Mini Review

iMedPub Journals
http://www.imedpub.com/

Journal of Eye and Vision

2018
Vol.1 No.1:2

Ocular Ergonomics for the Computer Vision Syndrome

Burak Turgut*

Department of Ophthalmology, Yuksek Ihtisas University, Ankara, Turkey

***Corresponding author:** Burak Turgut, Department of Ophthalmology, Yuksek Ihtisas University, Ankara, Turkey, Tel: +90 312 2803601; E-mail: burakturgut@yiu.edu.tr

Received date: November 8, 2017; **Accepted date:** January 8, 2018; **Published date:** January 15, 2018

Citation: Turgut B (2018) Ocular Ergonomics for the Computer Vision Syndrome. J Eye Vis. Vol.1 No.1:2.

Abstract

Computer vision syndrome (CVS) includes ophthalmic and visual problems related to computer use. Actually, it often occurs in the usage of all screened devices. As the computer vision syndrome increases day by day, it is in the process of becoming an age-old illness. In this review, we aimed to summarize the specific recommendations for the prevention from this syndrome and for the reduction of related complaints.

Keywords: Computer vision syndrome; Digital eye strain; Screen; Prevention; Treatment; Recommendation; Ocular problems; Ocular ergonomics

Introduction

Computer vision syndrome (CVS) is defined by The American Optometric Association as ''the complex of the eye and vision problems related to near work which is experienced during or related to computer use'' [1]. It is due to excessive usage of the devices including the screen such as computers, tablets, e-book readers, hand-held game consoles, and smartphones. CVS is also known as ''digital eye strain''. Viewing a digital screen shows difference than reading a printed page. Because the printed letters or figures in newspapers and books have generally dense black characters with well-defined borders and significantly more contrasting than the light background and do not cause the focusing problems and fatigue in healthy eyes [1-5]. However, the letters or characters on a screen have not the contrast which provides the distinguishing from their background and sharply defined edges and has the brightest center intensity and lower peripheral intensity. Additionally, the presence of glare and reflections on the screen cause the difficulty in viewing. Thus, to focus on these characters and sustain the focusing are very difficult for eyes. This difficulty creates fatigue and related symptoms in the eyes [1-5].

Ocular symptoms of the CSV are blurred vision, burning sensation, eye redness, lacrimation, ocular pain or discomfort, focusing problems, diplopia, dry eye symptoms and eyestrain beside extra-ocular complaints such as headaches, neck and shoulder pains. CVS is experienced by the 90% of computer users. The reduced numbers of blinking, environmental factors such as air conditioners, winter, high temperature, decreased humidity, corneal exposure due to higher gaze angle in desktop monitor viewing, aging changes, female gender, untreated refractive errors, focusing inability, incorrect sitting posture can contribute to the development of CVS [1-5].

In the ocular treatment of CVS, correction of any refractive errors and use of occupational glasses, treatment of dry eyes are required. Additionally, some ergonomics recommendations to the subjects which are at higher risk for CVS as follows [6-13]:

Recommendation 1: The distance between the eye and the screen should be at least of 20-25 inches (approximately 50-63 cm). This distance corresponds to approximately an arm's length. The place of the screen should be as far away as possible and, optimally, it is recommended to increase the font size.

Recommendation 2: The gaze position of the eye to the screen should be slightly downward. In the other words, the most ideally, the center of the screen should be about 4-6 inches (10-15 cm, 15° to 20°) below the straight-ahead gaze (the sight area located between the 20° and 50° angles from the horizontal viewing line). This lower position will also provide the less exposure of cornea to air and will decrease the evaporation of tear.

Recommendation 3: The level of room lighting at the workplace should be enhanced because the much brighter light of the screen than the surrounding light cause to be hard the eyes and eyestrain. So, keep bright lighting overhead to a minimum. To keep the desk lamp shining on the desk, but not the person and to keep window light off to the side, rather than in front or behind the person will be very useful.

Recommendation 4: The position of the computer screen should be set to avoid glaring and reduce reflections from windows or overhead lights. A screen glare filter can be used to minimize glare. For the same purpose, blinds or drapes on windows can be used.

Recommendation 5: The contrast of the screen should be increased to reduce eye strain; your eyes have to work harder to see. Horizontal and vertical adjustable curtains must be used to control daylight on the screen.

