



## *X-Plain* **Seizures And Epilepsy Reference Summary**

### **Introduction**

More than 2 million people in the United States have been diagnosed with epilepsy or have experienced a seizure.

During a seizure, a person has movements or feelings that he or she cannot control. The person may cry, fall unconscious, or twitch involuntarily.

A person has epilepsy when he or she has seizures more than once because of a brain disorder. Sometimes people use the term seizure to indicate epilepsy.

Epilepsy is one of the least understood diseases. This reference summary explains its symptoms, causes, and treatment options. It also covers what to do when a seizure occurs, how to live with seizures, and how to prevent seizures.



### **What Is A Seizure?**

The brain is the control center of the body. The brain has 2 main parts: the right hemisphere and the left hemisphere. The right side of the brain controls the left side of the body and the left side of the brain controls the right side of body.

Directions about how to move and function go from the brain to the muscles and other body parts through the nerves.

Certain areas of the brain control specific areas of the body. Some areas control vision, and other areas control other functions such as memory, movement, and sensation. Other areas are called “silent” because scientists have not identified their functions yet.

Nerves are made of small cells called neurons. In order for the brain to feel, think, and give orders to muscles, the neurons fire electrical and chemical signals to each other.

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Seizures happen because of abnormal electrical activity in the brain.

Depending on the area of the brain affected, a person having a seizure will experience different symptoms. For instance, if an area controlling a muscle is affected, the muscle may become still or jerk uncontrollably.

A person may have only one seizure in their whole life. Epilepsy is when the patient has recurrent seizures due to an underlying disease of the brain.

## Causes

About 1/2 of all seizures have no known cause. The other 1/2 are linked to a disease or injury of the brain.

During development and the first few years of childhood, the brain undergoes a lot of growth. During this growth, the brain is at danger of certain diseases due to infections, poor nutrition, and poor supply of oxygen. Some of these diseases are associated with epilepsy.

The neurons of the brain develop into complex webs of wires. Defects in wiring during brain development could lead to epilepsy.

After a head injury due to an accident or a stroke, the brain repairs itself by making new wiring. If the new wiring is abnormal, it could cause seizures.

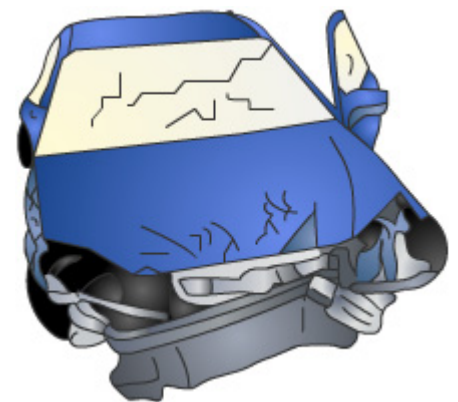
Disease of the brain, such as hydrocephalus and meningitis, could cause epilepsy.

Poisoning of the brain, such as lead and carbon monoxide poisoning, could lead to seizures.

Exposure to street drugs and overdoses of antidepressants could also lead to seizures.

Older people sometimes develop diseases of the brain, such as brain tumors, strokes, infections and bleeding. These types of diseases could lead to epilepsy.

Some types of epilepsy tend to run in families, suggesting hereditary causes.



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## Types Of Seizures

Due to the complexity of the brain and its function, there are more than 32 types of seizures. There are many different words used to describe seizures; some of them include:

- Convulsions
- Epileptic attacks
- Tonic-clonic seizures.

Most seizures last from a few seconds to a few minutes and stop naturally.

Seizures that limit themselves to one part of the brain are called partial seizures. These seizures are usually labeled using the area of the brain that they started from. In partial seizures, the person may experience sudden feelings of joy or sadness or sudden sensations of smell, hearing, or vision.

Another kind of partial seizure is called a complex partial seizure. During this kind of seizure, the patient may display abnormal repetitive behaviors, such as blinking, moving in a circle, striking out at walls or moving an arm or leg without being able to control the movement.



