CONDITION

Focal seizure

A focal seizure is a brief burst of abnormal electrical activity beginning in one area of the brain.

WHAT IT IS
A seizure starting in one area of the brain

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Altered awareness, jerking, unusual sensations, automatic movements

WHAT CAUSES IT
Abnormal electrical activity, sometimes linked to brain injury

HOW IT IS DIAGNOSED
Clinical history, EEG, and usually brain imaging

MAIN TREATMENT
Anti-seizure medicines and sometimes surgery

CAN IT BE CURED?
Sometimes - surgery can remove the source

IS IT AN EMERGENCY?
Sometimes - lasts five minutes or repeats without recovery

LONG-TERM OUTLOOK
Many gain control; some need long-term treatment

Overview

A focal seizure is a short episode of abnormal electrical activity that begins in one area of the brain. Symptoms depend on the area involved.

Some cause clear movements, such as jerking of one arm. Others cause a strange smell, sudden fear, altered vision, or brief confusion. You may remain fully aware or have reduced awareness.

Doctors classify focal seizures partly by awareness:

An "aura" is often a focal aware seizure rather than only a warning. It may cause a rising feeling in the stomach, altered vision, or an unusual taste before other symptoms.

One focal seizure does not always mean you have epilepsy. Epilepsy involves an ongoing

tendency to have unprovoked seizures. A seizure can instead result from a temporary problem, such as very low blood sugar or an acute brain illness.

- Focal aware seizure: you remain aware of yourself and your surroundings
- Focal impaired awareness seizure: your awareness or ability to respond is reduced
- Focal to bilateral tonic-clonic seizure: the seizure spreads to both sides of the brain, causing loss of consciousness, stiffness, and rhythmic jerking

Symptoms

Symptoms usually start suddenly, are brief, and may be similar each time for a particular person.

Movement symptoms may include:

Sensory symptoms include tingling, numbness, flashing lights, distorted vision, unusual sounds, smells, or tastes.

A focal seizure can also cause sudden fear, déjà vu, difficulty speaking, or a rising sensation in the abdomen. During a focal impaired awareness seizure, you may stare, seem confused, make automatic movements, or be unable to respond normally.

Afterward, you may feel tired, confused, emotional, or have a headache. Speech or movement can remain difficult briefly. This recovery phase is the postictal period , although some people recover immediately.

Not every brief stare, muscle jerk, unusual sensation, or fainting episode is a seizure. Migraine, panic attacks, sleep or movement disorders, fainting, and heart rhythm problems can cause similar events.

- Jerking, stiffening, or weakness affecting one side or body part
- Repetitive movements such as lip-smacking, chewing, picking at clothes, or rubbing the hands
- Turning of the head or eyes to one side
- Sudden loss of muscle tone

Causes and risk factors

A focal seizure occurs when a group of brain cells produces unusually synchronized electrical signals. Sometimes no cause is found.

Possible causes include:

An acute illness can provoke a seizure without causing epilepsy. Examples include severely low blood sugar, major changes in blood salts, alcohol withdrawal, poisoning, or a recent brain injury.

In people with epilepsy, missed medicine, poor sleep, illness, or heavy alcohol use may make seizures more likely. Stress can contribute for some people but is not usually the sole cause. Flashing lights trigger seizures in only a minority of people with epilepsy.

- A previous stroke or reduced blood flow in the brain
- A head injury or scar from earlier brain damage
- A brain tumour or other structural change
- A brain infection, such as encephalitis
- Differences in brain development
- Certain genetic conditions
- Autoimmune inflammation affecting the brain

Diagnosis

Diagnosis begins with an account of what happened before, during, and after the episode. Information from a witness is especially helpful because you may not remember everything. A safely recorded video may also help.

An electroencephalogram , or EEG, records electrical activity from the scalp. It may support an epilepsy diagnosis and help identify where seizures begin. A normal EEG does not rule out a focal seizure because abnormal activity may not occur during the recording.

Brain imaging looks for structural causes. MRI provides detailed brain images. A CT scan may be used when urgent imaging is needed or MRI is unsuitable.

Blood tests can identify temporary causes, such as abnormal blood sugar or salts. An electrocardiogram, or ECG, may check for a heart rhythm problem that could cause fainting.

No single test confirms every focal seizure. Diagnosis combines the event description, examination, EEG, and imaging. Longer video-EEG monitoring may be needed to record an episode and compare symptoms with brain activity.

Treatment and management

Treatment depends on whether the seizure was provoked, the likelihood of recurrence, its cause, and its effect on daily life.

Anti-seizure medicines reduce the chance of further seizures. Choice depends on seizure type, age, other conditions, medicine interactions, pregnancy considerations, and side effects. Some people need to try more than one.

Do not stop anti-seizure medicine suddenly unless a qualified prescriber provides a plan. Sudden withdrawal can cause more frequent or prolonged seizures.

If seizures continue despite appropriate medicines, referral to a specialist epilepsy service may be considered. Options include:

These treatments are not suitable for everyone and require detailed testing.

Some people receive rescue medicine for prolonged or repeated seizures. It should be given only according to their written seizure plan by someone who knows how and when to use it.

