



Photic Seizures

These notes are taken from the National Survey of Photosensitivity induced by electronic screen games and information sheets available from the National Society for Epilepsy. Hirstwood training would like to thank them for their help with this paper.

The NSE indicate that there is no evidence to suggest that flashing lights cause a photosensitive trait to develop, merely that it can trigger seizures in people harboring this trait.

Photic Seizures are divided into types one of which is described as “Those who have clinical seizures triggered by a wide range of light or patterns (e.g. the TV screen, sunlight coming through a line of tree’s, flashing lights and strongly patterned decorations.)”

This then indicates that a seizure could occur when people are exposed to flashing lights in a multi sensory room. “Flickering light. The frequency of flicker stimulation, which is most likely to provoke seizures, varies from person to person. In general terms this is at approximately 5 to 30 Hz (the equivalent to 5 to 30 flashes per second) and certain strong geometric patterns are particularly powerful triggers of seizures” (some subjects will also be sensitive to frequencies outside this range). Environmental stimuli are enhanced by the closeness to the source material and its size, configuration, contrast and luminance of the stimuli. Personal factors such as age, concentration, fixation and fatigue may also contribute.

Photosensitivity is rare and will most affect children around junior and secondary school age. There are of course other seizures caused by problem solving, calculation, startle, music and reading. Emotional factors such as excitement might be potential triggers.

Only a very small proportion of people with photic induced seizures has a family history. So it is relevant that the above factors are more likely to be as enhancers in photosensitive individuals rather than act on their own. Blanket restriction should not be put on people with epilepsy. The majority are not photosensitive and wherever possible should be allowed to lead as normal life as possible without further stigma, isolation or disadvantage.

In the Multi Sensory Room it could therefore be wrong to say that if a adult or child is known to have a history of seizures, they must not go into the room. Seizures can be caused by many stimuli; the visual effects may not be the cause.

For more information about seizures and specialist help contact the The Chalfont Centre for Epilepsy, Chalfont Saint Peter, Gerrards Cross, Buckinghamshire, SL9 0RJ Tel 01240 73991
The web site for the National Society for Epilepsy is extensive and offers a lot more information than we can put in this page. <http://www.epilepsynse.org.uk>

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**These are some of the web pages from <http://www.epilepsynse.org.uk>
This is the web site of the National Society for Epilepsy**

Explaining Epilepsy

What is epilepsy?

The brain is a highly complex structure composed of millions of nerve cells (neurones). Their activity is usually well organised and they process mechanisms for self regulation. The neurones in the brain are responsible for a wide range of functions including consciousness and bodily posture. A sudden temporary interruption in some or all of these functions may be termed a "seizure" or "fit".

Such an event may be caused by some disturbance arising within the brain itself (an intrinsic cause) or, more rarely, by an external factor such as temporary lack of oxygen or glucose. Many people have a single seizure at some time in their lives but this does not constitute epilepsy. If an individual has a tendency to experience repeated seizures due to an intrinsic disturbance of neuronal function within the brain, then the term epilepsy may be properly used.

It should be noted, however, that epilepsy is not just one condition, and that it is not always easy to give an explanation in each individual case why seizures begin, or why they continue to occur. The epilepsies, therefore affect different people in differing ways. When offering explanations of epilepsy, it is important to remember that there are still many misconceptions about this condition.

People may need reassurance that it is not an illness or disease.

What causes epilepsy?

Any person's brain has a capacity to produce a seizure if the circumstances are appropriate. But most brains are not likely to do this spontaneously and therefore be said to have a high "seizure threshold" or high resistance to seizures. Individuals vary as to their threshold and it is and it is probably one part of genetic characteristics. A person with a low threshold might develop epilepsy spontaneously without other factors being involved. Sometimes a predisposition to seizures can be seen in some families where several members are affected.

But the genetics of epilepsy are not straight foreword. In some individuals the existing seizure threshold may be lowered if the brain is subjected to unusual stimulation (such as a certain frequencies of flickering light and some drugs) or is injured. If the injury is severe, e.g. due to a road traffic accident, infection, birth trauma, stroke or tumour, then epilepsy may develop as a consequence.

Many individuals attribute the onset of seizures to some relatively minor event such as a blow to the head or an emotional upset. Although these cannot be completely discounted, in such cases it is likely that family predisposition to seizures plays a more important role.

How many people have Epilepsy?

Epilepsy is the most common serious neurological condition affecting people of all ages. A prevalence rate of 0.5% (1 in 200) is usually quoted as a minimum prevalence for the U.K. This would mean that there are at least 350,000 people with epilepsy in this country.