Seizures that spread to the rest of the brain are called generalized seizures. These seizures may cause the person to:

- Lose consciousness
- Fall
- Have muscle spasms
- Have jerking muscles all over the body or
- Stare into space, losing contact with reality for a few seconds.

Not all people who have a seizure have epilepsy. Some people have just one seizure at some point in their life and never have another one.

Sometimes a child may have a seizure during an illness with a high fever. Most of the time, these seizures do not recur unless there has been damage to the brain.

When a person has a seizure, the brain shows abnormal electrical activity that can be recorded by doctors on a special machine called an EEG.

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Some people have seizure-like behavior without any abnormal electrical activity. These are called non-epileptic seizures or pseudo-seizures. They may occur due to psychological reasons, such as stress or need for attention.

Some people can tell when they are about to have a seizure because they have a specific feeling before the seizure starts; this is called an “aura”. The most common aura is the smell of burnt rubber.

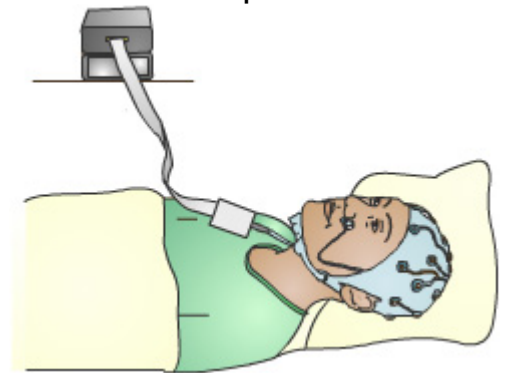
## Diagnosis

Doctors take a medical history, do blood tests, and use a variety of other medical tests to determine whether a person has epilepsy.

A test commonly used to diagnose epilepsy is called an electroencephalogram, or EEG. This test records brain waves. In most cases of epilepsy a doctor can determine if the brain has abnormal electrical activity associated with a seizure by reading the EEG.

During an EEG, electrodes are placed on the scalp and brain waves are measured. The test is painless. The doctor may also want to do an EEG while the patient is sleeping.

A doctor may use a magneto-encephalogram, or MEG. The purpose of this test is similar to an EEG, except that it measures magnetic signals in the brain instead of electrical signals. Because of this difference, it does not require electrodes and can detect signals from deeper areas of the brain than the EEG can.



The doctor may also request a brain scan in order to see structures inside the brain. Examples of brain scans are MRI, CT, and PET scans. These allow the doctor to see structures, such as tumors or cysts, which could be causing the seizures.

## Treatment Options

More than 80% of patients with epilepsy can have their seizures controlled with medication.

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After diagnosing the type of seizure, the doctor can recommend one of about two dozen different drugs that are available to control seizures. This usually depends on the type of seizures, the patient's age and medical condition.

The doctor usually prescribes a drug and adjusts its dosage based on the patient. Usually the doctor starts at a low dosage and increases it if needed, after each blood test.

Based on the patient's diagnosis, the doctor will determine whether or not the patient can stop using the medication. This depends on subsequent EEG tests, as well as how long the patient has been free of seizures.

If a medication is stopped suddenly, the patient may have more seizures that are harder to treat.

The side effects of anti-epilepsy drugs are relatively minor and include:

- Fatigue
- Weight gain
- Dizziness and
- Depression.

If your doctor recommends an anti-epilepsy drug, he or she will discuss the benefits and risks of it.

Some patients may be allergic to certain drugs. These patients should contact the doctor immediately if they develop any kind of rash.



In some cases of childhood seizures, a special diet that is rich in fat and low in sugar can help to reduce the frequency of seizures. This type of treatment should be done under the supervision of a healthcare provider to make sure the child gets proper nutrition.

