Photosensitive Epilepsy

What is photosensitive epilepsy?

Photosensitive epilepsy is a type of epilepsy, in which all, or almost all, seizures are triggered by flashing or flickering light. Both natural and artificial light may trigger seizures. Some patterns, like stripes or checks, can also trigger seizures for some people with photosensitive epilepsy.

Various types of seizure can be triggered by flashing or flickering light. However, the most common is a tonic clonic seizure.

How many people have photosensitive epilepsy?

Many people think that everybody with epilepsy has photosensitive epilepsy. In fact only five in a hundred people with epilepsy have this type of epilepsy.

When does photosensitive epilepsy begin?

Photosensitive epilepsy usually begins before the age of 20. It is most common between the ages of seven and 19. More girls than boys have photosensitive epilepsy.

Photosensitive epilepsy often remits by adulthood. Desensitising techniques have been used successfully with some photosensitive epilepsies.

Medication is effective in the treatment of photosensitive epilepsy.

Diagnosing photosensitive epilepsy

When doctors are diagnosing epilepsy, one of the tools they use is an electroencephalogram (EEG). The EEG records brainwave patterns from the tiny electrical signals that are constantly coming from the brain. During one part of the EEG, you are asked to look at flashing lights, to see if this triggers epileptic activity in your brain. If it does, then this may indicate that you have photosensitive epilepsy.

An explanation of hertz (Hz)

The word hertz (Hz) refers to how often something happens in a second. In these web pages, Hz refers to two different things. It refers to the number of flashes or flickers a second. It also refers to the rate the scanning lines on televisions and computer monitors 'refresh' themselves. Most people with photosensitive epilepsy are sensitive to 16-25 Hz, although some people may be sensitive to rates as low as 3 Hz and as high as 60 Hz.

Some possible triggers:

Ceiling fans

Light seen through a fast-rotating ceiling fan could trigger seizures in some people with photosensitive epilepsy. So it's best to get a slow-rotating one if possible.

Cinema films

In themselves, cinema films, including 3D, don't pose a risk for people with photosensitive epilepsy. However, some films contain images, such as flashing lights that could trigger a seizure. If you are watching a film and something comes on the screen that you think could
trigger a seizure, you should immediately cover one eye with the palm of your hand and turn away from the screen.

**Computer monitors**
Some people think that people with photosensitive epilepsy are not able to use computers, because they will trigger a seizure. In fact, it’s rare for a computer to trigger a seizure.

**Types of computer monitors:**
**Cathode ray tube (CRT) monitors**
Cathode ray tube (CRT) screens are the traditional, bulky, computer monitors. CRT computer monitors use scan frequencies ranging from 60 Hz to 100 Hz. As most people with photosensitive epilepsy are sensitive to 16-25 Hz, CRT monitors are unlikely to trigger seizures. This is provided they are set to a refresh rate greater than 70 Hz and are in good working order.

**Liquid crystal display (LCD) monitors**
Liquid crystal display (LCD) monitors are also known as thin film transistors (TFTs). These are thin, flat, screens and are flicker free. This means they are unlikely to trigger seizures.

**Risk from material displayed on computer monitors**
If material displayed on the screen contains flashing, flickering or some types of patterns, it could trigger a seizure in some people with photosensitive epilepsy. The risk of this type of material triggering a seizure is the same, whether it’s on a CRT or an LCD monitor. Some people are sensitive to patterns with a high contrast, such as black and white stripes. When these high contrast patterns are shown on an LCD monitor, they will be sharper and brighter than on a CRT monitor. This increase in sharpness and brightness may increase the risk to people with photosensitive epilepsy.

**Anti-glare screens**
Glare doesn’t usually trigger seizures, although it can make people feel uncomfortable. Anti-glare screens can be put over computer screens. They help to reduce glare, but don’t reduce flicker. They are, therefore, of no particular benefit to people with photosensitive epilepsy. Epilepsy Queensland is not aware of any product for people with photosensitive epilepsy that can be put over a computer screen.

**Computer or video games**
Most computer or video games are safe to play. Some, however, contain images that could be a risk if you have photosensitive epilepsy. Below are some things you can do to minimise the risk of computer or video games triggering a seizure.

