



**Ministry of Higher Education and Scientific Research**  
**Al-Mustaqbal University College**  
**Department of Medical Physics**



# **Practical Medical Physics**

## **Lecture 6**

# **Electroencephalogram (EEG)**

**By**

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# Electroencephalogram (EEG)

An electroencephalogram (EEG) is a test used to evaluate the electrical activity in your brain. Brain cells communicate with each other through electrical impulses. An EEG can be used to help detect potential problems associated with this activity.

An EEG tracks and records brain wave patterns. Small flat metal discs called electrodes are attached to your scalp with wires. The electrodes analyze the electrical impulses in your brain and send signals to a computer that records the results.



Figure (1) Electroencephalogram (EEG) Machine.

# Why is an EEG performed?

EEGs have been used since 1929 to detect problems in the electrical activity of the brain that are associated with certain brain disorders. The measurements given by an EEG are used to confirm or rule out various conditions, including:

- Seizure disorders (such as epilepsy).
- Head injury.
- Encephalitis (inflammation of the brain).
- Brain tumor.
- Encephalopathy (disease that causes brain dysfunction).
- Sleep disorders.
- Stroke.
- Dementia.

## Are there risks associated with an EEG?

EEG is usually painless and very safe. If an EEG does not produce any abnormalities, stimuli such as strobe lights, or rapid breathing may be added to help induce any abnormalities.

When someone has epilepsy or another seizure disorder, there's a small risk that the stimuli presented during the test (such as a flashing light) may cause a seizure. The technician performing the EEG is trained to safely manage any situation that might occur.

When someone is in a coma, an EEG may be performed to determine their level of brain activity. The test can also be used to monitor activity during brain surgery.

# How to prepare for an EEG Before the test?

- Ask your doctor if you should stop taking any medications before the test. You should also make a list of your medications and give it to the technician performing the EEG.
- Wash your hair the night before the EEG. Don't put any products like sprays or gels on the day of the test.
- Avoid eating or drinking anything containing caffeine for at least 8 hours before the test.
- Your doctor may ask you to sleep as little as possible the night before the test if you have to sleep during the EEG. You may also be given a sedative to help you relax and sleep before the test begins.
- In some cases, you may need to be given a sedative during the procedure. If so, your doctor will ask you to bring someone who can drive you home afterward.

