CANADIAN ASSOCIATION OF OPTOMETRISTS
ASSOCIATION CANADIENNE DES OPTOMÉTRISTES

Canadian Ophthalmological Society
Société canadienne d'ophtalmologie

Canadian Association of Optometrists/Canadian Ophthalmological Society Joint Position Statement:

Effects of Electronic Screens on Children's Vision and Recommendations for Safe Use

Policy Issue

The prevalence of electronic screen-related ocular symptoms is estimated as high as 50–90% in adult electronic screen users.[1,2,3] Due to a lack of scientific literature in the area, the corresponding statistic is not known for children. Children's use of electronic screens, however, has become more commonplace (home and school), [4a] begins earlier in childhood than in the past,[5a] and can last for long periods of time.[4a,6a,7a]

Adult prevalence of electronic screen symptoms and resultant guidelines for safe use should not be automatically conferred to children. Compared to adults, children's visual and physical systems are different and are still developing. Also, children use screens differently and for different tasks.[4a] This policy reviews the current literature on ocular and visual symptoms related to electronic screen use in children and provides evidence-based guidelines for safe use. The effect of screen time on other cognitive and developmental milestones is beyond the scope of this statement.

Definitions

For the purpose of this statement, "screen" refers to the electronic screens of all media: television, computer, tablets, smartphones, video games, etc., and "children" refers to individuals less than or equal to 18 years of age.

Clinical Evidence

The scientific literature on the effect of electronic screens on children's oculovisual systems is scant, but the lack of evidence should not necessarily be interpreted as an absence of negative effects. Children may ignore discomfort if they are enjoying a task[4a] and fail to complain, or they may fail to report some relevant symptoms, such as dry eye, even though they may report other symptoms, such as blur. [8a]

Within the emerging literature on the oculovisual effects of screen use on children, there is some evidence that both desktop and portable computer use are associated with musculoskeletal pain and discomfort in children.[9a,10a,11a]

In a 2014 survey of 200 American children between the ages of 10–17 years, 80% reported burning, itchy, or tired eyes after using their portable electronic devices.[7a] A South Korean study

of 715 children (mean age of 15 years) found that longer use of smartphones (greater than 2 hours) was associated with not only higher odds of ocular symptoms but also greater chances of multiple symptoms.[12a] Additional studies out of South Korea found the daily duration of smartphone use, compared to television and computer, was a risk factor for dry eye disease in children between the ages of 9–11 years;[13a,14a] the cumulative duration of the use of all video display screens together was also found to be a risk factor.[14a] Temporary acute acquired comitant esotropia (inward turning of the eye) was noted in 12 students between the ages of 7–12 years in South Korea who used a smartphone within 30cm from their eyes more than 4 hours a day for over 4 months.[15a] Some research suggests that screens may interfere with children's sleep[16] due to emission of blue light, which can suppress melatonin production.[17a,18a]

Most studies on the effects of screen time in children indicate that the odds of visual symptoms increase after 2–4 hours of use,[12a,13a] whereas musculoskeletal effects increase after 2–3 hours.[11a] No study offers a specific time limit on electronic screen use based on these symptoms. However, the Canadian Paediatric Society and the American Academy of Pediatrics suggest screen time limits based on age.[19a,20a] While the reasons cited for these guidelines are not visual, they are compelling and are based on the association of high screen time use with increased risk of obesity, poorer school performance, poorer sleep quality, and risky behaviours in older children, as well as delays in critical cognition, learning, and social skills in younger children.[5a,19a,20a,21a]

Despite earlier thinking, screen time is not a direct cause of the increased prevalence or progression of myopia; this prevalence has instead been linked with children spending fewer hours outdoors,[22a] and may potentially be due to decreased exposure to outdoor light.[23a]

Policy Position

It is our position that the safe use of electronic screens should encompass the following:

a) Recommended amount of screen-time for children:[19a,20a,21a]
   - 0–2 years: None, with the possible exception of live video-chatting[5a,24a] (e.g., Skype, Facetime) with parental support, due to its potential for social development,[25a] though this needs further investigation.
   - 2–5 years: No more than 1 hour per day. Programming should be age-appropriate, educational, high-quality, and co-viewed, and should be discussed with the child to provide context and help them apply what they are seeing to their 3-dimensional environment.
   - 5–18 years: Ideally no more than 2 hours per day of recreational screen time. Parents and eyecare providers should be aware that children report total screen time use as much higher (more than 7 hours per day in some studies).[5–7a] This is not unrealistic

considering the multitude of device screens children may be exposed to in a day, both at home and at school. Individual screen time plans for children between the ages of 5–18 years should be considered based on their development and needs.[21a]

b) Breaks no later than after 60 minutes of use (after 30 minutes is encouraged).[26a] Breaks should include whole-body physical activity. The ideal length of break has not been identified for either children or adults.

c) Workstation ergonomics: Chair heights should be set such that the child's feet can lay flat on the floor or on a stool underneath the feet to allow for support. Chairs should not have arm rests unless they fit the child perfectly, as should back rests.[26a] Desks should be set at the child's elbow height or slightly lower. There should be enough depth on the desk to allow for forearm support; this is specifically effective in preventing musculoskeletal strain.[26a] Displays should be set in front of the child. There is no official recommendation for the angle of screen inclination. For computers, it is recommended to place the top of the display or monitor at the child's eye level, and then allow them to move the screen down into a comfortable viewing position as needed. Official recommendations regarding a screen's distance from a child do not exist; the computer screen should be placed at arm's length, and then moved as necessary.[26a] External devices such as keyboards should also be placed in front of the child, with the mouse close to the keyboard and appropriately sized.[21] Workstation lighting should be equal throughout the visual field, so glare and reflections that inhibit screen viewing or cause visual discomfort are inhibited.[1,26a]

d) The use of screens should be avoided one hour before bedtime. Screens in the bedroom are not recommended.

e) Outdoor activity over screen time should be encouraged.

f) Children may or may not complain of electronic screen-associated discomfort. Regular* eye exams, which assess a child's visual ability to cope with their visual demands and offer treatments for deficiencies (e.g., glasses correction; treatment (other than glasses) of other contributing eye conditions, etc.) are recommended.

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* See guidelines regarding recommended frequency of eye examinations for children at: https://opto.ca/health-library/frequency-of-eye-examinations

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