**General advice for anyone with epilepsy playing computer or video games:**

- Tiredness, or lack of sleep, can increase the risk of a seizure. So:
  - try not to play if you’re feeling tired, and
  - take frequent breaks for rest and food between playing games.

**Advice for people with photosensitive epilepsy playing computer or video games on a television**

- play games in well-lit areas.
- have a lamp lit close to the television.
- sit at a distance of at least 2.5 metres from the screen.
- if you have to go near the television, cover one of your eyes with the palm of your hand.
- you could cover one eye with something that won’t let light through. This will cut down the number of brain cells that are stimulated by any flicker on the screen.
For most people with photosensitive epilepsy, this will minimise the risk of any flashing or flickering triggering seizures.

Advice for people with photosensitive epilepsy playing computer or video games on a computer:

- play games in well-lit areas.
- if possible, use an LCD/TFT monitor - but remember to reduce the brightness of the screen to reduce the contrast.
- you could cover one eye with something that won’t let light through. This will cut down the number of brain cells that are stimulated by any flicker on the screen. For most people with photosensitive epilepsy, this will minimise the risk of any flashing or flickering triggering seizures.

If your child has photosensitive epilepsy, you could look out for them showing any signs of distress or discomfort when they are playing computer or video games. These signs could be things such as dizziness, blurred vision, loss of awareness or muscle twitching. If this happens, you should immediately stop them playing the game.

Interactive whiteboards
Interactive whiteboards don’t flicker, so are not likely to trigger seizures. However, if material shown on the whiteboard contains flashing, flickering or high contrast patterns, it could trigger a seizure.

Lights
Compact fluorescent lights (CFLs)
There are different types of low energy and energy-saving light bulbs available. Compact fluorescent lights (CFLs) are the most commonly used. New generation CFLs are virtually flicker free, provided they are in good working order. They are, therefore, unlikely to trigger seizures. Some of the older generation CFLs can flicker on start up. However, the very high flicker frequency means they are considered to be no more of a risk than fluorescent strip lights or incandescent bulbs for most people with photosensitive epilepsy.

Flashing Christmas tree lights
Any flashing Christmas tree lights put up by public organisations, such as local councils, should comply with health and safety regulations. The lights shouldn’t, therefore, flash at a rate that could trigger seizures in most people with photosensitive epilepsy. The flash rate of lights sold to the public are not regulated and could flash at any rate. If you come across flashing Christmas tree lights that you feel could be a problem for you, you should immediately cover one eye with the palm of your hand and turn away from the lights.

Flashing novelty badges
The flash rate of novelty badges is not regulated, which means they could flash at any rate. If you come across flashing novelty badges that you feel could be a problem for you, you should immediately cover one eye with the palm of your hand and turn away from the badge.

Fluorescent strip lights
Some people find fluorescent strip lights uncomfortable. However, the flicker rate (100 Hz) of fluorescent strip lights means they shouldn’t be a problem for most people with epilepsy. The flicker of a faulty fluorescent strip light, however, could trigger a seizure in people with photosensitive epilepsy.

Red flashing bicycle lights
Red flashing bicycle lights (light emitting diodes, or LEDS) have triggered seizures in a small number of people. This has happened when they were close to the lights as they were setting them up. If you have photosensitive epilepsy, you may wish to avoid getting close to these types of lights.
Strobe lights
If you have photosensitive epilepsy, you may want to avoid places where you could come across strobe lights. Examples are night clubs, discos and theme parks. If strobe lights come on without warning, you should immediately cover one eye with the palm of your hand and turn away from the lights.

Patterns
Some non-moving high contrast patterns can trigger seizures in some people with photosensitive epilepsy. Examples of non-moving high contrast patterns are black and white stripes, some patterned materials and wallpapers, and sunlight through slatted blinds.

Sun beds
Using a sun bed shouldn’t trigger seizures. If the sun bed lighting flickers, there is the same risk that it can trigger seizures as from a faulty fluorescent strip light.

Sunlight
Being in sunlight is unlikely to trigger a seizure. However, some of the effects it can cause could trigger seizures in people with photosensitive epilepsy. Examples are sunlight shining through the leaves of trees, through railings as you are walking by, or reflected off uneven surfaces, like water.

