Digital Eye Strain And Visual Health: Strategies For Prevention And Care

Haziel Rynjah[1], Iamonlang Kharbangar[2,3], Syed Safikur Rahman[2,4], Ibtesam Zaman[2,4], Beyanca Sohbar[2,3], Khilbar Sonowal[2,5]

[1]*Assistant Professor, Department of Optometry, University of Science & Technology Meghalaya.*
[2] *M. OPTOM Student, Martin Luther Christian University.*
[3]*Shillong Meghalaya.*
[4] *SHS, Sushant University.*
[5] *Royal Global University, Assam.*

KEYWORDS
Dry eye strain, computer vision syndrome, digital, screen time

ABSTRACT
Purpose: Digital eye strain (DES), also called computer vision syndrome (CVS), has become a significant concern in modern optometry due to the extensive use of digital devices. The widespread adoption of computers, smartphones, tablets, and video games has led to increased visual discomfort and associated symptoms such as headaches, dry eyes, fatigue, and neck pain. This review explores the prevalence, diagnostic methods, management strategies, preventive measures, and long-term implications of DES. With optometrists playing a crucial role in patient education and treatment, this paper highlights the need for proactive interventions, including ergonomic adjustments, blue light filtering lenses, and the 20-20-20 rule. Additionally, the potential link between prolonged screen exposure and myopia progression underscores the importance of reducing digital eye strain. Through a comprehensive approach involving diagnosis, management, and public awareness, optometry professionals can mitigate the impact of DES and promote long-term eye health in an increasingly screen-centric world.

Introduction

In today's digital era, screen usage has become an integral part of daily life [1]. Whether for work, education, or entertainment, individuals spend extended hours on digital devices, often experiencing visual discomfort known as digital eye strain (DES) [2,3]. DES, or computer vision syndrome (CVS), encompasses a range of symptoms that arise from prolonged screen exposure, including blurred vision, dry eyes, headaches, and musculoskeletal discomfort [4]. Given the increasing dependence on digital devices, DES has become a critical issue in optometry, necessitating better diagnostic tools, treatment options, and preventive strategies [5].

Prevalence and Growing Concern

Increased Screen Time and Its Effects

- The use of digital screens has become unavoidable in professional, academic, and recreational activities. Studies indicate that individuals who spend more than four hours per day on digital devices are at a higher risk of experiencing DES [4,6].
- Factors such as poor posture, improper lighting, and excessive screen exposure contribute to DES symptoms, including eye fatigue, headaches, and musculoskeletal discomfort [7].
- Additionally, research has identified increased screen time as a modifiable environmental factor that may accelerate myopia progression, particularly among children and young adults [8,9].
- The growing prevalence of DES has led to an increase in patients seeking optometric interventions, emphasizing the need for targeted management strategies [4].

Diagnosis and Management

Assessment Techniques

- Optometrists employ a variety of methods to diagnose DES, including patient history evaluations, specialized questionnaires, dry eye tests, and assessments of blink rate and tear film stability [10].
- Advanced diagnostic tools such as corneal topography and meibography are increasingly used to assess tear film dysfunction and ocular surface changes associated with DES.

Treatment Approaches

- Prescription of computer glasses with blue light filtering coatings and anti-reflective lenses has shown effectiveness in reducing DES symptoms [11].
- The implementation of ergonomic recommendations, such as maintaining an optimal screen distance (20-28 inches), adjusting screen brightness, and improving ambient lighting, is crucial in managing DES [12].

- Regular eye examinations, the use of lubricating eye drops, and adherence to the 20-20-20 rule (every 20 minutes, look at an object 20 feet away for 20 seconds) are essential strategies in preventing visual fatigue [11].

Preventive Measures and Education

The Role of Optometrists in Patient Awareness

- Optometrists are at the forefront of DES prevention through education and awareness campaigns emphasizing healthy screen habits [10].
- Recommendations include optimizing workstations with proper lighting, adjusting device display settings to minimize glare, and promoting regular visual breaks [13].
- Increasing awareness of the importance of hydration, proper nutrition, and blinking exercises helps mitigate the risk of DES-related dry eye syndrome.

Long-term Implications

- While DES symptoms are often temporary, chronic exposure to screens without intervention may contribute to long-term ocular issues, such as myopia progression and dry eye syndrome [4].
- Emerging research suggests that increased outdoor activities and reduced near-work exposure can help mitigate the risk of myopia, particularly in children and adolescents [14].

