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Case Report

An integrative mind-body approach for screen-related neuro-ocular fatigue and cognitive exhaustion: a case report

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ABSTRACT

Digital eye strain (DES), also known as computer vision syndrome (CVS), is an increasingly prevalent health concern associated with prolonged digital screen exposure, characterized by ocular discomfort, visual fatigue, reduced cognitive efficiency, and sleep disturbances. Current management approaches are largely symptomatic and often fail to address the multifactorial neuro-ocular and cognitive aspects of the condition, highlighting the need for holistic, non-pharmacological interventions. We report the case of a 37-year-old male information technology professional who presented with a four-month history of eye strain, frontal headaches, blurred vision after prolonged screen use, irritability, reduced concentration, and difficulty initiating sleep. Baseline assessment using the CVS questionnaire (CVS-Q), ocular surface disease index (OSDI), Pittsburgh sleep quality index (PSQI), and fatigue severity scale (FSS) demonstrated clinically significant DES, moderate ocular discomfort, poor sleep quality, and cognitive fatigue. The patient underwent a two-week integrated intervention comprising yoga therapy, naturopathy-based lifestyle modifications, and acupuncture. Following the intervention, marked improvements were observed, with CVS-Q scores decreasing from 18 to 6, OSDI from 32% to 12%, PSQI from 11 to 5, and FSS from 5.8 to 3.1, reflecting reduced ocular symptoms, improved sleep quality, and decreased cognitive fatigue. The patient also reported enhanced daily comfort, improved work productivity, and better sleep without pharmacological treatment. This case suggests that an integrated yoga, naturopathy, and acupuncture approach may be a safe and effective strategy for managing screen-related neuro-ocular fatigue and cognitive exhaustion, warranting further evaluation through well-designed controlled studies.

Keywords: Digital eye strain, Computer vision syndrome, Yoga, Naturopathy, Acupuncture, Cognitive fatigue, Integrative medicine

INTRODUCTION

In the digital age, prolonged exposure to electronic display devices has led to a clinical condition known as digital eye strain (DES), also referred to as computer vision syndrome (CVS). DES is characterized by a range of ocular and extra-ocular manifestations, including eye discomfort, visual fatigue, headache, blurred vision, dry eye symptoms, neck and shoulder pain, and generalized fatigue, resulting from prolonged near-vision activities

involving computers, tablets, or smartphones.[1] Estimates of the global prevalence of DES vary widely, with numerous studies reporting that approximately 50% to 90% of regular digital device users experience related symptoms.[2] In India, a comparably high prevalence of DES has been reported, particularly among students and working professionals. For example, a study from North India documented DES symptoms in more than 70% of medical and nursing students, with headache, eye pain, and ocular dryness being the most frequently reported complaints.[3] Beyond visual disturbances, DES has been associated with cognitive fatigue, irritability, sleep disturbances, reduced work productivity, and a decline in overall quality of life.[1] The pathophysiology of DES is multifactorial. Contributing ocular mechanisms include a reduced blink rate, accommodative-convergence dysfunction, tear film instability, and ocular surface dryness, while extrinsic factors such as screen glare, suboptimal lighting, and poor ergonomic practices further intensify visual strain.[4] Cognitive fatigue associated with DES is believed to arise from autonomic dysregulation, characterized by heightened sympathetic activity resulting from prolonged visual attention and sustained near-vision tasks.[1] Pharmacological interventions offer primarily symptomatic relief, and there is currently no standardized approach for addressing the broader neurocognitive manifestations of DES.

Accordingly, non-pharmacological and integrative approaches have received increasing attention. Naturopathy focuses on lifestyle modification, sensory hygiene, adequate hydration, and natural therapeutic interventions to alleviate functional fatigue and restore physiological homeostasis, thereby facilitating a holistic management of visually and cognitively induced fatigue.[5] Yoga therapy has been shown to alleviate eye fatigue and visual discomfort by enhancing extraocular muscle function, improving accommodative capacity, and regulating autonomic balance through mindful movement and controlled breathing.[6] Systematic reviews underscore the potential of yoga as an adjunctive intervention for eye health, although the current evidence is constrained by heterogeneity in study designs and outcome measures.[7] Acupuncture, a central modality of Traditional Chinese Medicine (TCM), has demonstrated potential in enhancing ocular surface health, alleviating discomfort, and modulating neuroimmune pathways in dry eye disease, a condition frequently associated with DES.[8] Research integrating acupuncture with conventional treatments indicates potential benefits across both physical and cognitive symptom domains.[9]

