometry Department, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

Abstract

Purpose: This study investigated the impact of myopia control (MC) spectacle lenses on photopic contrast sensitivity, compared with single vision (SV) lenses, across different gaze directions and spatial frequencies. The aim was to determine whether MC lenses affected peripheral visual function.

Methods: A total of 40 participants aged 19–24 years were recruited. Monocular contrast sensitivity was measured using Tomey Chart Panel TCP-3000P (Tomey, Nürnberg, Germany) at five spatial frequencies (1.5, 3.0, 6.0, 12.0, and 18.0 cycles per degree (c.p.d)) and three gaze directions (on-axis central, off-axis nasal, and off-axis temporal), under photopic conditions (426 Lux). Each participant was tested wearing both SV and MC spectacles. The area under the logarithmic contrast sensitivity function (AULCSF) was calculated for each condition.

Results: MC spectacles significantly reduced contrast sensitivity in peripheral gaze directions at all spatial frequencies, with the largest reductions occurring at 12.0 and 18.0 c.p.d ($p < 0.001$). On-axis central contrast sensitivity was minimally affected and not statistically significant. Significant correlations between AULCSF and refractive error were observed in peripheral gaze with SV lenses and in central gaze with MC lenses.

Conclusion: MC spectacles reduce peripheral contrast sensitivity without affecting central vision, aligning with their optical design to induce peripheral defocus for myopia control. Further studies are recommended to evaluate long-term adaptation and functional consequences.

Biography

Dr. Muteb Alanazi is an Associate Professor of Optometry and the Assistant Vice Dean for Academic and Educational Affairs at King Saud University's College of Applied Medical Sciences. He is a dedicated educator and researcher with notable contributions to curriculum development, accreditation preparation, and the enhancement of clinical training environments. As a Principal Investigator in the International Scientific Partnership Program with UC Berkeley and a co-author of several scientific publications, his research interests span myopia management and impact on visual functions. He also serves as a board member of the Saudi Society of Optometry, supporting national initiatives to raise public awareness about eye health. Known for his leadership and collaborative approach.