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Impact Of Computer Technology On Health: Computer Vision Syndrome In Children- Review

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Abstract

Today, millions of children use computers daily. About 90% of school-aged children in the U.S. have access to a computer. Using computers and laptops helps in improving the motor skills of the kids and also helps in their cognitive development. This, in turn, improves the school readiness of the kids. However, too much of anything is bad. Like adults, excessive use of computers and digital media can cause Computer Vision Syndrome in children too. Extensive viewing of the computer screen can lead to eye discomfort, fatigue, blurred vision and headaches, dry eyes and other symptoms of eyestrain. These symptoms may be caused by poor lighting, glare, an improper work station set-up, vision problems of which the person was not previously aware, or a combination of these factors. Children can experience many of the same symptoms related to computer use as adults. Vision and eye problems are quickly becoming a common issue for people who work all day at a computer. Rather than one specific eye problem, computer vision syndrome (CVS) encompasses a host of eye discomforts associated with using a computer or other electronic screen for extended periods. With the popularity of video games, handheld devices and tablets, children are at high risk of being affected by CVS.

Keywords: computer vision syndrome, dry eyes, childhood.

INTRODUCTION

Today, millions of children use computers daily at school and home, both for education and recreation. Although the visual impact of computer use has been studied in adults, only a few studies have investigated the same issue in children. According to Ofcom, 9 out of 10 UK children aged 5 to 15 went online with an electronic device.98 per cent of 5-7-year-olds watch TV programmes or films on any device for an average of over 11 hours per week. And younger kids aged 3-4 are watching for even longer with 12 hours and 42 minutes per week with 24 per cent even having their tablet. Because this rapid increase in the use of computers and other digital devices by children has occurred within just the past decade or two, there's no conclusive data regarding the potentially harmful effects of too much screen time on kids' eyes both in the short-term and later in life [1].

The American Academy of Pediatrics Council of Communications and Media recommend time limitations on digital media use for children 2 to 5 years to no more than 1 hour per day to allow other activities important to their health and development. Families are encouraged to develop a Family Media Use Plan. Increased screen time means less time for reading, interactive play, and physical activity the absence of which can lead to an increase in childhood obesity. There are also some studies to suggest that increased screen time at a young age can lead to attention-related disorders in children [2]. There is no evidence to suggest that increased screen time affects a child's vision. Research shows that 50-90% of those who work or look at a computer screen for long hours report some type of eye problem. The two most common causes of CVS are the improper use of eyeglasses and working in an environment not ideally suited for the computer. Computer Vision Syndrome is a group of eye issues such as nearsightedness and farsightedness, eye strain and eye fatigue, and dry eyes syndrome which occur due to spending long hours in front of a computer, smartphone, or any other digital devices [3].

CAUSES

1. When your kid is viewing a computer or any digital screen for a long, the eyes have to work harder. Since the visual demands of computers and digital devices are high, the eyes become susceptible to developing vision-related symptoms.

2. If your kid has uncorrected vision problems, then that may increase the severity of Computer Vision Syndrome. Even if the vision problem is minor, it affects the comfort level of the eye when using a digital device[4].

3. Reading on a computer or digital screen is different from reading books. The letters on the computer screen are not always sharply defined. Moreover, the contrast of the letters is often not adjusted well with the

background; the presence of reflections and glare also make viewing difficult and strain the eyes.

4. Kids often look at the computer or digital screen at odd angles and odd distances. They might bend their heads, bringing their eyes too close to the screen or they might even tilt their head at odd angles if their glasses are not apt for computer viewing. Older kids often bend towards the desktop screen to see the content. In such cases, the posture may cause muscle spasms or pain in the back, neck, and shoulder.
5. Kids who spend hours staring at the computer or smartphone screen every day (particularly those who spend hours playing games) are at a greater risk of developing computer vision syndrome [5].

Symptoms of Computer Vision Syndrome

- Blurred or double vision
- Dry, itchy, or red eyes
- Eye irritation
- Headaches
- Back and neck pain
- Muscle fatigue

These symptoms may be caused by:

- Poor lighting.
- Glare on a digital screen.
- Improper viewing distances.
- Poor seating posture.
- Uncorrected vision problems.
- A combination of these factors.