Despite these observations, integrated therapeutic models that combine yoga, naturopathy, and acupuncture to comprehensively address screen-induced neuro-ocular fatigue and cognitive exhaustion remain lacking. The majority of research has concentrated on single interventions, with relatively few studies systematically assessing holistic approaches that target clusters of functional symptoms rather than isolated ocular outcomes. In this context, the present case report examines the impact of an integrated yoga, naturopathy, and acupuncture intervention on screen-induced neuro-ocular fatigue and cognitive exhaustion, addressing an existing gap in the literature and aligning with a holistic paradigm aimed at enhancing both symptom relief and functional capacity in individuals with prolonged screen exposure.

CASE REPORT

Patient information

A 37-year-old male employed in the information technology sector presented to the integrative medicine outpatient department with a four-month history of persistent eye strain, frontal headaches, blurred vision after prolonged digital screen use, irritability, impaired concentration, and difficulty initiating sleep. The symptoms were markedly exacerbated following daily screen exposure exceeding six hours. The patient had no history of refractive errors, migraine, psychiatric disorders, or chronic systemic illnesses, and was not on any regular medication.

Clinical findings

Anthropometric assessment revealed a height of 172 cm, body weight of 74 kg, and a body mass index of 25.0 kg/m². Vital signs were within normal limits, including blood pressure of 124/78 mmHg, heart rate of 76 beats per minute, respiratory rate of 16 breaths per minute, and oxygen saturation of 98% on room air. General physical examination was unremarkable, with no evidence of pallor, icterus, cyanosis, clubbing, or edema. Systemic examination was within normal limits, including neurological and ophthalmological assessments, except for mild tenderness over the supraorbital and frontal regions. Visual acuity and extraocular movements were preserved.

Diagnostic assessment

Symptom severity and functional impact were evaluated using the CVS-Q and the OSDI.[10,11] At baseline, the patient exhibited clinically significant DES, characterized by elevated symptom frequency and intensity on the CVS-Q, along with a moderate degree of functional limitation related to ocular discomfort as measured by the OSDI. Sleep quality and mental fatigue were further assessed using the PSQI and FSS respectively, revealing that participants exhibited poor sleep quality and pronounced cognitive fatigue at baseline.[12,13]

Therapeutic intervention

The patient underwent an integrated intervention combining yoga therapy, naturopathy, and acupuncture (Table 1).

Follow-up and outcomes

Post-treatment evaluation following the two-week integrative intervention demonstrated a marked reduction in symptom severity. The CVS-Q score decreased from 18 to 6, and the OSDI score declined from 32% to 12%, indicating substantial improvement in ocular comfort and visual function. Concurrently, sleep quality and cognitive fatigue showed notable improvement, with PSQI scores decreasing from 11 to 5 and FSS scores from 5.8 to 3.1, reflecting a restoration toward normal sleep patterns and reduced cognitive fatigue (Table 2).

Table 1: Detailed intervention components and duration.

Therapy modality	Intervention component	Frequency	Duration
Yoga therapy	Palming, blinking awareness exercises	Daily	5 minutes/session for 2 weeks
	Trataka (candle gazing-gradual progression)	Weekly twice	8-10 minutes/session for 2 weeks
	Nadi Shodhana Pranayama	Daily	10 minutes/session for 2 weeks
	Bhramari Pranayama	Daily	5 minutes/session for 2 weeks
	Shavasana with guided breath awareness	Daily	8-10 minutes/session for 2 weeks
Naturopathic Intervention	Screen hygiene education (20-20-20 rule)	Daily practice	Throughout the 2-week intervention period
	Cold water eye splashes (morning)	Once daily	Throughout the 2-week intervention period
	Adequate hydration guidance	Daily practice	Throughout the 2-week intervention period
	Sleep regulation (fixed sleep-wake timing)	Daily practice	Throughout the 2-week intervention period
Acupuncture	Acupuncture at BL2, GB20, LI4, LV3, ST36, SP6, HT7, DU20	2 sessions/ week	20 minutes/session for 2 weeks

Table 2: Pre- and post-intervention symptom assessment scores.

