TEST

EEG

An EEG records the brain's electrical activity using electrodes placed on the scalp.

WHAT IT MEASURES
Electrical activity produced by brain cells

SAMPLE
None; electrodes record from the scalp

FASTING NEEDED?
No

HOW LONG IT TAKES
About one hour for a routine EEG

RESULTS IN
Several days to weeks; varies by EEG laboratory

USED FOR
Diagnosis and monitoring of brain activity disorders

MAIN LIMITATION
A normal recording does not rule out epilepsy

Overview

An electroencephalogram, or EEG, records electrical activity produced by brain cells. Small metal discs called electrodes are attached to your scalp. They detect activity but do not send electricity into your head.

An EEG is best known for assessing possible seizures. It can also show changes related to sleep, reduced awareness, inflammation, infection, metabolic problems, or other conditions affecting brain function.

A routine EEG records a short period, usually while you are awake and sometimes drowsy. Longer tests include sleep EEG, ambulatory EEG at home, and video EEG monitoring in hospital.

Why the test is ordered

An EEG may be ordered after an unexplained episode involving loss of awareness, unusual movements, confusion, altered sensations, or a possible seizure. It may show patterns

associated with an increased tendency to have seizures.

The test may also be used to:

An EEG is interpreted alongside your symptoms, medical history, examination, and sometimes brain imaging. It is not normally used to screen people without a relevant clinical concern.

- Classify a suspected type of seizure or epilepsy
- Investigate unexplained changes in consciousness
- Monitor brain activity during critical illness
- Assess certain sleep-related events
- Help guide treatment after diagnosis

Who should have the test

Adults or children may be offered an EEG when recording brain activity could help explain an event or guide care.

An EEG should not be used alone to rule out epilepsy. It may also be unhelpful when the history clearly suggests a simple faint, because harmless EEG patterns could be mistaken for significant findings.

The type of EEG should match the clinical question. If a routine recording does not provide enough information, a sleep-deprived, ambulatory, or video EEG may be considered.

How to prepare

Follow your EEG service's instructions, because preparation differs for routine, sleep, and prolonged recordings.

Wash your hair beforehand and leave it clean and dry. Avoid hair spray, gel, oil, wax, and other products because they can prevent good electrode contact. Tell the service in advance about wigs, hair extensions, scalp dressings, or a sensitive scalp.

Eat normally unless instructed otherwise. Low blood sugar can affect how you feel and alter the recording. Bring a list of your medicines, including antiseizure medicines, sedatives, and non-prescription products. Do not stop any medicine unless the clinician responsible for your care specifically tells you to.

For a sleep-deprived EEG, you may be asked to sleep less than usual. Arrange safe transport if tiredness could make driving unsafe.

What happens during the test

A technician measures your head and attaches electrodes using paste, gel, or a fitted cap. The electrodes connect to recording equipment. Setup may take longer than the recording itself.

You will usually sit or lie quietly. The technician may ask you to open and close your eyes, breathe deeply for several minutes, or look at flashing lights. These steps can reveal patterns that are otherwise difficult to see, but may be changed or omitted if inappropriate for you.

The recording is painless. You may also be filmed so body movements can be compared with the EEG. A routine appointment commonly lasts about an hour.

Ambulatory equipment can record for one or more days at home. Inpatient video EEG may continue for several days to capture a typical event.

Understanding your results

A specialist examines background rhythms, differences between brain areas, and changes during sleep or stimulation.

A normal result means no concerning pattern was seen during that recording. It does not prove that an event was not a seizure or rule out epilepsy.

"Epileptiform activity" refers to spikes or sharp waves associated with a tendency to have seizures. These patterns support a diagnosis only when they fit the person's history. Similar-looking patterns can occur without epilepsy or result from recording artefact.

"Slowing" means activity is slower than expected in part or all of the brain. It is non-specific and can have several causes.

