

Screen Time Effects

Kathy Sexton-Radek^{1*}

¹Suburban Pulmonary and Sleep Associates, Elmhurst College, Elmhurst, Illinois, USA

Keywords

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Electronic device use that inundates our society involves screen use affects [1]. The frequent use of smartphones, tablets, laptops, computers and video games translates to many individuals becoming exposed to the light sources from those devices with the visual displays for the devices varies with a range of 500-2500 lux [2]. Further, the distance between the device emitting the light and the user varies from 2 inches to approximately 15 feet. Ergonomic studies of light are traditionally completed on a stationary light source with metric for light. This has not been the case for current devices and device users.

In extreme conditions such as internet gaming addiction, imaging studies have identified a reduction in cortical gray matter from the extended screen time [3]. Compromised white matter integrity, overall reduced cortical thickness has been identified and associated with reductions in dopamine function and resultant behaviors. In these conditions, the cortical atrophy and subsequent behavioral deficits have been found to be cravings, increased impulsivity, increased sensitivity to rewards, insensitivity to loss and less information processing [3-5]. Other studies have measured changes in visual information processing as a result of decrements in saccadic eye movements [5]. The tracking of saccadic eye movements has been found to relate to the emotional value of the visual target [6,7]. Survey studies of adolescents with infrequent screen use as compared to same age peers were happier, comparatively [5-7].

Researchers have identified from animal studies that, the association between drug addiction and screen addiction [7-9]. The fast paced, constant stimuli of continuous visually vivid media reset the brain. The brain reset takes the form of increased release of dopamine and glutamate that subsequently becomes depleted. A reduction in dopamine receptor affinity was also identified [7,8]. Both factors lead to focused, intensity seeking of the media stimulation by the laboratory animals. Addiction features in human include compulsions to use the substance, withdrawal symptoms when not using, abandonment of all activities and relationships, not related to the substance seeking and tolerance for the substance. Here, however the analogy breaks down in that type and pace of media that is analogous to screen use for animals and for humans I unknown. To address the human situation, the American Pediatric Association issued a "2X2" statement indicating no media use for 2 years and younger an d2 hours use, maximally for children [8]. A recent modification of this was the implication of the Neurologic suggestion that parents adopt a "media monitor" role [1,8].

Screen-related dependencies include: Internet Addiction Disorder, Internet Gaming Disorder, Problematic Internet Use, Compulsive Internet Use, Pathological Video Game Use, Video Game Addiction, Pathological Technology Use, Online Game Addictions, Pathological Technology Use, Online Game Addiction, Mobile Phone Dependence, Social Network Site Addiction, Facebook Addiction, Internet Pornography Addiction [5,8]. These conditions are problematic and of interest to the Neurologist. Neurological dysfunction is commonly seen with screen-related dependencies [7,8].

In conclusion, it seems that the pace of the screen time is significant as well as the extended use. However, more research is necessary to conclude what pace of programs viewed on various screens for what period is inconclusive now. Evidence is mounting about brain changes from imaging scans of children and teenagers' brains and eye damage with excessive screen time are provided in the literature [8,9]. Here again, the type, pace and extent of use converging into dangerous use is uncertain. The American Pediatric Association view of 2 hours minimally to children, no screen time for those under 2 years and a media monitor role of parents represents guidance on the situation. Studies examining the use of screen filters and anti-blue light glasses have found indicate not only their usefulness as well as reductions in eye fatigue [10,11]. Extensive blue light may cause eye damage. In these studies, analysis of animal models identified the deterioration of the blood retinal barrier [10,11]. In addition to eye damage, the blue light can stimulate the brain and influence circadian rhythm and resultant sleep quality [9,11]. In the absence of specific research on the timing and pace of screen use as it affects the viewer exists, these palliative approaches may be useful until more exacting conclusions about the type and extent of screen use affecting the user are known.

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***Corresponding author:**

Kathy Sexton-Radek
 Suburban Pulmonary and Sleep Associates
 Elmhurst College
 Elmhurst, Illinois, USA
 E-mail: ksrsleep@aol.com

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