Recommendation 6: If the device has glass screens causing markedly glaring, the matte screen filter should be used to reduce glare.

Recommendation 7: Eyes should be rested. The 20-20-20 rule can be applied to allow to relief the eyes. The rule is defined as

taking regular breaks every 20 min by looking at object 20 feet away instead of the screen in near for 20 s. As another option, a break for 15 min after every 2 h of continuous computer use has been suggested by The American Optometric Association. While looking at nearby objects, eyes focus to adjust, and they have to close each other. The focusing is no necessary in the looking at the distance. This distance is about 115 cm when looking straight ahead and about 90 cm when looking down 30°. The longer you look away, the more tired eyes are avoided. The rule 20-20-20 allows the eyes a chance to defocus and to rest.

Recommendation 8: Glasses should be weared for the correction of refractive error instead of contact lenses during the usage of computer and other monitored devices. This will provide a break and a relief for dryness due to both contact lenses and CVS.

Recommendation 9: An artificial humidifier to improve localized moisture should be used for providing optimal room humidity level (30-60%, average 45%).

Recommendation 10: Encourage blinking frequently keeps the moisture of the ocular surface and helps to prevent dryness and irritation. The number of blinking may be increased voluntarily. Normally, people blink about 14 times in a minute. Focusing the eyes on screens reduces the blink rate by a third to a half and this causes dry eye.

Recommendation 11: Monitor display quality should be increased by using high-resolution LCD monitors with a matte finish. Older CRT monitors should be exchanged with ones which have highest refresh rates to minimize flicker.

Recommendation 12: The all devices with the screen, fluorescent and LED lightings emit blue light or high-energy visible (HEV) light (also known blue-violet or violet light) which has the highest energy and the shortest wavelength, and which can cause CVS. The HEV light can affect the clearness and visual contrast and cause a glare or flickering and consequently CVS. Thus, eyeglasses with filter and the screen filters or coatings for blue-violet light can be used.

Recommendation 13: To keep some objects such as a document holder on the desk and away from the monitor in the keyboard area can provide a position the user does not need to move the head to look from the document to the screen.

In conclusion, the visual complaints associated with Computer Vision Syndrome or Digital Eye Strain can be prevented and reduced with taking some preventions and applying above mentioned recommendations.

References

1. American Optometric Association (1995) Guide to the clinical aspect of computer vision syndrome, St. Louis.
2. Campbell FW, Durden K (1983) The visual display terminal issue: A consideration of its physiological, psychological and clinical background. Ophthalmol Physiol Opt 3: 175-192.
3. Mussa A (2016) Computer vision syndrome. Adv Ophthalmol Vis Syst 4: 00110.
4. Blehm C, Vishnu S, Khattak A, Mitra S, Yee RW (2005) Computer vision syndrome: A review. Surv Ophthalmol 50: 253-262.
5. Klamm J, Tarnow KG (2015) Computer vision syndrome: A review of literature. Medsurg Nurs 24: 89-93.
6. Barthakur R (2013) Computer vision syndrome. Internet J Med Update 8: 1-2.
7. Bali J, Neeraj N, Bali RT (2014) Computer vision syndrome: A review. J Clin Ophthalmol Res 2: 61-68.
8. Gowrisankaran S, Sheedy JE (2015) Computer vision syndrome: A review. Work 52: 303-314.
9. Thomson DW (1998) Eye problems and visual display terminals-the facts and the fallacies. Ophthalmic Physiol Opt 18: 11-19.
10. Uchino M, Schaumberg DA, Dogru M, Uchino Y, Fukagawa K, et al (2008) Prevalence of dry eye disease among Japanese visual display terminal users. Ophthalmology 115: 1982-1988.
11. Ranasinghe P, Wathurapatha WS, Perera YS, Lamabadusuriya DA4, Kulatunga S, et al (2016) Computer vision syndrome among computer office workers in a developing country: An evaluation of prevalence and risk factors. BMC Res Notes 9: 150.
12. Web-source:https://www.aao.org/newsroom/news-releases/detail/ergonomics-eyes-tips-avoid-computer-eye-strai
13. Web-source: https://www.aao.org/eye-health/tips-prevention/computer-usage