Assessment tool	Domain assessed	Baseline score	Post-intervention score
CVS-Q	DES severity	18	6
OSDI	Ocular discomfort and visual function	32%	12%
PSQI	Sleep quality	11	5
FSS	Cognitive/mental fatigue	5.8	3.1

DISCUSSION

The present case report assessed the impact of a combined yoga, naturopathy, and acupuncture intervention on screen-induced neuro-ocular fatigue and cognitive exhaustion in a patient with extended digital device exposure, addressing the multifactorial nature of DES. Following a two-week intervention, the patient demonstrated marked improvements in ocular symptoms, sleep quality, and cognitive fatigue, as evidenced by reductions in CVS-Q, OSDI, PSQI, and FSS scores, achieved without the use of pharmacological treatment. Given the rising dependence on digital screens, these outcomes are clinically meaningful and suggest that a safe, cost-effective, holistic integrative approach may offer broader and more enduring benefits than traditional symptom-targeted interventions for DES. The potential mechanisms responsible for these effects are discussed below.

Yoga-based ocular exercises may mitigate eye fatigue by improving the function and coordination of the extraocular and ciliary muscles, thereby alleviating asthenopic symptoms such as eye strain and visual fatigue.[6] Yoga-based breathing and relaxation practices enhance parasympathetic activity and restore autonomic balance, as reflected by increased heart rate variability, potentially reducing stress-induced physiological arousal that contributes to visual and cognitive fatigue.[14] Yoga and pranayama have been linked to reduced sympathetic dominance and may enhance ocular blood flow, decrease oxidative stress, and improve neurovascular regulation, collectively promoting visual comfort, stress resilience, and overall well-being.[15] Conversely, extended screen exposure has been shown to decrease blink rate and disrupt tear film stability, leading to dry eye-like symptoms and visual discomfort.[16] Naturopathic interventions, such as regular screen breaks, following the 20-20-20 rule, proper lighting, and adequate hydration, help restore tear film stability and reduce ocular surface dryness. Enhancing sleep hygiene through lifestyle modifications can help counteract the neuroendocrine and autonomic disturbances linked to prolonged digital exposure. Sleep disturbances and psychological stress elevate sympathetic activity and fatigue, while restoration of sleep quality helps normalize circadian rhythms and reduces cognitive fatigue linked to extended screen exposure.[17] Comprehensive lifestyle management, including adequate hydration and regular

rest breaks, may further attenuate oxidative stress and systemic fatigue, thereby promoting neuronal resilience and supporting ocular health during prolonged near-vision tasks.[18] Acupuncture may alleviate DES by enhancing lacrimal gland–mediated tear secretion, modulating ocular inflammation and immune activity, and supporting autonomic regulation to maintain ocular and nervous system homeostasis.[8] These findings are consistent with prior research showing that yoga-based eye exercises and acupuncture can reduce eye fatigue, dry eye symptoms, and stress in computer users, although such modalities have rarely been examined within an integrated intervention framework.

Patient perspective

The patient expressed a high level of satisfaction with the integrative intervention, reporting enhanced daily comfort, improved work productivity, and better sleep quality, achieved without the use of pharmacological therapy.

Strengths

This case report demonstrates the potential efficacy of a multimodal intervention incorporating yoga, naturopathy, and acupuncture for the management of screen-induced neuro-ocular fatigue and cognitive exhaustion. The employment of validated assessment instruments alongside a non-pharmacological, cost-effective intervention underscores the clinical relevance and practical feasibility of this approach.

Limitations and future directions

The single-case design of this study restricts the generalizability of the findings and precludes causal inference concerning the observed outcomes. Future studies should utilize controlled designs with larger sample sizes, incorporate objective measures of ocular and autonomic function, and include extended follow-up periods to validate efficacy, clarify underlying mechanisms, and evaluate the long-term sustainability of integrative interventions combining yoga, naturopathy, and acupuncture for screen-related neuro-ocular fatigue.

