

To tackle symptoms of computer vision syndrome in era of COVID-19

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ABSTRACT

With the emergence of a novel coronavirus, there has been an increase in the use of electronic gadgets such as laptops, tablets, and mobile phones. There has been an emphasis on social distancing and work from home. Therefore, people are switched to online mode, whether it is office work or education. Both adults and children are getting dependent on electronic devices, which has led to increased symptoms of computer vision syndrome (CVS). Here, we address the symptoms that can occur with enhanced use of digital media and how that could be tackled.

KEY WORDS: computer vision syndrome; CVS; ergonomics; COVID-19

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INTRODUCTION

Computer vision syndrome (CVS), or digital eye strain, has been defined as a group of eye and vision-related problems resulting from prolonged use of electronic gadgets, leading to ocular, visual, and musculoskeletal problems [1].

The novel coronavirus has changed the lifestyle and living environment through mask wear, social distance, and work from home. Both adults and children are now occupied by digital media and devices as the meetings and learning have been made online that can only be done through the use of electronic devices such as laptops and tablets. This puts more strain on the eyes. Sitting for long hours in front of the screen not only causes problems with the eyes but can also lead to various problems such as neck pain, back pain, and, more importantly, obesity, which is the root cause of other illnesses such as cardiac problems and diabetes.

Here, we address the visual symptoms that can occur with the use of digital media and how they could be tackled.

PATHOPHYSIOLOGY

Continuous exposure of the eyes to an illuminated screen for prolonged periods with reduced blinking frequency puts immense strain on the eyes. The blinking rate is not only significantly reduced, but the blinks tend to be incomplete [9]. This causes unstable tear film and consequently dry eye symptoms. Furthermore, digital screens are made of pixels that don't have a single point of sharp focus, unlike text on reading material. As a result, the accommodating apparatus of the eye is constantly changing focus to achieve clear vision putting strain on the ciliary body and causing accommodative or asthenopic symptoms [2]. This is

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further complicated by poor posture and lighting conditions.

SYMPTOMS OF CVS IN ADULTS

The symptoms can be non-ocular such as shoulder pain, neck pain, neck stiffness, headache, and backache. It can be ocular symptoms such as blurred vision, double vision, presbyopia, and slowness of focus change. Eye strain, ache in or around the eyes, tired eyes, burning, dryness, redness, gritty sensation, tearing, and irritation can also occur [3, 4].

SYMPTOMS OF CVS IN CHILDREN

Children's most commonly reported symptoms are poor concentration and behavioral problems such as attention deficit and hyperactivity, irritability, dry eyes, ocular irritation, eye strain, headache, and neck and shoulder pain [5].

Overall, the symptoms are vast, and the root cause is enhanced screen exposure. The severity of symptoms is related directly to the duration of screen use [6]. For instance, the symptoms would be more in those who use the screen for 6 hours than those who use it for 2 hours. Symptoms are categorized into four main types, as depicted in Table 1 [7].

Symptoms are usually associated with screen overuse, leading to repetitive strain injury to the eyes. Symptoms typically disappear with the discontinuation of screen use but recur once screen activity is resumed.

Sometimes, CVS is misdiagnosed as transient ischemic attacks (TIA) in adults and is inappropriately treated as TIA with misuse of antithrombotic therapy. Therefore, proper diagnosis is essential for treating CVS [4].

TACKLING THE SYMPTOMS OF CVS IN THE ERA OF COVID-19

In the era of COVID-19, we are highly dependent on the use of digital media. As we are more restricted at home, we are bound to work online, and as for children, remote online learning has been given priority over the physical attending educational institution. Therefore, our aim is to work in a way that has less impact on our eyes and to tactfully deal with the use of gadgets such as laptops, tablets, and smartphones.

