



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 in adult users is estimated to be as high as 50–90%.^{1,2,3} While the corresponding statistic in children is not known, the use of electronic screens by children has become more commonplace (at both home and school),⁴ begins earlier in childhood than in the past,⁵ and can last for long periods of time.^{4,6,7}

The prevalence of electronic-screen symptoms in adults and the resultant guidelines for safe use should not be automatically applied to children. The visual and physical systems of children are different than those of adults, and still developing. In addition, children use screens differently and for different tasks.⁴ 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: televisions, computers, tablets, smartphones, video games, etc., and “children” refers to individuals less than or equal to 18 years of age.

CLINICAL EVIDENCE

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

Within the emerging literature on the oculo-visual effects of screen use on children, there is some evidence that the use of both desktop and portable computers is associated with musculoskeletal pain and discomfort in children.^{9,10,11}

In a 2014 survey of 200 American children between the ages of 10 and 17 years, 80% reported burning, itchy, or tired eyes after using their portable electronic devices.⁷ A South Korean study of 715 children (mean age 15 years) found that the longer use of smartphones (more than 2 hours) was associated with not only higher odds of ocular symptoms but also greater chances of multiple symptoms.¹² Additional studies from South Korea found that the daily duration of smartphone use, compared to television and computer use, was a risk factor for dry eye disease in children between the ages of 9 and 11 years;^{13,14} the cumulative duration of the use of all video display screens was also found to be a risk factor.¹⁴ Temporary acute acquired comitant esotropia (inward turning of the eye) was noted in 12 South Korean students between the ages of 7 and 12 years who used a smartphone within 30cm from their eyes for more than 4 hours a day for over 4 months.¹⁵ Some research suggests that screens may interfere with children's sleep¹⁶ due to the emission of blue light, which can suppress melatonin production.^{17,18}

Most studies on the effects of screen-time in children indicate that the odds of visual symptoms increase after 2–4 hours of use,^{12,13} whereas musculoskeletal effects increase after 2–3 hours.¹¹ No study has offered 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.^{19,20} While the reasons cited for these guidelines are not related to visual effects, they are compelling and based on the associations of high screen-time use with

increased risks of obesity, worse school performance, worse sleep quality, and risky behaviours in older children, as well as delays in critical cognition, learning, and social skills in younger children.^{5,19,20,21}

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,²² and may potentially be due to decreased exposure to outdoor light.²³

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:^{19,20,21}
 - 0–2 years: None, with the possible exception of live video-chatting^{5,24} (e.g., Skype, Facetime) with parental support, due to its potential for social development,²⁵ 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 to be much higher (more than 7 hours per day in some studies).^{5–7} 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.²¹
- b) Breaks after no more than 60 minutes of use (after 30 minutes is encouraged).²⁶ Breaks should include whole-body physical activity. The ideal length of a 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.²⁶ Desks should be set at the child's elbow height or slightly lower. The desk should be deep enough to allow for forearm support; this is specifically effective in preventing musculoskeletal strain.²⁶ 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 that the top of the display or monitor should be placed at the child's eye level, and the child should be allowed to move the screen into a comfortable viewing position as needed. There are no official recommendations regarding a screen's distance from a child; the computer screen should be placed at arm's length, and then moved as necessary.²⁶ 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 that glare and reflections which impair screen-viewing or cause visual discomfort are minimized.^{1,26}
- d) The use of screens within one hour before bedtime should be avoided. Screens in the bedroom are not recommended.
- e) Outdoor activity should be encouraged over screen-time.
- f) Children may or may not complain of electronic screen-associated discomfort. Regular* eye exams, which assess a child's ability to cope with 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 the recommended frequency of eye examinations for children at: <https://opto.ca/health-library/frequency-of-eye-examinations>.

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