

EEG tests and epilepsy

Contents

- Introduction
- What does an EEG test do?
- Standard EEG tests
- Ambulatory EEG tests
- Sleep EEG tests
- Sleep-deprived EEG tests
- Video-telemetry tests
- What information does an EEG test give?
- Can an EEG test show what type of seizures I have?
- Can an EEG test show if there is any damage in my brain?
- Will an EEG test cause me to have a seizure?
- Will having a seizure during an EEG test affect my right to drive?
- Will I have to have more than one EEG test?
- Further information

Introduction

Your doctor might ask you to have an EEG (electroencephalogram) test if you have epilepsy, or if they think you might have epilepsy. This is a painless test, which records the electrical activity in your brain. The results of an EEG may help doctors when they are making a diagnosis, or when they are making decisions about your treatment.

There are several different types of EEG test and the aim of this fact sheet is to tell you how they work.

What does an EEG test do?

Your brain is constantly producing tiny electrical signals. During an EEG test, electrodes (flat metal discs) are placed on your head. The electrodes pick up the electrical signals from your brain and record them on an EEG machine.

The electrodes only *pick up* the electrical signals. They do not affect your brain and they do not cause you any pain.

The EEG machine records the electrical signals from your brain on a computer. They look like wavy lines and these represent your brainwave patterns. The EEG test can only show your brainwave patterns at the time the test is carried out. At different times, your brainwave patterns may be different.

Most people have brainwave patterns that look similar to everyone else's. Sometimes, the EEG test shows that a person has different brainwave patterns to other people. These are caused by unusual electrical activity in their brain. They can sometimes indicate that the person has epilepsy.

Standard EEG tests

Usually, you have a standard EEG test at an outpatient's appointment at the hospital. The appointment normally lasts about one hour. You can go home as soon as the test has been done.

During the test, you sit or lie down. The person who does the test may be a nurse or a technician. They attach the electrodes to your head with a sticky gel. They may ask you to breathe deeply for some minutes and look at a flashing light. These activities can change the electrical activity in your brain. This can help the doctor to make a diagnosis.

It is helpful to keep as still as possible during the test, because any movement can also change the electrical activity in your brain. This can affect the results.

Ambulatory EEG tests

Ambulatory means designed for walking. So an ambulatory EEG can be used while you are moving around. An ambulatory EEG test can record the activity in your brain over a few hours, days or weeks. This allows more time for the test to pick up any unusual electrical activity in your brain, than during a standard EEG test.

An ambulatory EEG uses electrodes similar to those used on a standard EEG test. However, the electrodes plug in to a small machine that records the results. You can wear the machine on a belt, so you are able to go about your daily business. You do not usually stay in hospital while the test is being done.

Your doctor may ask you to keep a brief diary while you are wearing the ambulatory EEG. This can show if there is anything you do, or any particular situations, that cause your brainwave patterns to change.

Sleep EEG tests

Your doctor may ask you to have an EEG test while you are asleep. This could be because your seizures happen when you are asleep or when you are tired. Or, you may have had a standard EEG test when you were awake, but it did not show any unusual electrical activity. When you are asleep, your brainwave patterns change and may show more unusual electrical activity.

A sleep EEG test is usually done in hospital, using a standard EEG machine. Before the test, you may be given some medicine to make you go to sleep. The test lasts for one to two hours and you usually go home once you have woken up.

Sleep-deprived EEG tests

A sleep-deprived EEG test is done when you have had less sleep than usual. When you are tired, there is more chance that there will be unusual electrical activity in your brain. Your doctor may ask you to have this test if you have had a standard EEG test, but it didn't show any unusual electrical activity.

Before a sleep-deprived EEG test, your doctor may ask you not to go to sleep at all the night before, or to wake up much earlier than you usually do.

The beginning of the sleep-deprived EEG test is the same as a standard EEG test. You then try to fall asleep or doze while the EEG is still recording the activity in your brain. The test lasts for a few hours and you usually go home once you have woken up.

