

EPILEPSY 101

KNOW THE FACTS!



**EPILEPSY
FOUNDATION**
Metropolitan New York

Epilepsy Foundation of
Metropolitan New York
(EFMNY)
65 Broadway, Suite 505
New York, New York 10006
212 677-8550
www.EFMNY.org

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Table of Contents

Epilepsy Facts

Causes.....	3
Types and Symptoms.....	3
Diagnosis.....	6
Treatment.....	7
First Aid.....	8

Epilepsy Facts - Causes

Epilepsy occurs in all population groups, to persons of all ages, races and socioeconomic groups. Most people with epilepsy develop seizures before the age of 21 or as an older adult.

There are many causes of epilepsy:

- Injury to the brain before, during or after birth, such as:
 - Developmental defects of the brain
 - Perinatal brain injury due to bleeding or lack of oxygen
 - Traumatic injury of the brain later in life
- Genetic defects
- Degenerative disorders that affect the brain
- Metabolic and chemical disorders
- Infections of the nervous system
- Brain tumors and clots
- Toxic reactions to drugs and other substances

Some of the potential causes of damaged brain cells - and therefore epilepsy - can be prevented through good health care practices, highway safety, and recreational safety. For example, as a result of automobile accidents alone, 540,000 Americans suffered from head injuries each year. Almost 20,000 of them will develop persistent epileptic seizures as a result. Thus, prevention of epilepsy focuses on avoiding head injuries and brain damage by observing these simple points:

- Minimize risks in recreational activities (wear protective headgear for bicycling, skateboarding, football, baseball; play it safe when diving or climbing).
- Drive all vehicles safely (use seatbelts, observe speed limits, wear helmets where appropriate).

Epilepsy Facts - Types and Symptoms

The form, intensity, and duration of seizures are related to the number and type of brain cells affected. There are two broad types of seizures: generalized and focal. They range from convulsions to momentary lapses of attention.

When both hemispheres (sides) of the brain are involved, the seizures are termed “generalized” and affect consciousness and motor function from the onset. When only one hemisphere (side) of the brain is affected, the seizures are called “focal” and initially have specific effects depending on the part of brain involved. Persons can experience both seizure types.

Types of Seizures

GENERALIZED SEIZURES - involving both hemispheres of the brain

Tonic-Clonic Seizure (formerly known as “Grand Mal”)

A tonic-clonic seizure is characterized by a convulsion in which the person’s body stiffens, arms flex, legs, head and neck extend, and the jaws clamp shut; this is the “tonic” phase. The person falls to the ground, sometimes uttering a hoarse cry, and temporarily loses consciousness for a few minutes. During this time, breathing appears difficult or stops, the body jerks, saliva may accumulate in the mouth, and the bladder may empty. This is the “clonic” phase. Eventually, the jerking motions

Epilepsy 101

diminish and the person regains consciousness, somewhat disoriented and fatigued from the intense muscular activity.

Absence Seizure (formally known as "Petit Mal")

A generalized seizure, especially prevalent in children three to fourteen years old, is absence. The absence seizure looks considerably milder in form than the tonic-clonic and, in fact, often passes for daydreaming. Thus, the elementary school teacher often notices the disorder before anyone else is aware of it.

A brief lapse of consciousness with staring, eye blinking, or upward rolling of the eyes most commonly characterizes the absence seizure. It is not uncommon for a child to have 50 to 100 absence seizures a day. Most children outgrow this epilepsy at puberty.

Myoclonic Seizure

Myoclonic seizures can be described as jerking or twitching of the body in a muscle or a group of muscles, and are typically brief in duration, usually lasting only a couple of seconds. While people without epilepsy can experience myoclonus, in epilepsy myoclonic seizures usually cause abnormal movements on both sides of the body simultaneously.

- Juvenile myoclonic epilepsy: These seizures usually begin around the time of puberty, and often occur shortly after waking up.
- Progressive myoclonic epilepsy: This form of epilepsy is characterized by a combination of myoclonic and tonic-clonic seizures. These symptoms typically worsen over time and are difficult to control.

Tonic Seizure

Tonic seizures are characterized by the sudden contraction and stiffening of the muscles. Often a person's eyes may roll back into their head, and as the chest muscles tighten and contract, it may become more difficult to breathe. These seizures are short in duration, and usually last less than 20 seconds.