Anyone can develop epilepsy; it occurs in all ages, races and social classes. Seizures tend to start in infancy or by late adolescence, but the incidence rises again after 65.

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How is a diagnosis of Epilepsy made?

Unlike most neurological disorders, there may be no physical signs that a person has epilepsy. The diagnosis is, therefore, made on the basis of a history of more than one epileptic seizure. An accurate eye-witness account is crucial to making a correct diagnosis, as the person experiencing the seizure usually has no recollection of what has happened.

A number of investigations may provide additional information although these tests do not make the diagnosis of epilepsy.

- Blood tests - these check the general health of the person and help to exclude a metabolic cause for the attacks.
- X-rays of the skull and chest - these help to exclude a structural cause for the seizures. Special studies (CT or MRI scans) of the brain itself may be requested by the physician if there is an indication that epilepsy has a structural cause. In most people such tests will be normal.
- EEG (electroencephalogram) - this test measures the electrical activity of the surface of the brain. Electrodes are placed on the scalp and the signals picked up by the electrodes are then amplified and recorded onto paper. It is a painless procedure lasting about 40 minutes. It should be remembered that the EEG can only give information about the electrical activity of the brain during the period of recording. Only if patterns characteristic of epilepsy are seen during the routine recording is the EEG of value in the diagnosis of epilepsy. A negative EEG does not exclude a diagnosis of epilepsy. Sometimes ambulatory monitoring (longer term EEG) is used.

Are there different types of epilepsy?

Epilepsy may take many different forms and just knowing that a person "has epilepsy" gives very little useful information about that individual.

Epilepsy can broadly be divided into two categories, both producing a number of types of seizure.

Idiopathic epilepsy

In this type there is no clear environmental cause for the epilepsy and it is presumed that genetic factors predominate. There are usually no other handicaps and the EEG is often normal between seizures. The response to drug treatment is usually good.

Symptomatic epilepsy

This usually develops as a result of some structural abnormality in the brain, either present at birth or occurring in later life. Other disabilities may be caused by the same abnormality (physical, intellectual or psychiatric). EEG investigations may reveal the abnormality and the response to drug treatment is variable in different individuals.

Some individuals have cryptogenic epilepsy, which is epilepsy in which no cause can be found, but a cause is suspected.

Can Epilepsy be treated?

Yes, but the success depends on many factors: type of epilepsy, accuracy of diagnosis, accuracy of treatment, compliance, associated handicaps and social problems.

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With appropriate drug treatment, seizures can be completely controlled in the majority of people. In some the tendency to have seizures diminishes with time but maximum control should still be sought as early as possible. It may be necessary to take anti-epileptic drugs for a period of years even if seizures have stopped.

Some people however continue to have seizures despite appropriate treatment. A small proportion of such people may benefit from neurosurgery, but this is only usually recommended in people whose seizures are can be shown to arise from activity in one discreet area of the brain. Even if seizures continue it should be possible to adjust the drug regime so that the condition remains stable, to allow the person to function at an optimum level.

Many people are able to keep their seizures to a minimum by avoiding situations that they know may bring on a seizure. These may include lack of sleep, too much alcohol, emotional upsets or not taking tablets as directed. Practising "self care" is a vital part of overall management of epilepsy.

Is epilepsy a disability?

If seizures can be completely controlled, and if the person can achieve a high level of confidence and self-esteem, then epilepsy should present no real obstacles to a full life. However, having seizures for the first time and being told that the diagnosis is "epilepsy" (about which there may be many misconceptions in the individual mind) can be very upsetting.

Careful counselling and health education can do much to alleviate anxiety for the individual and the family.

If the person continues to have seizures then there may be difficulties many aspects of daily living. But even in this situation, good psychological health can help minimise physical problems, which only occur from time to time. Individuals should be helped not to blame everything on their epilepsy, and there should be an emphasis on abilities rather than the extent of the disability. Details of local self-help groups are available from the **NSE Helpline**.

Merely labelling people as 'epileptics' on the basis of a medical diagnosis of epilepsy ignores the rest of their attributes and characteristics both good and bad and should be avoided.

Seizures

What they are and what to do

Many people have an isolated seizure at some time in their lives. This can happen to anyone if the circumstances are appropriate.

This is not the same thing as epilepsy, which means having a tendency to recurrent spontaneous seizures. The information in this leaflet relates to people with epilepsy.

What is a seizure?

A seizure (often called a fit and sometimes an attack, turn or blackout) happens when ordinary highly complex brain activity is suddenly disrupted.

Seizures can take many forms, since the brain is responsible for such a wide range of functions. Personality, mood, memory, sensations, movement and consciousness are all controlled within the brain; any of these functions may be temporarily disturbed during the course of an epileptic seizure.