EEG has no single universal reference range. Interpretation depends on age, sleep state, medicines, laboratory methods, clinical context, and the reason for testing.

What affects the results

An EEG records only what happens during the test. Factors that can alter the recording include:

Normal EEG patterns also change with age. Pregnancy does not usually create a specific pattern, but related medicines, sleep changes, and medical conditions may affect interpretation.

Tell the technician about recent events, missed medicines, lack of sleep, illness, or substance use.

- Sleep and drowsiness: Some patterns appear mainly during sleep
- Timing: Abnormal activity may be more visible soon after an event
- Medicines: Antiseizure medicines, sedatives, stimulants like methylphenidate or lisdexamfetamine , and other drugs can alter activity
- Sleep deprivation: This may reveal patterns not seen while fully awake
- Movement: Blinking, jaw clenching, talking, shivering, and muscle tension create artefacts
- Electrode contact: Sweat, hair products, thick hair, or loose electrodes can distort signals
- Alcohol or recreational drugs: Recent use or withdrawal can change brain activity
- Illness and metabolism: Fever, low blood sugar, and kidney or liver problems can affect results

Accuracy and limitations

A short routine EEG can miss abnormal activity because seizure-related discharges may occur only occasionally. Detection varies with event type, timing, recording length, sleep, medicines, and the population tested, so one accuracy figure would be misleading.

An EEG can also appear positive when epilepsy is not present. Normal variants, muscle activity, eye movements, and electrical interference may resemble epileptiform activity. Specialist interpretation and a clear account of the event reduce this risk.

Repeated EEG, sleep EEG, or prolonged video EEG is more likely to capture intermittent changes. Video EEG can help determine whether typical episodes occur with seizure activity. MRI and other brain imaging answer a different question by showing brain structure rather than electrical function.

Risks and complications

An EEG is non-invasive, and the electrodes do not give an electric shock. Paste or adhesive may cause temporary scalp irritation, and removal can pull slightly on the hair.

Deep breathing can cause brief light-headedness or tingling. Flashing lights, sleep deprivation, or other activation procedures can occasionally provoke a seizure in someone susceptible. EEG staff are trained to respond.

What happens next

After a routine EEG, the electrodes are removed and you can usually return to normal activities. You may need to wash out remaining paste.

If you were sleep-deprived or received a sedating medicine, do not drive until you are safely alert. Follow the testing service's transport instructions.

A specialist reviews the recording and sends a report to the clinician who ordered it. Follow-up may cover whether the result fits your events, whether another EEG is needed, or whether other tests would be more useful.

Seek emergency help for a seizure lasting five minutes or longer, repeated seizures without recovery, serious injury, breathing difficulty, or an episode occurring in water. Questions about a report, brief recurrent events, or medicine effects can usually wait for routine follow-up unless advised otherwise.

Common questions

Can I drink coffee before an EEG?

Usually, but follow your appointment instructions. Caffeine can make sleep difficult, so you may be asked to avoid it before a sleep EEG.

Does the time of day matter?

It matters most when sleep must be recorded. Sleep studies may be scheduled around your usual sleep pattern.

Can I exercise beforehand?

Ordinary activity is generally fine. Avoid arriving very sweaty or with wet hair because moisture and muscle activity can interfere with the recording.

Should I wash my hair first?

Yes. Wash and dry it, but do not apply conditioner, oil, gel, spray, or other styling products unless the service says they are acceptable.

Can a normal EEG rule out epilepsy?

No. A routine test may not record an abnormal pattern during the short appointment. Results must be considered with your events and other clinical information.

Can I drive home afterward?

Usually, after a standard EEG. Do not drive if you are sleep-deprived, received a sedative, had an event during testing, or have been advised not to drive for another medical or legal reason.

Sources

- National Institute for Health and Care Excellence. Epilepsies in children, young people and adults: diagnosis and assessment of epilepsy . NICE guideline NG217
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