Patient Education

EEG Basics
(Electroencephalograph)

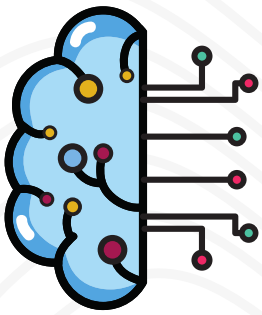
by NeuroCare.AI

What is EEG?

EEG is also known as ***electroencephalogram*** which measures brain electrical activity and records brain wave patterns. An EEG identifies the brain waves of LARGE GROUPS OF NEURONS that are active simultaneously. Some brain conditions such as brain tumor, brain injury, encephalopathy, encephalitis, and sleeping disorders, can affect a person's brain wave patterns.

EEG also measures the variation in membrane potentials evoked by neurotransmitters binding to receptors on the postsynaptic membrane, called postsynaptic potentials. The majority of the brain signals recorded on each surrounding electrode come from a specific area of the brain. Seizures and epilepsy are the most common illnesses or disorders people seek treatment for using electroencephalography.

How EEG works?



EEG identifies the brain waves of **LARGE GROUPS of NEURONS** that are active simultaneously. It also sends signals from **limited areas in the brain** surrounding each electrode are mostly recorded.

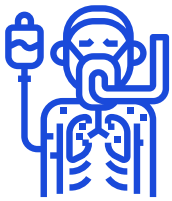
Why do I need an EEG?

Your physician might request an EEG when you have:

Epilepsy characterizes by repeated seizures

Memory problems

Sleep problems



Coma

Brain Injury, Brain Tumor

Stroke, psychogenic non-epileptic seizures, encephalopathy

How do you prepare for an EEG?

As soon as you are referred to have an EEG test, these are the following things you should do before the test:

- To prepare the scalp, your hair must be completely clean but, above all, dry. This is because several electrodes will be attached to the scalp of your head, and a gel will be applied to make sure the electrodes stick firmly to your scalp. So, **wash your hair with shampoo only.**
- Prior to your appointment, you must have all hair extensions, sewn on, or clipped in, removed. Unclean hair and hair products interfere with the electrode readings. You will have to reschedule your EEG laboratory testing if your hair is not clean, dry, and product-free.
- Never drink or eat anything with caffeine for **8 to 12 hours before the EEG test.**
- There is no need to fast before the test and it is not recommended, since a low blood sugar may also affect the outcome of the test.
- When a part of your doctor's instruction is about taking your medicines, **you need to take them as prescribed.**
- Your doctor will also advise you on sleep instructions. You may need to stay awake the night before your exam if the EEG requires a **"sleep-deprived EEG."** While following these directions, you must not consume any stimulants, such as coffee or energy drinks.
- Eat normal meals before testing.
- Bringing a hat for after the test is suggested.

What happens DURING an EEG?

- An EEG can take place in a laboratory or a hospital.
- At the start of the EEG, **multiple electrodes** will be attached to your scalp. (**See Figure 1**)
- You need to lie on a bed or lean back in a chair. And this is to avoid electrical interference caused by muscle contractions.
- You will be **connected to a computer** using electrodes that stick to your scalp, reading brain activity and recording it.
- You must **stay still with your eyes closed.**
- The technician will **ask you some questions** at different times during the EEG. You may be asked to close/open your eyes, look for a flashing light or breathing exercise deeply and quickly.
- EEG typically **lasts for an hour (60 minutes).** While sometimes, it may take much longer.

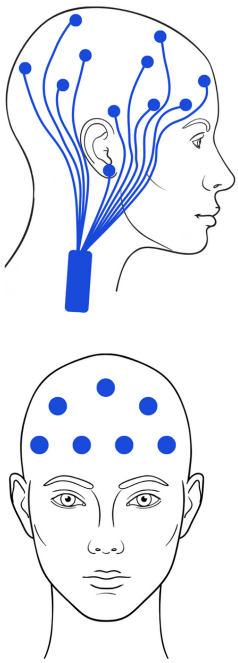


Figure 1. Multiple electrodes are attached to the scalp.

Factors interfering with an EEG reading

According to some experts, movement can produce "**artifacts**" on an EEG recording that mimic brain waves. When your EEG is interpreted, these movements will be taken into account. Here are some examples:

- Heartbeat and pulse rate
- Breathing
- Sweating
- Mouth and muscle movements
- Low blood sugar
- Bright or flashing lights
- Medications (sedatives), caffeine
- Oily hair or hair spray

What happens AFTER an EEG?

Once the technician removes the electrodes or cap, **you can resume your usual activities.** But if your doctor prescribes you a sleep-inducing medicine, you may feel drowsy for a while. In this case, **another person should drive you home.** When no sedatives are used, you can immediately resume your normal activities following the test. As soon as the glue has been removed, it is recommended that you **do not wear anything plastic** that will come in contact with your head, such as glasses, cell phones, hearing aids, earrings, etc. It is possible to damage the glue by using a solution. Take a shower when you get home. Your daily routine can resume after the test. During your next follow-up appointment, the neurologists will interpret the recorded information. A treatment plan will be developed based on the findings.

Advantages and Disadvantages of EEG

Advantages	Disadvantages
Low Cost	Cannot read thoughts or feelings
Painless Procedure and Extremely Non-invasive	Poor spatial resolution source of electrical activity
High Temporal Resolution	Only information on the electrical brain activity is recorded

What should I know about the results?

You should know that an EEG records brain activity during a short period, so an abnormal result does not immediately mean you have a brain condition. Your doctor will review this information with you and let you know what they think it means.