Case Report

Visual Disturbance in Multiple Sclerosis: The Effect of Tinted Spectacle Lenses

Alireza Sadeghi [1], BS; Reheleh Moravej [*1], PhD

1. Rehabilitation Research Center, Department of Optometry, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.

***Corresponding Author:** Raheleh Moravej
Email: baranrmom80@yahoo.com

Abstract

This case report investigates the impact of tinted spectacle lenses on visual disturbances in a patient with multiple sclerosis (MS). A 42-year-old woman with preclinical-stage MS presented with severe photophobia and visual discomfort, despite normal visual acuity and the absence of ocular pathology. Conventional spectacles had failed to alleviate her symptoms. The patient reported marked improvement in visual comfort, reduced photophobia, and better tolerance to daily visual environments one month after being prescribed yellow-tinted lenses with medium density (category B). This case supports the potential utility of tinted lenses as a non-invasive, optical intervention for managing visual symptoms in MS. Further studies are warranted to assess the efficacy of various lens colors and densities across a broader spectrum of neurological disorders with visual complaints.

Keywords: Multiple Sclerosis; Photophobia; Tinted Lenses; Visual Disturbance.

Article Notes: Received: Aug. 11, 2024; Received in revised form: Sep. 02, 2024; Accepted: Sep. 15, 2024; Available Online Dec.21, 2024.

How to cite this article: Sadeghi A, Moravej R. Visual Disturbance in Multiple Sclerosis: The Effect of Tinted Spectacle Lenses: A Case Report. Journal of Ophthalmic and Optometric Sciences . 2025;9(1):49-53.

Introduction

Photophobia is a complex and often debilitating visual symptom that affects individuals with various neurological conditions, including multiple sclerosis (MS). It involves abnormal sensitivity not only to bright lights but also to reflective surfaces and high-contrast visual stimuli [1,2]. The pathophysiology of photophobia is believed to involve dysfunction along the visual pathway, from the photoreceptors in the retina to the visual cortex [3,4].

MS is a chronic inflammatory demyelinating disorder of the central nervous system that frequently presents with visual complaints [5]. These can occur even in the absence of optic neuritis and include reduced visual acuity, impaired contrast sensitivity, visual field abnormalities, altered color perception, and photophobia [6-9]. Such symptoms significantly impact quality of life and daily functioning [6,7]. The high prevalence of visual complaints among MS patients underscores the need for effective symptomatic interventions [8-10]. Recent studies have suggested that optical aids such as tinted spectacle lenses may help reduce discomfort, enhance contrast sensitivity, and improve functional vision [10].

This case report investigates the impact of tinted spectacle lenses on visual disturbances in a patient with multiple sclerosis (MS).

Case Report

This report was conducted in accordance with the Declaration of Helsinki and was approved by the institutional ethics committee. Written informed consent was obtained from the patient prior to inclusion in the report.

A 42-year-old woman diagnosed with preclinical-stage MS presented to our private eye clinic with persistent complaints of photophobia and visual disturbance. She reported severe discomfort when exposed to streetlights, car headlights, and indoor lighting, often preferring to remain in dim environments. The visual symptoms significantly interfered with her daily routine.

A recent neurological evaluation and brain MRI were unremarkable, with no evidence of inflammation or optic neuritis. She was not on corticosteroids. Despite using multiple pairs of prescription glasses in the past, none had alleviated her symptoms.

On examination, her manifest refraction was +0.50 / –0.75 × 70 in the right eye and +0.75 / –0.75 × 160 in the left eye. Best-corrected visual acuity was 20/20 in both eyes as measured by a Snellen chart. Subjective refraction yielded similar results to her current prescription.

Anterior segment evaluation with slit-lamp biomicroscopy revealed no abnormalities. Tear breakup time was measured at 10 seconds, indicating stable tear film. Meibomian gland function was normal, with no evidence of blepharitis, conjunctivitis, or keratitis. The optic nerve head had clear margins with a cup-to-disc ratio of 0.2, and color vision was intact based on Ishihara plate testing.

The patient was prescribed yellow-tinted lenses (category B density) with her full refractive correction. At one-month follow-up, she reported marked improvement in photophobia and general visual comfort. She noted improved tolerance of lighting conditions and enhanced ability to perform daily visual tasks. No side effects were reported.