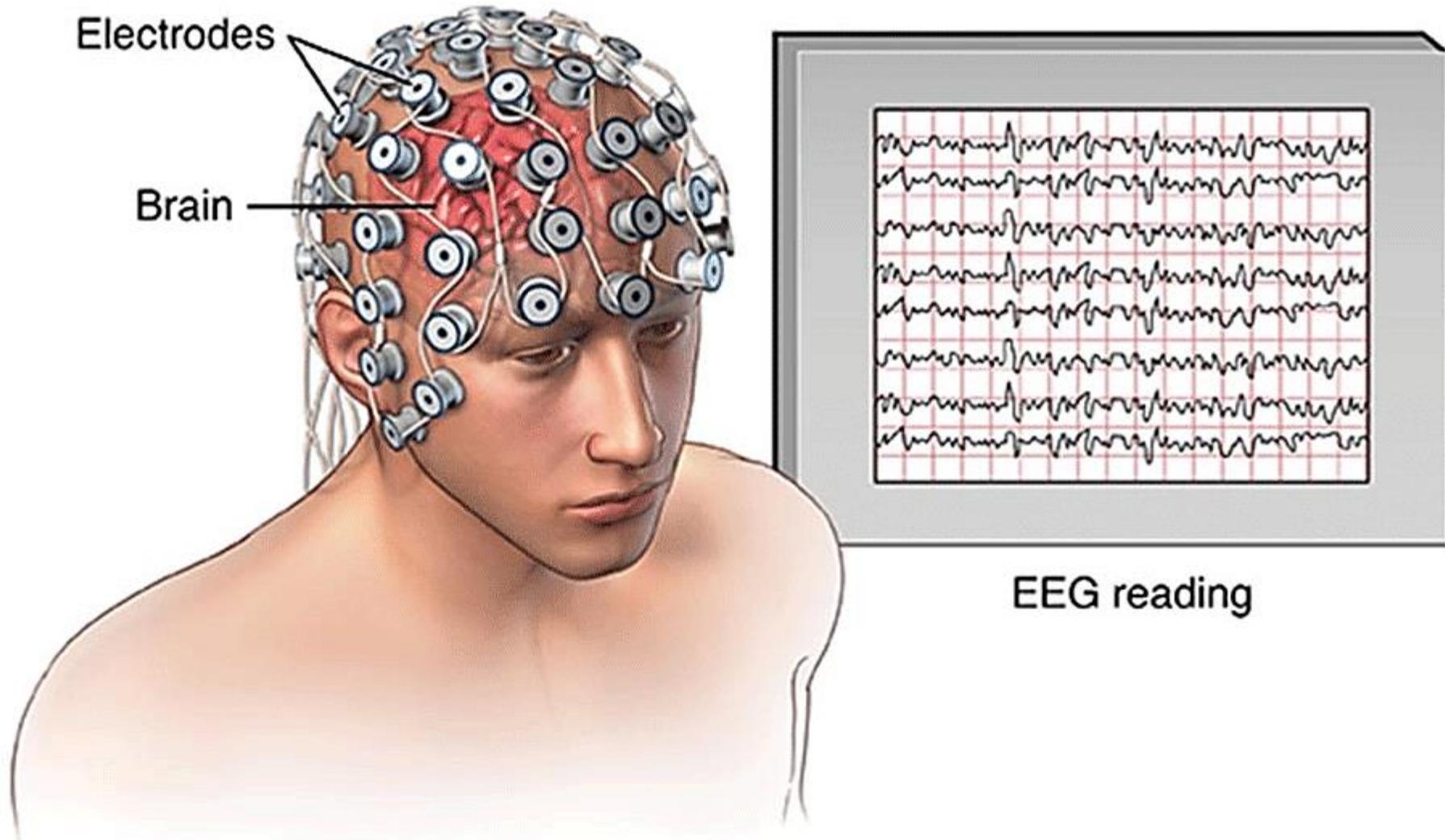


Figure (2) Electroencephalogram (EEG) reading.

# What to expect during an EEG?

An EEG measures the electrical impulses in your brain by using several electrodes attached to your scalp. An electrode is a conductor through which an electric current enters or leaves. The electrodes transfer information from your brain to a machine that measures and records the data. Specialized technicians administer EEGs at hospitals, doctor's offices, and laboratories. During the test, very little electricity passes between the electrodes and your skin, so you'll feel very little to no discomfort. The test usually takes roughly 30 to 60 minutes to complete and involves the following steps:

# What to expect during an EEG?

- You'll lie down on your back in a reclining chair or on a bed.
- A technician will measure your head and mark where to place the electrodes. These spots are scrubbed with a special cream that helps the electrodes get a high-quality reading.
- The technician will put a sticky gel adhesive on 16 to 25 electrodes and attach them to spots on your scalp.
- Once the test begins, the electrodes send electrical impulse data from your brain to the recording machine. This machine converts the electrical impulses into visual patterns that appear on a screen. A computer saves these patterns.
- The technician may instruct you to do certain things while the test is in progress. They may ask you to lie still, close your eyes, breathe deeply, or look at stimuli (such as a flashing light or a picture).

# What do the EEG test results mean?

A neurologist (someone who specializes in nervous system disorders) interprets the recordings from the EEG and then sends the results to your doctor. Your doctor may schedule an appointment to go over the test results with you.

- **Normal results**

Electrical activity in the brain appears in an EEG as a pattern of waves. Different levels of consciousness, like sleeping and waking, have a specific range of frequencies of waves per second that are considered normal. For example, the wave patterns move faster when you're awake than when you're asleep. The EEG will show if the frequency of waves or patterns is normal.

# What do the EEG test results mean?

- **Abnormal results**
  - Epilepsy or another seizure disorder.
  - Abnormal bleeding or hemorrhage.
  - Sleep disorder.
  - Encephalitis (swelling of the brain).
  - Tumor.
  - Dead tissue due to a blockage of blood flow.
  - Migraine.
  - Excessive alcohol or drug use.
  - Head injury.

# Summery

An EEG is a test that measures your brain waves and helps detect abnormal brain activity. The results of an EEG can be used to rule out or confirm conditions, such as epilepsy, a brain tumor, or a stroke.

EEGs are generally safe and painless, but there's a small risk of having a seizure during the test if you have epilepsy and flashing lights are used during the test. It's important to let your doctor know if you've had a seizure triggered by flashing lights in the past before receiving an EEG.

*Thanks for  
listening*