Impact of Computer Use on Children's Vision

When first introduced, computers were almost exclusively used by adults. Today, the vast majority of children increasingly use these devices both for education and recreation, both at home and at school. In fact, children are the first generation of digitally native computer users.

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Computer vision issues typically fall into one of three areas: 1) symptoms associated with visual blur; 2) symptoms associated with ocular structural changes (e.g. dry eye); and 3) symptoms associated with musculoskeletal strain from improper ergonomics of the workstation. Children can experience many of these same symptoms related to computer use as adults, and as explained below, some unique aspects of how children use computers may make them more susceptible than adults to the development of these problems. Extensive viewing of the computer screen can therefore lead to eye discomfort, fatigue, blurred vision and headaches.

The potential impact of computer use on children's vision involves the following factors:

- **Children often have a limited degree of self-awareness.** Many children keep performing an enjoyable task with great concentration until near exhaustion (e.g., playing video games for hours with little, if any, breaks). Prolonged activity without a significant break can cause eye focusing (accommodative) problems and eye irritation.

  Accommodative problems may occur as a result of the eyes' focusing system "locking in" to a particular target and viewing distance. In some cases, this may cause the eyes to be unable to smoothly and easily focus on a particular object, even long after the original work is completed. Transient distance blur when first looking up from a computer is a common sign of this condition.

- Dry eye is a common condition associated with computer use. Studies have shown that blink frequency is reduced by 69% when comparing blinking during active computer use versus passive viewing of videos. Studies have also shown that children are very poor at reporting symptoms of dry eye. A study in 2009 reported that only 1% of kids with clinical signs of dry eye associated with extended computer use reported symptoms.
- **Children are very adaptable.** Although there are many positive aspects to their adaptability, children frequently ignore problems that would be addressed by adults. A child who is viewing a computer screen with a large amount of glare often will not think about changing the computer arrangement or the surroundings to achieve more comfortable viewing. In schools, where there may be more than one child using a computer simultaneously, a child may be forced to view the computer from an oblique angle which can make issues of glare worse. This can result in excessive eye strain. Also, children often accept blurred vision caused by nearsightedness (myopia), farsightedness (hyperopia), or astigmatism because they think everyone sees the way they do. Uncorrected farsightedness can cause eye strain with extended computer use, even when clear vision can be maintained.

- **Children are not the same size as adults.** Most computer workstations, especially at home, are arranged for adult use. Therefore, a child using a computer on a typical office desk often must look up higher than an adult. Since the most efficient viewing angle is slightly downward about 15 degrees, problems using the eyes together can occur. In addition, children may have difficulty reaching the keyboard or placing their feet on the floor, causing arm, neck or back discomfort.

**Steps to Visually-Friendly Computer Use**

Here are some things to consider for children using a computer:

- **Have the child's vision checked.** A comprehensive eye examination will ensure that the child can see clearly and comfortably and detect any hidden conditions that may contribute to eye strain. When necessary, glasses, contact lenses, eye drops or vision therapy can provide clear, comfortable vision for computer use.

- **Build in break times.** A brief break every hour will minimize the development of eye focusing problems and eye irritation due to conditions like dry eyes.

- **Carefully check the height and position of the computer.** The child's size should determine where the monitor and keyboard are placed. In many situations, the computer monitor will be too high in the child's field of view. A good solution to many of these problems is an adjustable chair that can be raised for the child's comfort. A foot stool may be helpful in supporting the child's feet.

- **Carefully check for glare and reflections on the computer screen.** Position the monitor to minimize glare. Windows or other light sources should not be visible when at the computer either directly or by reflection off the monitor screen. When this occurs, the desk or computer may be turned to prevent the direct or reflected glare.

- **Adjust the amount of ambient lighting in the room for sustained comfort.**

- **Limit long term exposure to bright computer monitors especially close to bedtime.** In the last 15 years, it has become established that the cells in our eyes that play a key role in regulating our circadian and sleep patterns are especially sensitive to blue light. The display screens on electronic devices (laptops, tablets, smartphones) emit significant light in the blue region. It has not yet been conclusively shown that the use of
these devices in the evening has an adverse effect on sleep quality, but being aware of the potential side effects of light exposure at night is a reasonable consideration.

References

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