DIAGNOSIS

CVS, or digital eyestrain, can be diagnosed through a comprehensive eye examination. Testing, with special emphasis on visual requirements at the computer or digital device working distance, may include:

- Patient history to determine any symptoms the patient is experiencing and the presence of any general health problems, medications taken or environmental factors that may be contributing to the symptoms related to computer use [6].
- Visual acuity measurements to assess the extent to which vision may be affected.
- A refraction to determine the appropriate lens power needed to compensate for any refractive errors (nearsightedness, farsightedness or astigmatism).
- Testing how the eyes focus, move and work together. To obtain a clear, single image of what is being viewed, the eyes must effectively change focus, move and work in unison. This testing will look for problems that keep the eyes from focusing effectively or make it difficult to use both eyes together [7].

TREATMENT

Eyeglasses or contact lenses prescribed for general use may not be adequate for computer work. Lenses prescribed to meet the unique visual demands of computer viewing may be needed. Special lens designs, lens powers or lens tints or coatings may help to maximize visual abilities and comfort.

- Some computer users experience problems with eye focusing or eye coordination that can't be adequately corrected with eyeglasses or contact lenses. A program of vision therapy may be needed to treat these specific problems. Vision therapy, also called visual training, is a structured program of visual activities prescribed to improve visual abilities. It trains the eyes and brain to work together more effectively. These eye exercises help remediate deficiencies in eye movement, eye focusing, and eye teaming and reinforce the eye-brain connection. Treatment may include office-based as well as home training procedures[8].

Tips for preventing computer vision syndrome in children

- **An eye examination.** This makes sure that the child can see clearly and comfortably. For regular computer users, at least an annual eye examination is required. When necessary, refractive correction and/or orthoptic exercises (eg. in convergence insufficiency), should be provided.
- **Reduction of the amount of time that a child can continuously use the computer.**

  A ten-minute break for every hour of work will minimize the development of accommodative problems and eye irritation.
- **Carefully check the position of the computer.**

  The computer monitor and the keyboard are positioned and adjusted according to the child's body parameters. The screen should not be positioned in a too high level in the child's field of view; the chair should not be positioned in too low level and the desk not in a too high level. An adjustable chair is a good solution. A foot stool may be necessary to support the child's feet.
- **Carefully check the lighting for glare on the computer screen.**

  Windows or other light sources could create glare on the screen. When this occurs, the desk or the computer screen should be turned to another direction.
- **Reduce the amount of lighting in the room.**

  In some cases, a dimmer light is preferred instead of the bright overhead light..
- **Rearranging your work area:** Research shows that the optimal position for a screen is 20-26 inches in front (not to the side) of the face. The center of the screen should be slightly lower (4-8 inches) than the eyes. Both measures should be more comfortable and less straining to the eyes and neck. Adjust your chair so that your feet are flat on the floor and your knees are at a 90-degree angle for improved overall posture.
- **Using a document holder:** Place any reference materials on a stand close to the screen. This will minimize the eye strain caused by looking back and forth from the desk to the screen, and constantly having to refocus[9].
- **Reducing factors that can cause dry eyes:** Keep air vents pointed away from eyes and the area as dust-free as possible. Use a humidifier to moisten the air in the room.
- **Don't take a vision problem to work.** Even if glasses are not needed for driving, reading or other activities, they still may offer benefits for a minor vision problem that is aggravated by computer use. A mild glasses prescription may be needed to reduce vision stress on the job. It's a good idea for computer users to get a thorough eye exam every year.

- **Glasses should meet the demand of the job.** If glasses are worn for distant vision, reading or both, they may not provide the most efficient vision for viewing a computer screen, which is about 20 to 30 inches from the eyes. Tell the doctor about job tasks and measure on-the-job sight distances. Accurate information will help get the best vision improvement. Patients may benefit from one of the new lens designs made specifically for computer work[10].

CONCLUSION

Computers are an essential part of modern life. The exponential increase in their use has ushered in a new era of occupational hazards collectively known as computer vision syndrome. A variety of ergonomic factors like the level of the top of the display screen, viewing distance from the screen, the position of AC, brightness of the room, use of anti-glare filters, regular breaks, etc. play an important role in the development of this syndrome. Children have different needs to comfortably use a computer. A small amount of effort for precautions can help to reinforce the appropriate viewing habits and ensure comfortable and enjoyable computer use.

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