Clonic Seizure

With clonic seizures, an individual's muscles jerk and spasm repeatedly, and it is important to note that restraining or repositioning the individual cannot stop these seizure movements. Clonic seizures are considered to be rare.

Atonic Seizure

During an atonic seizure, muscles suddenly lose tone (or "strength") due to temporary changes in brain function. These seizures are brief, and usually last 15 seconds or less. Atonic seizures usually begin in childhood and last into adulthood. Although the individual usually remains conscious and the seizures themselves do not cause any bodily harm, indirect injuries can often occur from falling due to the lack of muscle control. Atonic seizures are also sometimes referred to as "drop seizures" or "drop attacks".

FOCAL SEIZURES - involving a localized area of the brain

Focal seizures (also known as "partial seizures" or "localized seizures") are usually described by how they look and feel, such as:

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Epilepsy 101

- Without impairment of consciousness or awareness
- Involving subjective sensory or psychic phenomena
- With impairment of consciousness or awareness, or dyscognitive
- Evolving to a bilateral convulsive seizure

The different types of focal seizures are categorized/ described by the major types of symptoms of the seizure.

Simple Partial Seizures

Simple partial seizure may precede a complex partial seizure, and in such cases are often referred to as a "seizure aura". Auras are often characterized by a brief sensation in the stomach or head, such as a sinking or rising feeling, a buzzing sound, an unpleasant odor, or spots before the eyes. Individuals who can train themselves to recognize the start of seizure activity before it spreads to other parts of the brain can use it as a warning to take protective measures to prevent possible injury during the seizure itself.

Complex Partial Seizures (also known as "Temporal Lobe" or "Psychomotor")

The most common partial seizure is what is now termed complex-partial and formerly was known as temporal lobe or psychomotor. The complex-partial seizure consists of three brief phases: The person stops ongoing activity and assumes a dazed and staring expression. Then a pattern of automatic, purposeless behavior begins and typically lasts a few minutes. Such behavior may include lip smacking, picking at clothes, buttoning and unbuttoning clothes or finger pulling. As the person returns to consciousness, a short period of disorientation and confusion occurs.

Revised Classifications of Seizures

(Report of the ILAE Commission 2005- 2009)

- Generalized seizures
 - Tonic-clonic (of any kind)
 - Absence
 - Typical
 - Atypical
 - Absence with special features
 - Myoclonic absence
 - Eyelid myoclonia
 - Myoclonic
 - Myoclonic
 - Myoclonic atonic
 - Myocloic tonic
 - Clonic
 - Tonic
 - Atonic
- Focal seizures
- Unknown
 - Epileptic Spasms
 - (Events that are not clearly diagnosed into one of the categories above)

Epilepsy Facts - Diagnosis

Accurate diagnosis of a seizure disorder is critical in order to prescribe proper treatment, and obtain and maintain a healthy and productive lifestyle. Misdiagnosis can cause seizures to persist. The best way to diagnose epilepsy is through careful observation and documentation of symptoms, combined with a thorough medical examination, including evaluation of personal and family medical history, and appropriate neurological testing.

Careful observation and documentation of symptoms:

Chances are your physician may never see you actually have a seizure; although many people now have electronic devices that can videotape the person. An accurate description of what happens during the seizure is important. It can help your physician decide on treatment options.

The following guidelines can help you give an accurate description:

1. Describe, as accurately as possible, what you observe in chronological order.
2. Since the duration of the event is useful information for the physician, please time the seizure whenever possible.
3. If possible, the person with epilepsy or a family member should maintain a seizure log with dates, time of day, any precipitating factors or triggers and descriptions of seizures. These descriptions can include the following information:
 - a. Was there a cry and/or other sounds?
 - b. Was there a staring episode in which the person did not respond or appeared to be daydreaming or preoccupied?
 - c. Was there any twitching or jerking of any parts of the body?
 - d. Was there any loss of bowel or bladder control?
 - e. Did the person appear to be unconscious?
 - f. Did you observe behavior such as lip smacking, humming, picking at clothes, rapid eye blinking, or wandering around in a confused manner?
 - g. After the seizure, was the person confused, sleepy, or dazed?
 - h. Did the person recall any sensory experience such as a bad odor, tingling, feeling of fear, etc.?