Video-telemetry tests

During a video-telemetry test, you need to stay in hospital. A video-telemetry test involves wearing an ambulatory EEG (see above). At the same time, all your movements are recorded by a video camera. The test is usually carried out over a few days. Sometimes your epilepsy medicine may be reduced or withdrawn. This is to increase the chances that you will have a seizure that can be recorded.

After the test, doctors can watch the video to see any seizures that you had. They can also look at the EEG results for the time you were having the seizure. This will tell them about any changes to your brainwave patterns at the time of the seizure(s).

You would usually only have a video-telemetry test if you have already been diagnosed with epilepsy. Here are some examples of why your doctor might ask you to have a video-telemetry test.

- It is not clear what type of seizures you have.
- Your epilepsy medicine is not working well.
- There is a possibility that your seizures are not caused by epilepsy, but something else.
- You are considering having epilepsy surgery.

What information does an EEG test give?

EEG tests give information about the electrical activity that is happening in your brain at the time the test is carried out.

With many types of epilepsy, you only have unusual electrical activity in your brain when you are having a seizure. The rest of the time your brain activity is normal. So, if your EEG test doesn't show any unusual activity, it means that there was no epileptic activity in your brain at the time the test was done. This doesn't rule out the possibility that you have epileptic activity in your brain at other times. A clear EEG test does not definitely mean that you don't have epilepsy.

People with some types of epilepsy have unusual electrical activity in their brain all the time, even when they are not having a seizure. When they have an EEG test, the results can show certain brainwave patterns that doctors recognise. This information is very helpful for doctors when they are making a diagnosis. An example of this is children who have typical absence seizures.

A small number of people have unusual EEG test results, even though they never have seizures and they don't have epilepsy. These could be caused by other medical conditions such as encephalitis (swelling of the brain) or vertigo (dizziness). Some people inherit unusual brainwave patterns from their parents, even though they don't have epilepsy. Therefore, an EEG that shows unusual brainwave patterns doesn't necessarily mean that you have epilepsy.

Can an EEG test show what type of seizures I have?

When an EEG test picks up unusual electrical activity, it shows the areas of your brain where it is coming from. This is because each electrode picks up the activity in the part of the brain directly underneath it. The recording will be different, depending on whether you have generalised or focal seizures.

More information about different types of seizure is available from Epilepsy Action.

Can an EEG test show if there is any damage in my brain?

An EEG test only gives information about the electrical activity in your brain. It does not show if there is any damage or physical abnormalities in your brain.

Will an EEG test cause me to have a seizure?

There is a very small risk that you could have a seizure during an EEG test. This could be caused by looking at a flashing light or breathing deeply. These are usually part of the test.

Your doctor might ask you to reduce your epilepsy medicine or have less sleep than usual before you have an EEG test. This would also increase the risk that you will have a seizure.

Will having a seizure during an EEG test affect my right to drive?

If you hold a driving licence, having a seizure could mean that you have to stop driving until you have been seizure free for 12 months.

If you are concerned about the risk of having a seizure, it is advisable to talk to the doctor who has asked you to have the test.

Further information about epilepsy and driving is available from Epilepsy Action.

Will I have to have more than one EEG test?

If you have an EEG test that does not show any unusual electrical activity in your brain, your doctor may ask you to have another. It can be helpful, if possible, to have an EEG test at times when you are more likely to have a seizure. For example, this might be early in the morning. For some women, it might be around the time of having a period.

Further information

If your doctor has asked you to have an EEG test, you will usually receive a letter from the hospital. The letter will tell you what to expect during the test. It will also tell you if there is anything you need to do. For example, you may be asked to wear loose clothing, or not wash your hair before the test.

If you have any other questions before an EEG test, you could ask your GP, epilepsy specialist, epilepsy specialist nurse or the person who will carry out the test. Alternatively, you could speak to an epilepsy adviser on the Epilepsy Helpline, freephone 0808 800 5050.

About this publication

This fact sheet is written by Epilepsy Action's advice and information team, with guidance and input from people living with epilepsy and medical experts. If you would like to know where our information is from, or there is anything you would like to say about the fact sheet, please contact us.

Epilepsy Action makes every effort to ensure the accuracy of information in its publications but cannot be held liable for any actions taken based on this information.

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Your support

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