Conclusion

In today's digital world, digital eye strain (DES) has become a significant concern in optometry due to increased screen use. The prevalence of DES symptoms, such as headaches, neck pain, and visual discomfort, underscores the need for effective management strategies. Optometrists play a crucial role in diagnosing and treating DES through specialized exams and personalized interventions, including computer glasses and the 20-20-20 rule. Preventive measures and patient education are essential for mitigating the risk of DES. By advocating for proper screen use and ergonomic setups, optometrists can help reduce the incidence and severity of DES. Furthermore, understanding the long-term implications—such as myopia progression and dry eye syndrome—reinforces the importance of proactive eye care [15]. Addressing digital eye strain requires a comprehensive approach involving diagnosis, management, and prevention, with optometrists leading the way in safeguarding visual health in an increasingly screen-centric society[16].

Reference

1. A Salem, F., M Weheida, S., Abdel Ghafar Ali, K., Mohamed Metwely, S., Alkordy, A., Y El Emam, S., ... & Magdi Farghaly, S. (2023). Computer Vision Syndrome as Perceived by Undergraduate Nursing Students Versus Clinical Nursing Teachers. Egyptian Journal of Health Care, 14(4), 399-418.
2. Lanca, C., & Saw, S. M. (2020). The association between digital screen time and myopia: A systematic review. Ophthalmic and Physiological Optics, 40(2), 216-229.
3. Rosenfield, M. (2011). Computer vision syndrome: a review of ocular causes and potential treatments. Ophthalmic and Physiological Optics, 31(5), 502-515.
4. Kaur, K., Gurnani, B., Nayak, S., Deori, N., Kaur, S., Jethani, J., ... & Mishra, D. (2022). Digital eye strain comprehensive review. Ophthalmology and therapy, 11(5), 1655-1680.
5. Sheppard, A. L., & Wolffsohn, J. S. (2018). Digital eye strain: prevalence, measurement and amelioration. BMJ open ophthalmology, 3(1).
6. Blehm, C., Vishnu, S., Khattak, A., Mitra, S., & Yee, R. W. (2005). Computer vision syndrome: a review. Survey of ophthalmology, 50(3), 253-262.
7. Cantó-Sancho, N., Ronda, E., Cabrero-García, J., Casati, S., Carta, A., Porru, S., & Seguí-Crespo, M. (2022). Rasch-Validated Italian Scale for diagnosing digital eye strain: the computer vision syndrome questionnaire IT©. International Journal of Environmental Research and Public Health, 19(8), 4506.
8. Wu, P. C., Tsai, C. L., Wu, H. L., Yang, Y. H., & Kuo, H. K. (2013). Outdoor activity during class recess reduces myopia onset and progression of myopia in school children. Ophthalmology, 120(5), 1080-1085.
9. Owens, D. A. (1984). The Resting State of the Eyes: Our ability to see under adverse conditions depends on the involuntary focus and convergence of our eyes at rest. American Scientist, 72(4), 378-387.
10. 10.Liu, J., Li, B., Sun, Y., Chen, Q., & Dang, J. (2021). Adolescent vision health during the outbreak of COVID-19: Association between digital screen use and myopia progression. Frontiers in pediatrics, 9, 662984.
11. Fan, Q., Wang, H., Kong, W., Zhang, W., Li, Z., & Wang, Y. (2021). Online learning-related visual function impairment during and after the COVID-19 pandemic. Frontiers in public health, 9, 645971.

12. Noreen, K., Ali, K., Aftab, K., & Umar, M. (2021). Computer vision syndrome (CVS) and its associated risk factors among undergraduate medical students in midst of COVID-19. *Pakistan Journal of Ophthalmology*, *37*(1).
13. Rosenfield, M. (2016). Computer vision syndrome (aka digital eye strain). Optometry in practice, 17(1).
14. Coles-Brennan, C., Sulley, A., & Young, G. (2019). Management of digital eye strain. Clinical and experimental Optometry, 102(1), 18-29.
15. Proactive eye care strategies, including regular eye check-ups and customized optical solutions, are critical in addressing the long-term effects of DES.
16. Azlan, N. Z., Kamaruddin, A., Othman, N., & Isa, M. L. M. (2024). Knowledge and awareness of computer vision syndrome (CVS) and their contributing factor among undergraduate university students. Malaysian Journal of Public Health Medicine, 24(1), 215-224.