

# Seizures after Traumatic Brain Injury

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One of the problems that can occur after a traumatic brain injury (TBI) is seizures. Although most people who have a brain injury will never have a seizure, it is good to understand what a seizure is and what to do if you have one. Most seizures happen in the first several days or weeks after a brain injury. Some may occur months or years after the injury. About 70-80% of people who have seizures are helped by medications and can return to most activities. Rarely, seizures can make you much worse or even cause death.

## What are seizures?

Seizures happen in 1 of every 10 people who have a TBI that required hospitalization. The seizure usually happens where there is a scar in the brain as a consequence of the injury.

During a seizure there is a sudden abnormal electrical disturbance in the brain that results in one or more of the following symptoms:

- Strange movement of your head, body, arms, legs, or eyes, such as stiffening or shaking.
- Unresponsiveness and staring.
- Chewing, lip smacking, or fumbling movements.
- Strange smell, sound, feeling, taste, or visual images.
- Sudden tiredness or dizziness.
- Not being able to speak or understand others.

Symptoms of a seizure happen suddenly, and you are unable to control them. Seizures usually last only a few seconds or minutes, but sometimes continue for 5 to 10 minutes. You may have a bladder or bowel accident or bite your tongue or the inside of your mouth during a seizure. After the seizure, you may be drowsy, weak, confused or have a hard time talking to or understanding others. After a severe seizure, one that lasts longer than 2 minutes, it may be harder for you to stand, walk or take care of yourself for a few days or even longer.

Conditions that could increase the risk of having a seizure include:

- High fever.
- Loss of sleep and extreme fatigue.
- Drug and alcohol use.
- Chemical changes in the body such as low sodium or magnesium, or high calcium.

## Seizures and TBI

- **Early post-traumatic seizures:** A seizure in the first week after a brain injury is called an early post-traumatic seizure. About 25% of people who have an early post-traumatic seizure will have another seizure months or years later.
- **Late post-traumatic seizures:** A seizure more than seven days after a brain injury is called a late post-traumatic seizure. About 80% of people who have a late post-traumatic seizure will have another seizure (epilepsy).
- **Epilepsy:** Having more than one seizure is called epilepsy. More than half the people with epilepsy will have this problem for their whole lives.

The cause of your brain injury can help doctors figure out how likely you are to have seizures.

- 65% of people with brain injuries caused by bullet wounds have seizures.
- 20% of people with ‘closed head injuries’ that cause bleeding between the brain and the skull experience seizures. A ‘closed head injury’ means the skull and brain contents were not penetrated in the injury.
- Over 35% of people who need 2 or more brain surgeries after a brain injury experience late post-traumatic seizures.
- Over 25% of people with bleeding on both sides of the brain, or who have a blood clot that must be removed by surgery, experience late post-traumatic seizures.

## Medications to treat seizures

Medications that are used to control seizures are called antiepileptic drugs (AEDs). These drugs may be used for other problems, such as chronic pain, restlessness, or mood instability. You and your doctor will decide on which drug to use based on your type of seizures, your age, how healthy you are, and if you get any side effects from the medications. Side effects of AEDs usually improve after you’ve been taking the medication for 3-5 days.

Some common side effects of AEDs are:

- Sleepiness or fatigue.
- Worsening of balance.
- Lightheadedness or dizziness.

- Trembling.
- Double vision.
- Confusion.

Blood tests may be needed to make sure you are getting enough of the medication and to make sure the drug isn’t causing other problems. Although these drugs rarely cause birth defects in newborns, tell your doctor if you are pregnant or may become pregnant.

Sometimes your doctor will prescribe two or more of these medications to stop your seizures. Some common AEDs are:

- Carbamazepine (also known as Tegretol).
- Lamotrigine (also known as Lamictal).
- Levitiracetam (also known as Keppra).
- Gabapentin (also known as Neurontin).
- Oxcarbazepine (also known as Trileptal).
- Phenobarbital.
- Phenytoin/ fosphenytoin (also known as Dilantin).
- Pregabalin (also known as Lyrica).
- Topiramate (also known as Topamax).
- Valproic acid or valproate (also known as Depakene or Depakote).
- Zonisamide (also known as Zonegran).

