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Black Ice

Six ways to get a grip on computer vision syndrome in medical school examinations

Six façons de maîtriser le syndrome de la vision artificielle dans les examens des facultés de médecine

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Abstract

Computer Vision Syndrome is a group of vision symptoms related to screen use, which is a growing point of concern as screens become more integrated into daily life. Medical students are hit particularly hard by this, as they report substantial levels of screen use. While screens are practically necessary in medical education, there are areas of harm reduction that have yet to be addressed. Medical exams are particularly hostile to eye health, as students have to stare at screens for prolonged periods, making them ideal subjects for eye protection and education interventions. Some steps that examiners can take to encourage positive habits in their students are to extend exams with spaces for five-minute breaks or according to the 20-20-20 Rule, encourage an area of alternate fixation for eye breaks, add audio cues signalling breaks, educate about environmental and postural modifications to improve eye health, allow lubricating drops in exams, and modify exams to decrease suspicion of academic misconduct.

Résumé

Le syndrome de la vision artificielle est un ensemble de symptômes visuels liés à l'utilisation d'écrans, ce qui est de plus en plus préoccupant, étant donné que ces écrans sont de plus en plus intégrés à la vie quotidienne. Les étudiants en médecine sont particulièrement touchés par ce phénomène, car ils utilisent souvent les écrans pour leurs études. Pourtant que les écrans sont pratiquement nécessaires dans l'enseignement médical, certains aspects de la réduction des dommages n'ont pas encore été explorés. Les examens médicaux sont particulièrement hostiles à la santé oculaire, car les étudiants doivent regarder des écrans pendant de longues périodes, ce qui en fait des sujets idéaux pour des interventions de protection et d'éducation oculaires. Pour encourager les étudiants à adopter des habitudes positives, les examinateurs peuvent notamment prolonger les examens en prévoyant des pauses de cinq minutes ou en suivant la règle des 20-20-20, encourager une autre zone de fixation pour les pauses, ajouter des signaux audio pour signaler les pauses, informer sur les modifications environnementales et posturales permettant d'améliorer la santé oculaire, autoriser l'utilisation de gouttes lubrifiantes lors des examens, et modifier les examens pour réduire les soupçons de mauvaise conduite académique.

Introduction

Research has linked screen use to eye strain, blurry vision, dry eyes, double vision, and headaches.[1] These issues may arise because the human eye is not designed for prolonged focus on digital displays, resulting in continuous activity of the ocular muscles. These symptoms, commonly referred to as Computer Vision Syndrome (CVS), constitute a repetitive strain disorder with an estimated prevalence of 66%, underscoring its widespread reach across digital device users globally.[1] Some culprits for these adverse outcomes are a reduced blink rate during computer use, increased ocular surface exposure due to a retracted eyelid position when looking up at screens, and the lack of defined edges and resolution inherent to analogue media that challenges natural accommodation processes.

How does this impact medical education? Medical students reported a daily median screen time of 930 minutes (15.5 hours), with Bhatnagar et al. reporting a striking 92%

prevalence of CVS symptoms among medical students who transitioned to remote learning.[2,3] In the digital era, where charting and studying are increasingly screen-based, students need eye care wherever possible. The current education system lacks safeguards for preventing CVS, a problem not unique to medicine.

Given the established correlation between screen use and various ocular symptoms, this paper proposes strategies for implementing eye care solutions in the context of digitally administered examinations. In this scenario, one is contending with significant time pressures and a general discouragement from diverting one's gaze away from the screen. Test-takers may forgo blinking or resting their eyes while under time constraints. Proctoring software may also penalize students for suspicious activity if they glance away, contributing to an environment where prolonged, uninterrupted screen use is the norm. A literature search yielded no results, highlighting a knowledge gap that this paper aims to address.

Around 1991, Dr. Anshel introduced the 20-20-20 Rule to prevent eye strain.[4] The concept: every 20 minutes, take a 20-second break by shifting your focus to an objective at least 20 feet (6.1 meters) away. Studies have found that this practice reduces digital eye strain, prevents dry eye symptoms, and helps combat CVS among practitioners.[5] Although the rule is widely recognized and easily remembered, it has its detractors.[5] A study examining this rule found no benefit when applying 20-second breaks during a 40-minute high-demand trial.[6] While imperfect, this rule remains a feasible and memorable approach to mitigating eye strain. Animal studies examining myopia prevention suggest that a break of at least 5 minutes per hour is required.[7] While this is likely superior to the 20-20-20 Rule, it is less feasible, and thus, the two suggestions are interchangeable based on the circumstances. Honourable mention also goes to reverting to paper exams where possible. Unfortunately, due to sustainability concerns, this is likely infeasible in many environments.

As these rules can be challenging to implement, the following section discusses various success strategies. The authors have summarized these guidelines in a flowchart (Figure 1).