Discussion

The visual system integrates multiple structures within the central nervous system. Any disruption along this pathway, from the retina to the visual cortex, can result in symptoms such as photophobia, reduced

visual acuity, impaired contrast sensitivity, and visual field defects. These disruptions are well-documented in neurological conditions including stroke, traumatic brain injury, Parkinson's disease, and MS [11-13].

MS is more common in females and has a growing global prevalence, including a reported rate of 85.8 per 100,000 in Iran [14]. Beyond the clinical burden, MS exerts substantial psychosocial and economic impacts, including reduced quality of life and work productivity [15,16].

Visual disturbances are common among MS patients and may persist even after resolution of acute events such as optic neuritis. These include reductions in low-contrast acuity and contrast sensitivity, which may fluctuate over time [17-22]. While visual acuity may appear normal on standard testing, patients often continue to experience debilitating photophobia and visual discomfort [9].

One proposed intervention involves the use of tinted spectacle lenses, which selectively filter specific wavelengths of light. Yellow filters, in particular, are thought to reduce peripheral visual noise and enhance central processing by modulating activity in the primary visual cortex (V1) [23,24]. This mechanism may explain the observed symptomatic relief in patients with MS.

Previous studies have demonstrated the effectiveness of tinted lenses in various neurological and visual conditions, including migraine, autism spectrum disorders, cluster headaches, and photosensitive epilepsy [25]. The primary goals of tinted lenses are to reduce glare, minimize intraocular scatter, and enhance contrast sensitivity. Low-density tints (categories A and B) generally do not impair color discrimination, making them suitable for daily use [26].

Color selection and lens density should be personalized based on patient symptoms and visual demands [27]. In MS patients, where contrast sensitivity and low-contrast acuity are frequently impaired, tinted lenses may provide substantial functional benefits even in the absence of overt ocular pathology [28].

Conclusion

This case suggests that yellow-tinted spectacle lenses of medium density (category B) can effectively reduce photophobia and improve visual comfort in patients with MS. The non-invasive and reversible nature of this intervention makes it a practical option for managing visual symptoms in neurological disorders. Further clinical studies are recommended to explore the efficacy of different tint densities and spectral filters across broader patient populations.

Authors ORCIDs

Alireza Sadeghi:
https://orcid.org/0009-0002-3906-6712
Reheleh Moravej:
https://orcid.org/0000-0003-0333-1780

References

1. Wilkins AJ, Haigh SM, Mahroo OA, Plant GT. Photophobia in migraine: A symptom cluster? Cephalalgia. 2021;41(11-12):1240-8.
2. Digre KB, Brennan KC. Shedding light on photophobia. J Neuroophthalmol. 2012;32(1):68-81.
3. Wu Y, Hallett M. Photophobia in neurologic disorders. Transl Neurodegener. 2017;6:26.
4. Matynia A, Parikh S, Chen B, Kim P, McNeill DS, Nusinowitz S, et al. Intrinsically photosensitive retinal ganglion cells are the