## What if the medications do not work?

If your seizures continue even after trying medications, your doctor may refer you to a comprehensive Epilepsy Center for more tests and to be seen by special seizure doctors called epileptologists or neurologists specializing in epilepsy. At the comprehensive Epilepsy Center the doctors may do brain wave tests and take a video of you during one of your seizures to help figure out what is causing the problems. This may help your doctor decide what drug will work best, and to see if other types of treatment will help with the problems you are having.

The websites of the Epilepsy Foundation of America ([www.efa.org](http://www.efa.org)) or the American Epilepsy Society ([www.aesnet.org](http://www.aesnet.org)) can tell you about the nearest comprehensive Epilepsy Center.

## Safety Issues

In most states, if you have had a seizure you cannot drive and you must notify the department of motor vehicles (DMV). Usually you won't be able to return to driving for a period of time, or until your seizures have been completely stopped. Laws vary from state to state regarding how long after a seizure you must not drive.

Other things you should do to stay safe if your seizures have not stopped:

- Always have someone with you if you are in water (pool, lake, ocean, bath tub).
- Don't climb on ladders, trees, roofs or other tall objects.
- Let people you eat with know what to do in case you have a seizure and start choking.

## What your caregiver should do if you are having a seizure

Family members or caregivers should watch closely to see what happens during a seizure so they can explain it to medical professionals. They should make a diary describing the date, time of day, length of time, and description of each seizure. Your doctor will need this information about your seizures and the drugs you are taking to control them.

The majority of seizures are short and do not result in significant injuries. However, it is important for your caregivers to know what to do to keep you from hurting yourself.

What to do for someone having a seizure:

- Loosen tight clothing, especially around the neck.
- Make sure the person does not fall. Hold the person steady if he or she is in a chair, couch or bed. If the person is standing, get him or her to the ground safely.
- Turn the person and his or her head to the side so that anything in the mouth, even spit, does not block the throat.
- It can be dangerous to put anything in the mouth as you can get bitten.
- If you know CPR, check the heart beat in the neck. Start CPR if there is no pulse. Call 911.

- Listen for breathing at the mouth and extend the neck if breathing is difficult. If there is no breathing, start CPR by sealing your lips over the person's mouth and breathing 2 quick breaths. Continue breathing every 5 seconds unless the person starts breathing without help. Call 911.
- If this is the first seizure after TBI, call the person's doctor for advice.
- If the seizure does not stop after 3 minutes, call 911.
- If the seizure stops within 3 minutes, call the person's doctor.
- If the person does not return to normal within 20 minutes after the seizure, call 911.

## For More Information

The Epilepsy Foundation of America

Phone: 1-800-332-1000

Web: [www.efa.org](http://www.efa.org)

Brain Injury Association of America

Phone: 1-800-444-6443

Web: [www.biausa.org](http://www.biausa.org)

## Disclaimer

This information in this booklet is not meant to replace the advice from a medical doctor. You should consult a physician regarding specific medical concerns or treatment.

## References

Diaz-Arrastia R, Agostini MA, Frol AB et al, Neurophysiologic and neuradiologic features of intractable epilepsy after traumatic brain injury in adults. *Arch Neurol* 2000; 57:1611-6

Englander J, Bushnik T, Duong TT et al, Analyzing risk factors for late posttraumatic seizures: a prospective, multicenter investigation. *Arch Phys Med Rehabil* 2003; 84: 365-373

Yablon SA, Dostrow VG. Post-traumatic seizures and epilepsy in Zasler ND, Katz DI, Zafonte RD, Brain Injury Medicine: Principles and Practice. Demos, New York, 2007  
Brain Trauma Foundation and American Association of Neurological Surgeons: Management and prognosis of severe traumatic brain injury 2000; pp 159-165

## Source

Our health information content is based on research evidence and/or professional consensus and has been reviewed and approved by an editorial team of experts from the TBI Model Systems.

## Authorship

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