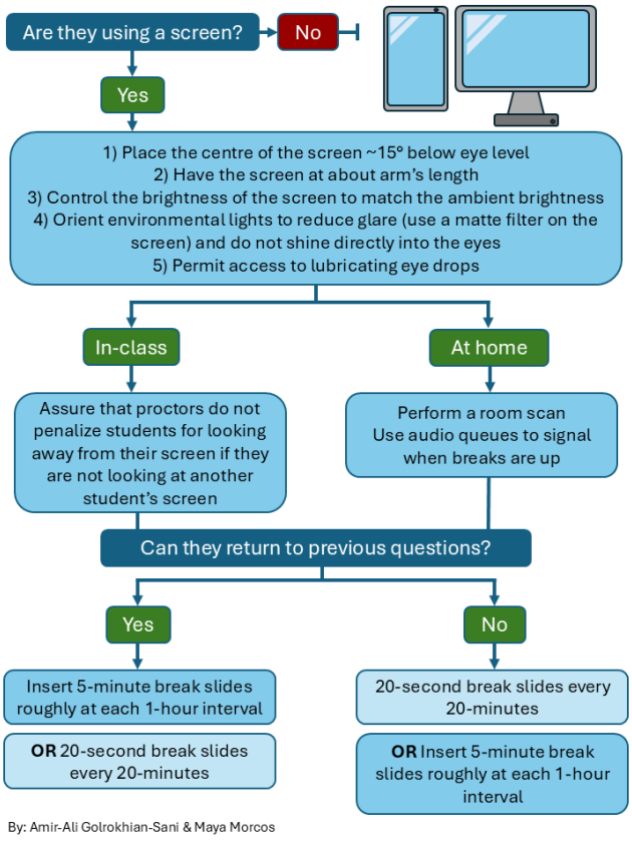

Figure 1. A flow chart detailing interventions to apply in exams where screens are used

Six Ways to get a grip

1. Be aware of eye-health

While being proactive in using such breaks remains optional for the examinees, their implementation alone raises awareness of the importance of eye care beyond the examination environment. The break screens are also a great space to provide eye-rest advice for students who choose not to close their eyes.

Such advice may include reducing exposure to bright light, whether from windows, screens, or ambient room lighting, to minimize ocular discomfort.[8] Similarly, managing the brightness contrast between the screen and the environment is essential. A useful tool to permit within the testing software would be the ability to invert screen colours to decrease overall brightness. One must note variations in individual comfort levels, as younger individuals generally require less light to work comfortably.[9] Finally, matte screen filters can reduce glare.

One's posture is another consideration. The Canadian Centre for Occupational Health and Safety recommends positioning the centre of a monitor approximately 15 degrees below the horizontal eye level, with a viewing distance of about an arm's length.[10]

2. Modify exam formats

Exams can be formatted so that students cannot return to previous questions, allowing organizers to feel more comfortable with five-minute breaks between question pages without concern for academic dishonesty. Thus, if the examination style is amenable to these modifications, this could be a helpful strategy.

3. Exam time modifications

Exams should be lengthened by five minutes per hour (e.g., a three-hour exam could be extended by 15 minutes, with five-minute break intervals spaced evenly throughout) for the five-minute break strategy. Even for the 20-20-20 Rule, a slight increase in exam time could help assuage student worries about time. In both instances, the exam introduction screen should include a notice stating that these extensions have been made specifically for eye rest and will not impact question difficulty.

4. Lubricating eye drops

As a rule, examiners should explicitly allow lubricating eye drops on the desk in all exam settings. Moreover, maintaining adequate humidity, such as with a humidifier, may further alleviate dry eye symptoms.

5. Alternate fixation

An alternate fixation target is an area that complies with the distance requirements of the 20-20-20 Rule, where the examinee can look during eye breaks. In home-based exams, mandating a room scan may help alleviate examiners' concerns that no unauthorized aids are present. During the room scan, the examinee should clearly identify the alternate fixation target. In a controlled examination setting, rules should permit students to look away from their screens at an alternate fixation target located far from other screens, as designated by the examiner(s). While specific to the 20-20-20 Rule, this target can also give someone a chance to look away from their screen in a five-minute break-structured exam for a brief respite.

6. Audio cue

An audio cue marking the midpoint and end of these breaks could promote adherence to resting one's eyes. In a public setting, this would necessitate synchronizing the break for the entire group. This change would maintain an on-screen timer, accommodating both students with low vision and limited hearing.

Summary

Medical students and many others can greatly benefit from the strategies outlined in this paper. Small changes, such as breaks and a more optimal test-taking environment, can help protect students' visual health during digital examinations. Academic programs, students, administrators, and examiners should consider adopting these changes as proactive measures to prevent the development of CVS, promoting the overall well-being of test-takers. Furthermore, the skills these students acquire can be integrated into their studying habits and later applied in their workplaces, where they can educate patients on CVS. CVS prevention is an area that could benefit from future research to verify and solidify these recommendations.

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