Polarised sunglasses
Polarised lenses work by removing reflected horizontal light. Wearing polarised sunglasses out of doors on sunny days can help to minimise the risk of seizures happening. Your optician or retailer should be able to tell you which of the sunglasses they stock have polarised lenses.

Television
Watching television can trigger seizures if you have photosensitive epilepsy. The nearer you are to the screen the more likely it is to trigger a seizure. Being near the screen will stimulate a larger area of your retina (a light-sensitive part of the eyeball). This will stimulate a larger number of brain cells, increasing the risk of a seizure. The images shown on the screen can also make seizures more likely. For example, there could be a combination of colour and flicker. Or there could be occasions when there are a lot of press photographers using flash photography, all at the same time.

Types of television:
Cathode ray tube (CRT) televisions
Conventional televisions use cathode ray tube (CRT) technology. When you are near the screen, you can see the 25 Hz ‘refresh rate’ as well as the 50 Hz scan of the screen. This will look like a flickering picture to the human eye. It’s common for people with photosensitive epilepsy to be sensitive to 25 Hz, so it makes sense to sit well back from the television to reduce the risk of seizures.
Newer CRTs are available that scan the picture at 100 times a second (100 Hz). Televisions of 100 Hz are less likely to trigger seizures in people with photosensitive epilepsy.

Plasma and liquid crystal display (LCD) televisions
Plasma and liquid crystal display (LCD) televisions don’t use the scanning lines of CRT televisions. Although the risk isn’t removed entirely, they are less likely to trigger seizures than CRT televisions. Plasma screens tend to be brighter and have higher contrast than LCD screens. This extra brightness and increased contrast could make seizures more likely for some people with photosensitive epilepsy.
If you are choosing between a plasma or LCD television, and you have photosensitive epilepsy, the current advice is to buy an LCD television.
High definition 3D televisions
On this type of television you can view programmes in high definition (HD) and programmes in 3D, as well as normal television viewing. These televisions should not pose a greater risk than ordinary television viewing for people with photosensitive epilepsy.

Note
If you've been watching a 3D programme it’s advisable to remove the special glasses before changing to normal television viewing. This is because when changing from a 3D programme to normal television viewing, with the glasses on, the eye lenses can pick up severe flickering. This can be a trigger of seizures for people with photosensitive epilepsy.

Safety suggestions when watching television:
• watch the television in a well-lit room.
• have a lamp lit close to the television.
• watch the television from a distance of at least 2.5 metres (eight feet).
• use the remote control wherever possible - from a safe distance - to adjust the television or to change channels.
• if you have to go near the television, cover one of your eyes with the palm of your hand. This will cut down the number of brain cells that are stimulated by any flicker on the screen.

Educational Interventions
• seek individual advice from the child’s specialist as the risks of seizures vary from person to person.
• covering or shutting one eye may reduce the effects of a flashing or flickering light if the child is suddenly/unexpectedly exposed to a flickering light source.
• change channels on the TV using a remote control to avoid going too close to the screen.
• see if using a high frequency TV or a smaller screen helps.
• sit at least 2-3 metres away from the TV and 30cm back from a computer monitor.
• use a high quality computer monitor with a refresh rate of at least 60Hz.
• view all electronic equipment in a well lit room. Eliminate reflected light on the screen.
• adjust colour and brightness of your TV and computer screen.
• try to avoid scrolling when using a computer.
• be mindful of visual patterns in some screensavers.
• use a good UV filter on your computer.
• use a LED type display (as on some laptops, notebooks and calculators).
• adjust the cursor blink speed.
• use polarised sunglasses preferably with side shades when exposed to flickering light both indoors and outside.
• call ahead when planning on attending a theatrical or other event where there may be strobing or provocative stimuli.
• excessive tiredness may increase the risk of photosensitive seizures.

References:
www.epilepsy.org.uk/info/photosensitive-epilepsy
www.epilepsy.org.au/about-epilepsy/understanding-epilepsy/photosensitive-epilepsy
‘Epilepsy: A Resource for Teachers’ (Copyright 2002
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