During a seizure, move hazards away and protect the person's head if needed. Do not restrain them or put anything in their mouth. If they lose consciousness and jerking stops, place them on their side if safe. Time the seizure and stay while they recover.

- Surgery to remove or disconnect the area where seizures begin
- Implanted devices that alter nerve or brain activity
- Specialist-supervised dietary treatment in selected cases

Complications

Focal seizures can cause falls, burns, cuts, drowning, or other accidents, particularly when awareness is affected. Driving and working near traffic, heights, fire, or machinery may carry risks.

A prolonged seizure, or repeated seizures without recovery, can become status epilepticus and requires emergency treatment.

Focal seizures can spread and become bilateral tonic-clonic seizures, involving loss of consciousness, body stiffening, and rhythmic jerking.

Frequent seizures or medicine side effects may affect memory, concentration, mood, school, work, and independence. Anxiety and depression are also more common in people with epilepsy and deserve treatment.

Sudden unexpected death in epilepsy , or SUDEP, is uncommon but important to discuss when focal seizures progress to tonic-clonic seizures. Risk is higher when tonic-clonic seizures are

uncontrolled. Taking medicine as prescribed and improving seizure control can reduce risk.

Prevention

A first focal seizure cannot always be prevented, especially when related to an inherited tendency, older brain injury, or developmental brain difference.

Appropriate head protection and management of stroke risk factors may reduce some causes of brain injury, although they cannot prevent every seizure.

If you have had seizures, following your treatment plan can lower recurrence risk. Take medicine consistently and discuss side effects rather than stopping without advice.

Adequate sleep and avoiding heavy alcohol use may help when these are triggers. Recording seizures, missed medicine, sleep, illness, and possible triggers can reveal patterns, but not every seizure has an avoidable trigger.

Living with it and what to expect

Some people have one provoked focal seizure and no others after the temporary cause is corrected. Others develop epilepsy and need treatment for months or years.

Many gain good control with medicine. People whose seizures continue may need specialist testing or other therapies. The course is not always predictable after a first event.

After a seizure-free period, a specialist may discuss reducing treatment based on the cause, EEG findings, seizure history, and recurrence risk. Medicine must be reduced gradually under medical supervision.

Safety planning may be needed while seizures remain possible. Showers are generally safer than baths when alone. Take care around open water, heights, flames, and powered machinery. A seizure plan can tell family, friends, school staff, or coworkers what your seizures look like and when to seek help.

Driving rules vary by location. A seizure usually must be reported to the relevant licensing authority, and you may need to stop driving for a set period.

Most people with focal seizures can have relationships, work, study, exercise, and raise a family, although some activities need added precautions. Pregnancy planning is important because seizure control and medicine safety should be considered before conception.

When to get medical help

Arrange prompt medical assessment after a first suspected seizure, even if you feel fully recovered. A clinician must consider seizures and other possible causes, including fainting or heart rhythm problems.

If you already have a diagnosis, contact your usual healthcare team for follow-up when:

Call emergency services if:

Follow an existing emergency seizure plan if one is available.

- Seizures become more frequent or change from their usual pattern
- Side effects affect daily life
- You miss doses or have trouble taking medicine
- You are planning pregnancy
- Seizures affect work, school, mood, memory, or safety
- A seizure lasts five minutes or longer
- Another seizure starts before the person recovers
- Breathing remains difficult after the seizure
- The person is seriously injured
- The seizure happens in water
- It is a first seizure and urgent assessment is needed
- The person is pregnant, has diabetes, or has another condition increasing immediate risk
- Recovery is much slower or different from usual

Common questions

Is a focal seizure the same as epilepsy?

No. A focal seizure is an event. Epilepsy is an ongoing tendency to have unprovoked seizures. A person can have one focal seizure without developing epilepsy.

Can I be awake during a focal seizure?

Yes. During a focal aware seizure, you remain aware even if you cannot control a movement or sensation. Other focal seizures reduce awareness and may leave memory gaps.

What does a focal seizure feel like?

It may cause tingling, a rising stomach sensation, sudden fear, distorted vision, an unusual

smell, or déjà vu. Some cause no remembered sensation because awareness is impaired.

Can a focal seizure turn into a tonic-clonic seizure?

Yes. Activity can spread from one brain area to both sides, causing loss of consciousness, stiffening, and jerking. This is a focal to bilateral tonic-clonic seizure.

Can stress cause focal seizures?

Stress can make seizures more likely for some people, often alongside poor sleep or missed medicine. It does not explain every seizure, and seizure-like episodes can have non-epileptic causes.

Can I drive after a focal seizure?

You may need to stop driving even if you did not completely lose consciousness. Rules depend on your location, seizure type, and how long you have been seizure-free.

Sources

- National Institute for Health and Care Excellence. Epilepsies in children, young people and adults: NICE guideline NG217
- National Institute of Neurological Disorders and Stroke. Epilepsy and Seizures
- NHS. Epilepsy
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- Fisher RS, Cross JH, French JA, et al. Operational classification of seizure types by the International League Against Epilepsy . Epilepsia. 2017;58:522-530