When medical treatment fails to control the seizures, a brain surgery may be considered. Brain surgery for seizures tries to remove the part of the brain that is responsible for abnormal electrical signals; this is the part that causes the seizures. However, these operations only work in less than 1/2 of all seizure patients.

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Another operation, called a vagal nerve stimulator, may be suggested. During this operation the surgeon inserts an electronic device under the skin in the upper left chest. The device stimulates a big nerve in the neck. This nerve is known as the vagus nerve. The stimulation helps some patients to have seizures less often. This operation is not ideal for all seizure patients.

## **Living With Epilepsy**

When seizures are controlled, most epileptic patients can have a normal life. However, patients with seizures that are not well controlled need to take precautions that may affect their daily living.

Patients with uncontrolled seizures may not be able to drive, or operate hazardous machinery. Most states will not issue a driver's license to someone with epilepsy unless the person can document that he or she has been seizure-free for a certain period of time. The length of this period varies from state from state.

Jobs and hobbies may have to be limited to those that are not dangerous to the person in case he or she loses consciousness or attention for a few moments. Examples of jobs and hobbies that may need to be avoided are:

- Flying an airplane
- Motor racing
- Skydiving
- Mountain climbing.

Other activities and sports may be possible with supervision, such as:

- Swimming
- Sailing
- Riding bicycles.

A lot of activities and sports are safe for a person with epilepsy, like jogging and volleyball. Contact sports should be avoided, since even minor trauma could set off a seizure. Therefore, it might not be wise for seizures patients to play football or hockey.

The effects of uncontrolled seizures are more distinct in children and young adults who may not be able to proceed with their education in a normal manner.

Since some anti-epilepsy medications interfere with memory and concentration, children with epilepsy may need extra time to learn and complete their homework.

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Women with a seizure disorder can get pregnant. However, they should stay on the medication prescribed by their doctor throughout the pregnancy. The neurologist should be made aware of an upcoming planned pregnancy. He or she may switch anti-epileptic medications, as some of these medications are known to increase the risks of abnormalities in the baby.

People with epilepsy should not drink alcoholic beverages or do illicit drugs; doing so increases the chances of seizures significantly.

Epilepsy is NOT associated with mental retardation.

By law, people with epilepsy in the United States cannot be denied employment, access to education, or recreational activities.

Moreover, epilepsy does not affect a patient's sexual capabilities.

### **Dealing With A Seizure**

Seizures can last from just a few seconds up to a few minutes. The greatest majority of seizures stop on their own. However, in rare cases seizures can last hours, requiring urgent medical attention.

If you notice a person having a seizure, protect the person from harm until he or she regains awareness and control.

The following are some tips that can decrease the chances of injury during a seizure.

Lower the patient into a reclining position on the floor or a flat surface.

Put something soft under their head.

Turn the head gently to one side to prevent any vomit from being sucked into the lungs as the person breathes.

If the person is confused during a seizure and is moving around, remove anything from the area that may cause injury to the patient or to others, such as a pan of boiling water or a hot iron.

During a seizure, do NOT do the following:

Do not force anything into their mouth.



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Do not give them water or medicine until the seizure is over.

Do not try to stop the jerking movement.

People with epilepsy can lead full, active lives and usually return to normal activity after a seizure. However, in some cases, the seizure is prolonged or the patient does not regain consciousness between seizures. In either case you should call 911 if this happens.

If the person stops breathing, call 911 and perform CPR.

## Summary

Epilepsy is a disorder of the brain that affects millions of Americans. Seizures are signs of epilepsy but not all seizure-like symptoms are due to epilepsy.

There are many types of seizures and epilepsies. It is important to see a doctor for the correct diagnosis and appropriate treatment.

Thanks to medical advances, we understand epilepsy much better than we did 50 years ago. Epilepsy is not a mental illness nor is it mental retardation.

Most cases of epilepsy can be controlled with medications, allowing the person to live a normal productive life without any reason for shame or embarrassment.



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