Table 1. Symptoms of computer vision syndrome (CVS) and its possible causes

CVS symptoms	Possible causes
Asthenopic	
Eye strain	Binocular vision Accommodation
Tired eyes	
Sore eyes	
Related with ocular surface	
Dry eyes	Infrequent blinking
Watery eyes	
Irritated eyes	
Contact lens problems	
Visual	
Blurred vision	Refractive error
Slowness of focus change	Accommodation
Double vision	Binocular vision
Presbyopia	Presbyopic correction
Transient blindness	Bleaching or photopigment, with the viewing eye becoming light-adapted
Extra-ocular	
Neck pain	Computer screen location
Back pain	
Shoulder pain	

There are certain ways in which it could be accomplished. One way is to improve ergonomics which helps reduce discomfort and increases productivity [8, 9]. Ergonomics depicted in Figure 1 can be improved by optimal placement of the screen at an arm's length, and a shorter distance would promote eye straining. Another aspect is the proper positioning of the individual using a comfortable screen that prevents other problems such as back and neck pain. When we use the screen, we are so occupied by it that we neglect that our eyes are constantly watching the screen without any blinking, and this promotes dryness and a gritty sensation, so it is advisable to blink in between. The American Optometry Association recommends rest per the 20-20-20 rule and at least 15 minutes after each continuous 2 hours of computer work. Blink training may help reduce the symptoms of CVS [1]. Adjustment of room lighting and screen contrast is of utmost importance. Without this, the eyes will strain. If the light source can not be adjusted, the screen should be switched to a better position where reflection and glare could be minimized.

Where possible, the duration of screen use should be minimized, and the habit of taking

Table 2. Recommendations for 24-hour physical activity, sedentary behaviour and sleep for children under 5 of age according to World Health Organization [11]	
Infants (less than 1 year)	
Physical activity	Physical activity several times a day in a variety of ways, particularly through interactive floor-based play. Infants not yet mobile — at least 30 minutes in prone position (tummy time) spread throughout the day while awake
Sedentary screen time	Not be restrained for more than 1 hour at a time (e.g. prams/strollers, high chairs, or strapped on a caregiver’s back). Screen time is not recommended. When sedentary, engaging in reading and storytelling with a caregiver is encouraged
Good quality sleep	14–17 hours (0–3 months of age) or 12–16 hours (4–11 months of age), including naps
Children 1–2 years of age	
Physical activity	At least 180 minutes in a variety of types of physical activities at any intensity, including moderate to vigorous-intensity physical activity, spread throughout the day
Sedentary screen time	Not be restrained for more than 1 hour at a time (e.g. prams/ strollers, high chairs, or strapped on a caregiver’s back) or sit for extended periods of time. For 1-year-olds, sedentary screen time (such as watching TV or videos, playing computer games) is not recommended. For those aged 2 years, sedentary screen time should be no more than 1 hour; less is better When sedentary, engaging in reading and storytelling with a caregiver is encouraged
Good quality sleep	11–14 hours, including naps, with regular sleep and wake-up times
Children 3–4 years of age	
Physical activity	At least 180 minutes in a variety of types of physical activities at any intensity, of which at least 60 minutes is moderate- to vigorous intensity physical activity, spread throughout the day
Sedentary screen time	Not be restrained for more than 1 hour at a time (e.g. prams/ strollers) or sit for extended periods of time. Sedentary screen time should be no more than 1 hour; less is better. When sedentary, engaging in reading and storytelling with a caregiver is encouraged.
Good quality sleep	10–13 hours of good quality sleep, which may include a nap, with regular sleep and wake-up times

