

EPILEPSY AND WORKING WITH COMPUTERS

Although epilepsy is a very common condition, occurring approximately in 1/200 of the population, photosensitive epilepsy is quite rare occurring in 1/4000 of the population. Photosensitivity means that an epileptic attack can be triggered by flickering or intermittent light stimulation, of certain shapes or visual patterns. The biggest headlines regarding photosensitive epilepsy were made in 1997 in Japan when more than 600 children were admitted to hospital with provoked seizures after watching Pokemons. Here the main trigger was flashing lights with rapid change of strong colours. It also demonstrated that photosensitive epilepsy is more common in childhood with the peak between 8 and 20 years. It is more common in girls than in boys. With age, this sensitivity can disappear and it becomes less common from the mid-20's onwards. The remaining $\frac{3}{4}$'s stay photosensitive for life.

Computer monitors use a technique that continually refreshes or repaints the screen's image. The higher the frequency of repainting, the more stable the image appears and the less it flickers. This refresher rate is expressed in Hertz (Hz). The frequency that is most likely to provoke a seizure varies from person to person. Generally it is the range of 3-30 flashes per second, with a peak between 15 and 20 Hz. Sensitivity above 60 Hz is quite rare. For people with photosensitive epilepsy it is therefore recommended that they use a computer screen with a high refresher frequency. The eye is able to discriminate single pictures up to about 70 Hz (70 new pictures per second can be seen as single pictures). It therefore is normally indicated that computer screens have a refresher frequency of 73 Hz or more. For photosensitive people an even higher refresher rate is of benefit. Refresher rates of 100 Hz and above do not cause problems with photosensitivity. An alternative to a monitor is a flat screen, which use a different type of image display (liquid crystal display, LCD). This technique does not use a refresher rate and therefore does not show any flickering.

Working in an office environment, the computer monitor is not the only source of flashing light than can cause problems. A further source is fluorescent tubes (strip lights), which can also trigger a seizure. It is far more beneficial to use natural light or old-fashioned incandescent light bulbs. However, beware of the new energy-saving bulbs which are in fact small folded-up fluorescent tubes and therefore prone to flickering. The frequency of flickering becomes more and more apparent with the age of the strip light, it therefore is recommended that older strip light tubes be exchanged regularly. The computer screen should not show any glare, which can result in a flickering. The light should be natural from a window from the right or left hand side of the workplace. Ideally the monitor should be placed at right angles to the light source, for example the window. Light coming from behind can create glare on the monitor.

If a monitor is placed in the same direction in front of a light source, for example a window, it is expected that the user will change to focus (between the relatively dark monitor screen and the very bright background of the window). This is a natural thing to do and must not be mistakenly interpreted that the individual cannot concentrate on their job. This contrast in brightness can provoke a seizure and even without photosensitive epilepsy it is very tiring for the monitor user.

A stripy pattern and strong contrast between shapes can provoke seizures; it is therefore recommended that strong stripy contrasts are not used within the office environment. It is especially known that the strong red colour is known to be a good trigger.

Generally, the workplace is very well adjustable and there is no reason why photosensitive individuals cannot work with visual display units.

Refs. Harding & Jeavons, 1994

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Jeavons & Harding 1975

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