primary but not exclusive circuit for light aversion. Exp Eye Res. 2012;105:60-9.
5. Baecher-Allan C, Kaskow BJ, Weiner HL. Multiple Sclerosis: Mechanisms and Immunotherapy. Neuron. 2018;97(4):742-68.
6. Salter AR, Tyry T, Vollmer T, Cutter GR, Marrie RA. "Seeing" in NARCOMS: a look at vision-related quality of life in the NARCOMS registry. Mult Scler. 2013;19(7):953-60.
7. Garcia-Martin E, Rodriguez-Mena D, Herrero R, Almarcegui C, Dolz I, Martin J, et al. Neuro-ophthalmologic evaluation, quality of life, and functional disability in patients with MS. Neurology. 2013;81(1):76-83.
8. McDonald WI, Barnes D. The ocular manifestations of multiple sclerosis. 1. Abnormalities of the afferent visual system. J Neurol Neurosurg Psychiatry. 1992;55(9):747-52.
9. Jasse L, Vukusic S, Durand-Dubief F, Vartin C, Piras C, Bernard M, et al. Persistent visual impairment in multiple sclerosis: prevalence, mechanisms and resulting disability. Mult Scler. 2013;19(12):1618-26.
10. van der Feen FE, de Haan GA, van der Lijn I, Huizinga F, Meilof JF, Heersema DJ, et al. Recognizing visual complaints in people with multiple sclerosis: Prevalence, nature and associations with key characteristics of MS. Mult Scler Relat Disord. 2022;57:103429.
11. Hepworth L, Rowe F, Walker M, Rockliffe J, Noonan C, Howard C, et al. Post-stroke Visual Impairment: A Systematic Literature Review of Types and Recovery of Visual Conditions. Ophthalmology Research: An International Journal. 2016;5(1):1-43.
12. Armstrong RA. Visual problems associated with traumatic brain injury. Clin Exp Optom. 2018;101(6):716-26.
13. Salter AR, Tyry T, Vollmer T, Cutter GR, Marrie RA. "Seeing" in NARCOMS: a look at vision-related quality of life in the NARCOMS registry. Mult Scler J. 2013;19(7):953-60.
14. Eskandarieh S, Heydarpour P, Minagar A, Pourmand S, Sahraian MA. Multiple Sclerosis Epidemiology in East Asia, South East Asia and South Asia: A Systematic Review. Neuroepidemiology. 2016;46(3):209-21.
15. Brundin L, Kobelt G, Berg J, Capsa D, Eriksson J; European Multiple Sclerosis Platform. New insights into the burden and costs of multiple sclerosis in Europe: Results for Sweden. Mult Scler. 2017;23(2_suppl):179-91.
16. Langelaan M, de Boer MR, van Nispen RM, Wouters B, Moll AC, van Rens GH. Impact of visual impairment on quality of life: a comparison with quality of life in the general population and with other chronic conditions. Ophthalmic Epidemiol. 2007;14(3):119-26.
17. Hickman SJ, Raoof N, McLean RJ, Gottlob I. Vision and multiple sclerosis. Mult Scler Relat Disord. 2014;3(1):3-16.
18. Noble J, Forooghian F, Sproule M, Westall C, O'Connor P. Utility of the National Eye Institute VFQ-25 questionnaire in a heterogeneous group of multiple sclerosis patients. Am J Ophthalmol. 2006;142(3):464-8.
19. Hoff JM, Dhayalan M, Midelfart A, Tharaldsen AR, Bø L. Visual dysfunction in multiple sclerosis. Tidsskr Nor Laegeforen. 2019;139(11).
20. Costello F. Vision Disturbances in Multiple Sclerosis. Semin Neurol. 2016;36(2):185-95.
21. Francis CE. Visual issues in multiple sclerosis. Phys Med Rehabil Clin N Am. 2013;24(4):687-702.
22. Balcer LJ, Miller DH, Reingold SC, Cohen JA. Vision and vision-related outcome measures in multiple sclerosis. Brain. 2015;138(Pt 1):11-27.
23. Yadav NK, Ciuffreda KJ. Objective assessment of visual attention in mild traumatic

brain injury (mTBI) using visual-evoked potentials (VEP). Brain Inj. 2015;29(3):352-65.
24. Ciuffreda KJ, Yadav NK, Ludlam DP. Effect of binasal occlusion (BNO) on the visual-evoked potential (VEP) in mild traumatic brain injury (mTBI). Brain Inj. 2013;27(1):41-7.
25. Wilkins A, Evans B, Plant G. Potential Uses for Precision Tinted Lenses in a Neurology Clinic. touchREVIEWS in Neurology. 2022;18(2):93-102.
26. Mehta M, Ramkissoon P, Bhagwanjee A. A comparison of the effect of reduced illumination and tinted lenses on stereopsis at near. African Vision and Eye Health. 2007;66(1):3-11.
27. Marmor MF. Double fault! Ocular hazards of a tennis sunglass. Arch Ophthalmol. 2001;119(7):1064-6.
28. Seelan Samuel S, Pachiyappan T, Livingstone Kumaran S. Impact of Tinted Lenses on Contrast Sensitivity, Color Vision, and Visual Reaction Time in Young Adults. Cureus. 2023;15(11):e48377.

Footnotes and Financial Disclosures

Conflict of interest:

The authors have no conflict of interest with the subject matter of the present manuscript.