

# Seizures: Causes and Diagnosis

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## BASIC INFORMATION

### Description

Seizures (also called *convulsions* or *fits*) are sudden neurologic events that cause changes in consciousness and involuntary movements. Seizures have many manifestations, but the clinical signs are usually the same each time. The duration of a seizure ranges from a few seconds to several minutes. Seizures are classified as *generalized* (involving all of the body, also known as *grand mal*) or *partial* (involving just one area of the body).

### Causes

Seizures can be classified by cause into three categories: those caused by structural brain disorders (such as tumors), those arising from metabolic problems and toxins that affect brain function, and those in which an underlying disorder cannot be identified (idiopathic epilepsy). (See the handout on **Seizures: Idiopathic Epilepsy**.)

Structural brain disorders that can cause seizures include congenital birth defects (such as hydrocephalus), brain tumors, traumatic brain injuries, inflammatory diseases, infections, vascular strokes, and degenerative brain diseases. Metabolic disorders associated with seizures include severe liver and kidney disease, imbalances of blood sodium or calcium, low blood sugar, high blood pressure, and hormonal disorders. A variety of toxins can cause seizures.

The age and breed, neurologic examination findings, and a description of the seizure are important when determining the underlying cause.

### Clinical Signs

During a generalized seizure, the animal is often unconscious and unresponsive. It may fall or lie down. The legs are often rigidly stretched out or drawn up toward the body. The limbs may jerk or paddle as if running (*tonic/clonic* movements). Chewing motions, excessive salivation, urination, or defecation may occur.

During a partial seizure, jerking or twitching movements of a single limb may be seen, the head may turn to a one side, or one or both sides of the face may twitch. Repeated blinking of one or both eyes, chewing movements, and salivation may occur. Disorientation, unresponsiveness, excessive barking, unprovoked aggression, or excessive licking or biting at the air (referred to as fly biting) may also occur.

Some animals have abnormal behaviors prior to seizures, which are referred to as *preictal behaviors*. Examples include hiding, restlessness, hyperactivity, and attention seeking. Sometimes, owners can predict the onset of a seizure based on these behaviors. Some animals also have abnormal behaviors immediately after a seizure, which are referred to as *postictal behaviors*. Examples include

restlessness, panting, hyperactivity, thirst, and hunger. Some animals become quiet and sleep. Others appear blind and bump into objects or seem fearful and growl or bite when approached. The postictal period ranges from several minutes to 24 hours.

Animals with brain diseases and metabolic or toxic disorders often have other clinical signs, such as abnormal behavior or gait, blindness, loss of appetite, vomiting, diarrhea, excessive thirst, frequent urination, weight loss, weakness, and general debilitation. Young animals may fail to grow normally.

### Diagnostic Tests

Evaluation of an animal with seizures includes physical and neurologic examinations, routine laboratory tests, and sometimes x-rays. Additional tests may be recommended based on the results of these tests or if a metabolic or toxic cause is suspected.

Identification of specific brain disorders requires imaging of the brain, such as magnetic resonance imaging (MRI). Collection and examination of cerebrospinal fluid, which surrounds the brain, is often helpful in the diagnosis of certain inflammations or infections of the brain.

## TREATMENT AND FOLLOW-UP

### Treatment Options

If an underlying cause is identified, specific treatment is started for that disorder. Depending on their frequency, duration, and severity, treatment may be recommended to control the seizures. In general, treatment is usually started if seizures occur more frequently than every 6-8 weeks, if multiple seizures occur within a 24-hour period, or if the underlying disease cannot be resolved. (For a detailed description of seizure treatments, see the handouts on **Seizures: Treatment** and **Seizures: Treatment of Resistant Cases**.)

### Follow-up Care

If an underlying disease is identified, initial follow-up is defined by that disease. Rechecks are usually needed frequently at the beginning of seizure therapy and may be decreased to twice yearly once seizure control is achieved. It is helpful to keep a diary of the timing and frequency, duration, and severity of the seizures in order to establish patterns that can play a role in adjusting treatments.

### Prognosis

Prognosis depends on the underlying cause. Prognosis is good if the underlying disease can be resolved and guarded if it cannot be treated. Prognosis for animals with idiopathic epilepsy is usually good, because many of these seizures can be controlled.