A thorough medical examination including evaluation of personal and family medical history:

An accurate personal history is very important, as well as family history. It is a good idea to check with older relatives about seizures in the family, as this information has sometimes been hidden in families.

Appropriate neurological testing:

The medical profession utilizes a variety of methods to diagnose epilepsy ranging from laboratory testing to imaging techniques.

- Normally, an **EEG (electroencephalogram)** is conducted. An EEG records the electrical activity and patterns of the brain.
- **MRI (magnetic resonance imaging)** may be performed. MRI images are pictures of the brain. They can reveal tumors, scarred tissue and structural changes.
- In some cases **inpatient hospital video/EEG monitoring** at a comprehensive epilepsy center may be indicated.

Keep in mind that experiencing a seizure or an event that looks like a seizure does not

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Epilepsy 101

necessarily mean that a person has epilepsy. Several conditions have been misdiagnosed as epilepsy including:

- Febrile seizures, a seizure common among children that is induced by a high temperature
- Breath-holding spells
- Transient ischemic attacks (TIA), brief interruptions of blood flow to the brain
- Psychiatric disorders: panic attacks, psychogenic seizures
- Syncope
- Tic

Epilepsy Facts - Treatment

About 60% of epileptic seizures can be controlled partially or totally by medication. Once control has been established, many persons with epilepsy are virtually seizure-free for a lifetime, allowing them to hold most kinds of jobs and participate in most other kinds of activities. New medications are available which often make it possible to maintain or even improve seizure control with fewer side effects, thereby improving the quality of life. Ask your doctor which of the new drugs are best for you.

The drugs used to control epileptic seizures are called **antiepileptic drugs or AEDs**. They act in two basic ways:

- By suppressing the undesirable activity of the damaged neurons, thus minimizing the electrical discharge.
- By reducing the responsiveness of neighboring normal neurons, thereby blocking the spread of the excess electrical discharge to other parts of the brain.

The aim of the person with epilepsy is to find the particular drug or combination of drugs that will maximize seizure control while minimizing side effects. This often requires a period of cooperative experimentation and observation during which drugs are tried and dosages adjusted until the desired results are attained.

A percentage of persons with epilepsy have seizures that are not adequately controlled by medications. For many of these persons other treatment modalities are now available.

Resective surgery is the preferred option for persons with partial seizures arising from a single focus that is in an operable location. Resective surgery involves identifying the portion of the brain where the seizures originates and removing it.

For persons who are not good candidates for resective surgery, the **vagus nerve stimulator (VNS)** is another option. This consists of implanting a pacemaker type device in the chest attached to a wire that wraps around the vagus nerve and stimulates it with an electric discharge. VNS has been effective in reducing seizure frequency and severity (though rarely completely eliminating them) in many persons. There are other types of stimulators that are currently being developed.

The **ketogenic diet**, a diet low in carbohydrates and high in fat is sometimes used, most commonly in children. This is a very restrictive diet that is usually initiated on an inpatient basis and requires careful supervision. There are some modified diets that are also being used with some success.

Persons who are candidates for any of these procedures undergo careful testing to determine if they are appropriate for these interventions. These procedures are generally available only at medical centers that specialize in the treatment of epilepsy.

Epilepsy Facts – First Aid

IF A GENERALIZED SEIZURE OCCURS...

If you're trying to help a person who is having a tonic-clonic seizure, the following procedures are recommended:

- Don't try to restrain the person.
- Clear the area to avoid injury. Remove hard or dangerous objects; cushion the person's head to avoid striking the floor or sidewalk. If the person is wearing glasses, remove them.
- Loosen clothing in the neck and head area.
- Turn the person on his side to allow saliva to drain from the mouth.
- Do NOT place any hard object in the mouth or between the teeth. (It could cause choking or damage to the mouth or teeth.)
- When the person regains consciousness and the seizure ends, help find a place for the person to rest and become reoriented.

Most people recover spontaneously. Thus, it's usually unnecessary to call for emergency assistance unless the person is not known to have tonic-clonic seizures or if injury occurs. However, if the seizure lasts more than five minutes, or if one seizure follows another without a return of consciousness, immediate medical help should be sought.

IF A FOCAL SEIZURE OCCURS...

Try to avoid restraining and calmly help protect the person having the seizure from accidental injury. When consciousness is regained, you may help the person get reoriented.