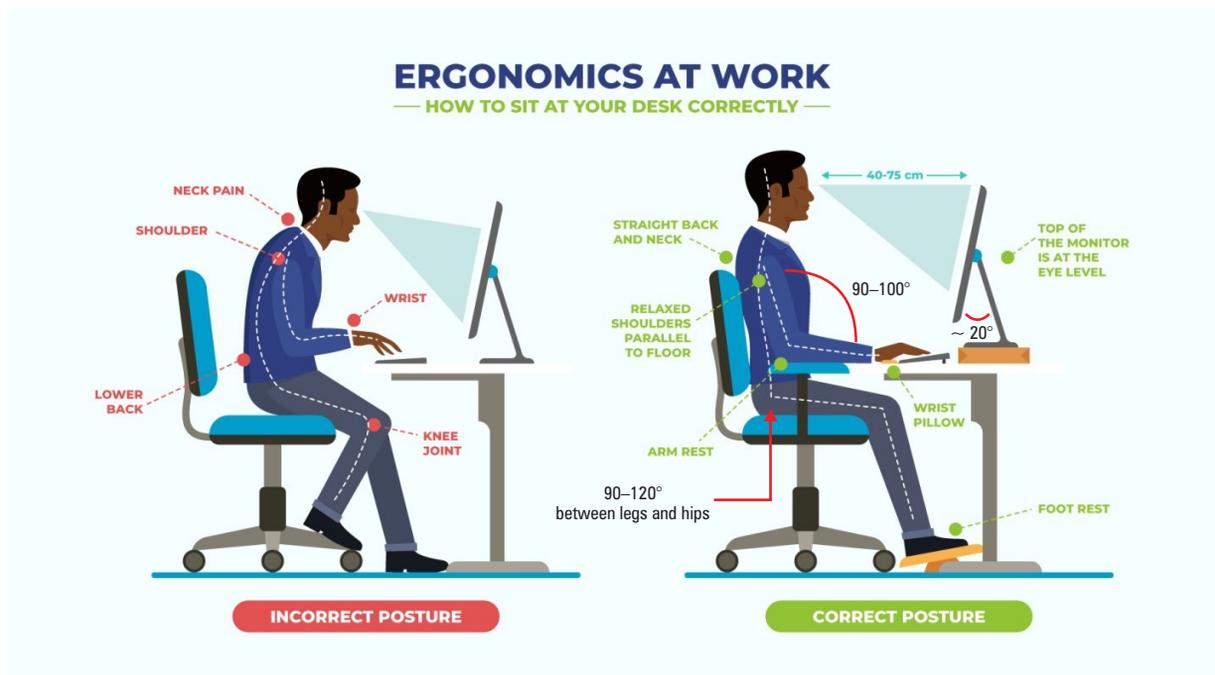


FIGURE 1. Ergonomics. Image source: [Freepik.com](https://www.freepik.com) (modified by author)

breaks between screen exposure should be developed. Adopting the 20-20-20 rule, which means

that every 20 minutes, an individual should take the eye off the screen for about 20 seconds and look

at a distant object (situated 20 feet away). This will help to overcome the symptoms of CVS. Underlying conditions that lead to symptoms should be addressed. For instance, lubricating eye drops should be advised if an individual has a dry eye disease. Blepharitis and meibomian gland dysfunction should be treated with lid hygiene, warm compresses, lid massage, and suitable drops. Problems with accommodation and vergence should be managed accordingly. Once underlying issues are addressed, there would be a more significant improvement in symptoms of CVS.

Managing children is a bit tricky as they are more addicted to the screen. They are diverted towards screen use not only for educational purposes but for entertainment too in the form of playing video games and watching cartoons and movies. The screen time must be limited in children to prevent the development of CVS and other problems such as refractive error, depression, aggression, anxiety, attention deficit, irritability, and disturbance of sleep patterns. All these conditions have been defined with screen use in many studies. The World Health Organization (WHO) has given guidelines for children under 5 years of age, which are presented in Table 2.

CONCLUSION

In this challenging pandemic situation, we are mostly switched to an online working and learning environment. And in this circumstance, we will have to show a balance and take precautionary measures while being exposed to screen. In

a nutshell, proper ergonomics, room lightening, improved number and quality of blinking [10], and breaks between exposure to the screen following the 20-20-20 rule should be adopted. Screen time in children should be limited to prevent the development of CVS and some other issues, as discussed.

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