CONCLUSION

This case indicates that an integrative intervention combining yoga, naturopathy, and acupuncture may provide a safe and effective strategy for alleviating screen-related neuro-ocular fatigue and cognitive exhaustion. The results support the potential utility of holistic, non-pharmacological interventions for managing the complex manifestations of DES, warranting confirmation in controlled trials.

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REFERENCES

1. Pucker AD, Kerr AM, Sanderson J, Lievens C. Digital Eye Strain: Updated Perspectives. Clin Optom (Auckl). 2024;16:233-46.
2. Sheppard AL, Wolffsohn JS. Digital eye strain: prevalence, measurement and amelioration. BMJ Open Ophthalmol. 2018;3(1):e000146.
3. Chowdhury B, Abid M, Kumar P, Ramraika D. Digital Eye Strain and Associated Risk Factors among Medical Science Students of North India. Indian J Public Health. 2025;69(3):267-72.
4. Auffret É, Gomart G, Bourcier T, Gaucher D, Speeg-Schatz C, Sauer A. Digital eye strain. Symptoms, prevalence, pathophysiology, and management. J Fr Ophtalmol. 2021;44(10):1605-10.
5. Myers SP, Vigar V. The State of the Evidence for Whole-System, Multi-Modality Naturopathic Medicine: A Systematic Scoping Review. J Altern Complement Med. 2019;25(2):141-68.
6. Gupta SK, Aparna S. Effect of Yoga Ocular Exercises on Eye Fatigue. Int J Yoga. 2020;13(1):76-9.
7. Boopalan D, Kumar AP, Vanamoorthy MK, Vijayakumar V, Ravi P, Kasi M, et al. Yoga therapy for eye health and disease: A scoping review. Europ J Integrative Med. 2025;73:102427.
8. Chen T, Feng LQ, Jin Y. A Review of Acupuncture for the Treatment of Dry Eye Syndrome: Mechanisms, Efficacy, and Clinical Implications. Int J Gen Med. 2025;18:4647-58.
9. Zhao L, Dong BQ, Zuo T, Zhang ZQ, Wang FY, Zhou HM. Combination of acupuncture and medication for dry eye complicated with computer vision syndrome: a randomized controlled trial. Zhongguo Zhen Jiu. 2023;43(10):1134-8.
10. Seguí Mdel M, Cabrero-García J, Crespo A, Verdú J, Ronda E. A reliable and valid questionnaire was developed to measure computer vision syndrome at the workplace. J Clin Epidemiol. 2015;68(6):662-73.
11. Schiffman RM, Christianson MD, Jacobsen G, Hirsch JD, Reis BL. Reliability and validity of the Ocular Surface Disease Index. Arch Ophthalmol. 2000;118(5):615-21.
12. Grandner MA, Kripke DF, Yoon IY, Youngstedt SD. Criterion validity of the Pittsburgh Sleep Quality Index: Investigation in a non-clinical sample. Sleep Biol Rhythms. 2006;4(2):129-39.
13. Krupp LB, LaRocca NG, Muir-Nash J, Steinberg AD. The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol. 1989;46(10):1121-3.
14. Chen H, Ratanapakorn T, Sukonpatip M, Wang X, Eungpinichpong W. Self-Administered Yoga Facial Massage with Breathing Regulation to Improve Heart Rate Variability in Individuals with Computer Vision Syndrome: A Randomized Controlled Trial. J Integr Complement Med. 2025;32(2):156-64.

15. Abraham L, George S, Bhat R. Yoga for Eye Disorders-A Systematic Review. Adv Mind Body Med. 2025:ADV1441.
16. Kaur K, Gurnani B, Nayak S, Deori N, Kaur S, Jethani J, et al. Digital Eye Strain- A Comprehensive Review. Ophthalmol Ther. 2022;11(5):1655-80.
17. Şambel Aykutlu M, Aykutlu HC, Özveren M, Garip R. Digital media use and its effects on digital eye strain and sleep quality in adolescents: A new emerging epidemic? PLoS One. 2024;19(12):e0314390.
18. Lem DW, Gierhart DL, Davey PG. Can Nutrition Play a Role in Ameliorating Digital Eye Strain? Nutrients. 2022;14(19):4005.

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