Some very young children have a generalised convulsion when there is a sudden rise in their body temperature and this is called a "febrile convulsion". If a baby has recurrent febrile convulsions, preventative drug treatment may be recommended. These are not, however epileptic seizures.

How can seizures be described?

Not all seizures involve convulsions and many different terms are used. It is important to use terms which describe what is happening during the seizure.

A person with epilepsy can experience more than one type of seizure, but the pattern of seizures tends to remain fairly constant in an individual.

Although epilepsy can be classified in different ways the International Classification of Seizures(published by the International League Against Epilepsy) is the most commonly used.

Generalised Seizures

In this type the whole of the brain is involved and consciousness is lost. The seizure may then take one of the following forms:

The most dramatic form is the generalised tonic clonic convulsive seizure (previously called "grand mal" seizure) in which the person becomes rigid, and may fall if standing. The muscles then relax and tighten rhythmically causing the person to convulse. Breathing is laboured and they may be incontinent. Other types of generalised seizures include:

Tonic in which there is general stiffening of muscles without rhythmical jerking. The person may fall to the ground if standing with consequent risk of injury.

Atonic (also known as drop attacks) in which there is a sudden loss of muscle tone, again causing the person to fall if standing.

Myoclonic in which an abrupt jerking of the limbs occurs. These often happen within a short time of waking up either on their own or in company with other forms of generalised seizure.

Absences in which there is a brief interruption of consciousness without any other signs, except perhaps for a fluttering of the eyelids. These occur most commonly in children and are sometimes known as "petit mal".

Partial seizures

During a partial seizure the disturbance in brain activity begins in or involves a distinct area of the brain. The nature of these seizures is usually determined by the function of the part of the brain that is involved. Partial seizures are sometimes known as "focal".

There are basically three types of partial seizure – simple partial, complex partial and secondary generalised.

In simple partial seizures consciousness is not impaired and the seizure is confined to either rhythmical twitching of one limb, or part of a limb, or to unusual tastes or sensations such as pins and needles in a distinct part of the body. Simple partial seizures sometimes develop into other sorts of seizures and they are often referred to as a "warning" or "aura".

Complex partial seizures differ from partial seizures in that consciousness is affected. The seizures may then be characterised by a change in awareness as well as 'semi-purposive' movements such as fiddling with clothes or nearby objects, wandering about and general confusion. Complex partial seizures usually involve the temporal lobes of the brain, however they can also affect the frontal and parietal lobes.

In some people either of these seizures may spread to involve the whole brain and if this happens it is called a secondarily generalised seizure.

What to do when a seizure happens

Convulsive Seizures

These seizures can be frightening to watch, but the person having the seizure is not in any pain and will have little or no memory of what has happened. At the start of the attack the person may cry out as the air from the lungs is expelled through the voice box. During the early phase of a seizure breathing may stop and the person may go slightly blue. This looks frightening but it is to be expected until normal breathing resumes later on.

The attack cannot be stopped or altered so the best thing to do is to follow these guidelines:

During the seizure

- Prevent other from crowding round.
- Put something soft under the persons head (like a jacket or cardigan) to prevent injury. Only move them if they are in a dangerous place i.e. at the top of a flight of stairs or in the road.
- Do not attempt to restrain the convulsive movements.
- Do not put anything in the persons mouth. There is no danger of swallowing the tongue and teeth can easily be broken.

Once the convulsions have stopped

- Roll the person on to their side in to the recovery position.
- Wipe away any excess saliva and if breathing is still laboured check that nothing is blocking the throat such as dentures or food.
- Do all you can to minimise any embarrassment. If the person has been incontinent deal with this as quickly as possible.
- Stay with the person giving reassurance until they have fully recovered.
- Make yourself aware of how long the seizure has gone on for will be useful.

Non convulsive seizures

As these seizures can take many different forms, the response of observers will need to vary. If a person falls during a seizure you should make sure that they have not done any injury to themselves which needs medical attention. If prolonged confusion occurs do nothing except:

- Gently guide them away from obvious dangers like wandering into the road.
- Keep others from crowding road.
- Speak gently and calmly to the person to help reorientation to surroundings as quickly as possible.
- Remember that the person may be confused for some time after the seizure and it is better to leave well alone than to keep offering help and have it rejected with what might be misunderstood as aggression.
- Stay with the person until they are able to resume their activities.

Medical help should be called if:

- Someone has injured themselves badly in a seizure.
- They have trouble breathing after a seizure.
- One seizure immediately follows another or the seizure lasts more than five minutes and you do not know how long they usually last.
- The seizure continues for longer than usual (remember they may be carrying a card which says how long their seizures usually last).

