

## Photosensitive Epilepsy

Photosensitive epilepsy is not as common as many people think. Lots of people have heard about it because of warnings about strobe lighting in films, theatre or clubs. Only 3% of people who have epilepsy have photosensitive epilepsy. If you do not have photosensitive epilepsy then flickering or flashing images or lights should not affect you.

### What is it?

Photosensitive epilepsy is the name for seizures triggered by information processed by the eyes. The triggers are usually flashing lights (like strobe lights) or flickering images but can also include repetitive patterns. Common triggers for this type of epilepsy include strobe lighting, flickering light bulbs, and also sunlight flickering through trees or on water, or the yellow lines on a road approaching a roundabout. This information all passes through the eye into a part of the brain called the visual cortex. The visual cortex then sorts out the images received by the eye. Flashing, flickering and repetitive patterns cause the visual cortex to be overloaded with images and this can cause a seizure in people who are sensitive to this trigger.

### What kind of seizure usually happens?

A tonic-clonic seizure is the most common type of seizure in people with photosensitive epilepsy. During a tonic-clonic seizure the person first becomes rigid and then starts jerking. The name photosensitive epilepsy refers to the trigger that provokes the seizure, not the actual type of seizure that it causes.

### How do I know if I have photosensitive epilepsy?

When you are being investigated for epilepsy, a flashing light test (called photic stimulation) will be carried out while the electrical activity of the brain is recorded by EEG.

Photosensitive epilepsy is most commonly diagnosed in children and young people under 20 years old.

## How is it treated?

Like other types of epilepsy, it is treated with anti-epileptic drugs (AEDs). Awareness of the triggers that affect you and trying to avoid them is also very important.

**Polarised sunglasses** (available from most opticians) can reduce reflection and glare but are unlikely to prevent seizures. If you are generally sensitive to light or are affected by visual distortions you may want to speak to your optician about getting **coloured or photochromic glasses** (those that darken on exposure to light). Like polarised glasses, these are unlikely to prevent seizures though. Unfortunately, these are not available on prescription and you will have to pay for these yourself.

## Photosensitive triggers

There are many different triggers but they all enter the brain through the eye. Triggers include flashing or flickering lights and repetitive patterns. Flickering or flashing between 3 and 30 per second (hertz) are the most common frequencies that trigger seizures. The range of frequencies that affects people varies from person to person. Occasionally people may be sensitive to frequencies above 30 hertz and some people report feeling unwell even outside these flicker rates.

Flickering and flashing lights can be caused by the light emitted from a screen (like a TV, computer screen etc) or by the content played on that screen (like a news report containing flash photography). They can also be caused by natural events – sun reflecting on water, or dappled sunlight seen through trees.

Repetitive patterns can include many things. Outside, patterns that are most likely to cause a problem can include the yellow lines on a road on the approach to a roundabout, or looking through railings when you're moving past them.

Other patterns are usually man-made and may contain stripes or repeating geometric patterns. Some colour combinations are more likely to cause a problem than others – black and white or black and red together are thought to be some of the most problematic. If the pattern is animated (moves around) then it is more likely to cause a problem.

## Televisions, computers, smartboards and other screens

Televisions, as well as computer screens, smartboards and cinema screens can have both flickering/flashing lights and repetitive patterns. The screen itself can cause flickering/flashing light, and the images you watch on the screen can contain flickering/flashing light and also repetitive patterns. So when you are thinking about the potential risk, you need to think about both the equipment and the content.

### Equipment:

- Modern Plasma, LED or LCD screens do not refresh so they do not flicker and will not cause any problem.
- If you still have an old style cathode ray tube television or computer screen you need to set the refresh rate to its highest level, as this type of screen flickers as it refreshes itself. However, the refresh rate tends to be up to 100 times per second (hertz) and so is unlikely to affect people with photosensitive epilepsy.
- 3D televisions and 3D films could trigger a seizure but there is currently no scientific evidence for this. It is possible that switching between 3D and non-3D viewing could be a trigger. It is also thought that seeing 3D and non-3D televisions at the same time could be a problem.
- Smartboards are used in many schools and workplaces. Although there does not seem to be any problem with flickering, what is shown on the Smartboard still needs to be checked for flashing/flickering or repetitive patterns (see below)

## Content:

Any images seen on a screen – ie the content of a television programme, film, computer game or internet page can include repetitive patterns or flashing/flickering lights that can trigger a seizure.

All images on television and in films are checked for patterns that may trigger an epileptic seizure before they are broadcast. This means that material on television, DVD and in the cinema should normally be safe.

If news stories or TV programmes do contain high levels of flashing and flickering lights which could trigger a seizure, current Ofcom regulations state that there has to be a warning before the start of each programme or news item. Ofcom also covers any TV series (but not films) shown via a Video on demand service, but only those that operate within the UK.

Films unfortunately are not covered by these Ofcom regulations. If you are affected by photosensitive epilepsy, it may be best to check with the cinema before you book a ticket. If you watch films via a Video on demand service or on DVD, you could ask someone to check out the film first to keep yourself safe.

Images on the internet and images in computer games do not have to be tested so could potentially cause a problem

## Strobe lighting

Legally, strobe lights have to be run at a level outside the most problematic range of 3 to 30 hertz. However, some people do find that they still feel unwell whenever strobe lights are used. Public places using strobe lighting have to warn the public so that if you are affected by strobe lights you can choose whether or not to enter.

If you are in a place where a strobe starts flashing and you feel unwell, cover one eye with your hand and get yourself to a place without strobes as quickly as you can. By covering one eye, you reduce the intensity of the flashing and this can stop a seizure from happening.

## Lighting

Lighting that is faulty can flicker and this can cause a seizure for some people. To avoid this make sure that any flickering bulbs or strip lights are replaced immediately. Report any that are faulty immediately if you are at work.

With the phase out of incandescent light bulbs in favour of energy saving bulbs, some people have reported feeling unwell when exposed to energy saving bulbs. If this affects you, try to use newer types of energy saving bulbs as these seem to cause fewer problems.

To reduce your chances of having a seizure:

- Do not sit too close to the television or computer screen and take regular breaks away from the screen.
- If you are in a place with strobe lighting, flashing lights or repetitive patterns which make you feel unwell, cover one eye with your hand and get yourself to a place away from the trigger if possible.