What is photosensitive epilepsy?

Seizures can sometimes be triggered by flashing or flickering lights, or even geometric shapes or patterns. This fairly rare condition is known as photosensitive epilepsy.

How many people with epilepsy are photosensitive?

Approximately one in two hundred of the population have epilepsy and of these only a few per cent may have seizures induced by flashing lights. Such sensitivity is commoner in children and adolescents and becomes less frequent with age, being very uncommon from the mid twenties onwards.

How can I tell if I am photosensitive?

Most people are aware of this. A standard EEG is done with photic stimulation ie flashing light and photosensitivity would usually be diagnosed at this stage.

What factors may trigger a seizure in someone with photosensitive epilepsy?

Common triggers include:

- Viewing a television screen, playing a video game/using other computer graphics
- Having a faulty television or other light source which flickers at a slow frequency
- Sunlight coming through a line of trees
- Looking out of a window in a train
- Sunlight on water
- Stroboscopic lights
- Looking at a moving escalator

Sometimes people are also sensitive to various geometric shapes or patterns, for example, stripes or checks

A number of factors which also contribute to photosensitivity are:

- the frequency of the stimulus
- the intensity of the stimulus
- the background illumination
- the wave length of the light
- whether the person's eyes are opened or closed or in the act of opening and closing

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Usually people with epilepsy will also have had seizures both with and without flashing light. There are some people who only have seizures due to this trigger.

What frequency of flashing lights is most likely to trigger a seizure?

The frequency of flashing light which is most likely to provoke seizures varies from person to person. Generally, it is between the frequencies of 5-30 flashes per second (hertz). Some people, however, are photosensitive at higher flash frequencies. It is uncommon to have photosensitivity below 5 hertz.

Can VDUs cause a problem in people with photosensitivity?

VDUs usually operate at a sufficiently high frequency that they do not provoke seizures, even in people with photosensitivity. Nevertheless, there are rare examples of people with sensitivity to high flash frequencies. In general terms, it is better if the lighting in the room is with an ordinary light rather than a fluorescent tube, as the flicker frequency from the fluorescent tube could potentially interact with the flicker frequency from the VDU. Probably, what matters more is what is showing on the VDU, in other words, is one looking at a flickering programme or changing geometric pattern on the screen?

What about computer games?

Playing computer games very rarely triggers epileptic seizures in people without a known history of epilepsy. Those people who do have a seizure for the first time when playing video games usually have an unrecognised susceptibility to seizures triggered by flashing light, that is, most of them are photosensitive.

It is important to realise that epilepsy is common and that one should not be surprised that seizures will sometimes occur by chance whilst someone is playing an electronic game or watching TV, without any causal link. Proper investigation is required to determine the true cause of a presenting seizure in order to give appropriate medical advice.

Can my child go to discos?

Ordinary coloured lights do not usually cause a problem if they do not flash, however, stroboscopic lights can trigger seizures, particularly if the background illumination is low and there may be other environmental triggers e.g. stress, excitement, tiredness etc. Some local authorities do have rules concerning the flash frequency of strobe lighting. The local Environmental Health Department will be able to give you more information on this. Unfortunately, if a person is known to be photosensitive it may be best to avoid stroboscopic lights.

Can it be treated?

Photosensitivity usually responds best to sodium valproate (Epilim).

Helpful Hints for people with known photosensitivity:

- 1) Seek individual advice from your specialist as the risks of seizures vary from person to person.
- 2) Covering or shutting one eye may reduce the effects of a flashing or flickering light if you are suddenly/unexpectedly exposed to a flickering light source.
- 3) Change channels on the TV using a remote control to avoid going too close to the screen.
- 4) Avoid looking at poorly tuned channels or faulty TVs.
- 5) Consider using a high frequency (100hertz) TV or one with a smaller screen.
- 6) Wearing sunglasses can reduce glare
- 7) Avoid pastimes that require close exposure to electronic screens, especially if they are large or involve the use of standard TV screens (e.g. playing video games).
- 8) It is rare for seizures to be triggered by film in a cinema or hand held miniature screens.
- 9) Excess tiredness may increase the risk of photosensitive seizures.

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It is important not to put blanket restrictions on all people with epilepsy presuming that they are photosensitive. This condition is relatively rare and unnecessary constraints on people's lifestyles must be avoided.

Reference:

Fish DR, Quirk JA, Smith SJM, Sander JWAS, Shorvon SD, Allen PJ "Video games and epilepsy" DTI Home and Accident Research HMSO 1993

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