

## Seizures and Fever Overview

Febrile seizures, also known as convulsions, body spasms, or shaking, occur mainly in children and are caused by fever. (Febrile is derived from the Latin *febris*, meaning fever.)

As with most types of seizures, the onset is dramatic, with little or no warning. In most instances, the seizure lasts only a few minutes and stops on its own.

Febrile seizures may occur because a child's developing brain is sensitive to the effects of fever. These seizures are most likely to occur with high body temperatures (higher than 38.5°C) but may also occur with milder fevers. The [sudden rise in temperature](#) seems to be more important than the degree of temperature. The seizure may occur with the initial onset of fever before a child's caregiver is even aware the child is ill.

- Seizures generally occur in those aged 3 months to 5 years; peak incidence is in infants aged 8-20 months.
- **About 2-5% of all children will experience a febrile seizure.**
- Of those who have had a febrile seizure, 30-40% will experience more seizures.
- About 25% have a first-degree relative with a history of febrile seizure.
- The seizure itself is *almost* always harmless.

## Seizures and Fever Causes

Febrile seizures are classified into 2 types:

- Simple febrile seizures are more common and are characterized by generalized seizures that last less than 5 minutes.
- Complex febrile seizures are those that are either prolonged (longer than 15 minutes), focal (meaning they involve only a part of the body, such as the face), or recurring within a 24-hour period.

Children who have experienced a complex febrile seizure may be at risk for these outcomes:

- A somewhat higher risk of having a serious infection
- More likely to have preexisting neurologic abnormalities
- **A higher risk for developing epilepsy later**

Most fevers associated with febrile seizures are due to the usual causes of fever in young children—namely, common viral and mild bacterial infections such as ear infections. Although perhaps only 1% of children with febrile seizures have a serious infection of the central nervous system such as meningitis, this possibility should always be carefully considered in a child who has had a febrile seizure.

## Seizures and Fever Symptoms

By definition, febrile seizures occur when the child has a fever. Most febrile seizures are generalized. In other words, the whole body may be involved.

During a generalized seizure, any or all of the following may be seen:

- Stiffening of the entire body
- Jerking of the arms and legs
- Complete lack of response to any stimuli
- Eyes deviated, staring, rolling back, moving back and forth
- Tightness of the jaws and mouth
- [Urinary incontinence](#) (wet their pants)
- Noisy breathing, labored, slower than normal (unusual for a child to stop breathing completely)
- Although it may seem like an eternity if you are witnessing a seizure, most of these episodes last only 1-5 minutes. Afterward, the child is typically drowsy but usually starts to become responsive within 15-30 minutes.

- Following a seizure, a child may remain somewhat “twitchy,” with intermittent small jerks of the arms or legs. It can be difficult to distinguish these movements from seizure activity, but the caregiver should be reassured if the child's body tone has become relaxed, breathing is regular, and the child begins to show some signs of responding to stimulation (will respond if talked to, for example).
- Focal seizures are less common and, as the term implies, involve only a part of the body. Abnormal movements may be seen only in the face (eye blinking, lip smacking, other movements of the mouth) or one side of the body. Variable degrees of alteration in consciousness are seen in focal seizures. Some seizures begin as focal ones and then become generalized.

## When to Seek Medical Care

With any medical concern, if you determine immediate medical emergency is not necessary, you may call your doctor for instructions on how to handle a febrile seizure. Your doctor may advise you to come to the office or to proceed directly to a hospital's emergency department.

Understandably, unprepared parents and other caregivers who have never dealt with a seizure before will likely be compelled to call 000 when their child is having a seizure. In most cases, the seizure will have stopped by the time emergency medical personnel arrive. Even so, it is wise to have the child seen promptly either by the regular physician or in the hospital's emergency department.

- It is important to consider and exclude other causes of seizures. Although serious infections such as meningitis are infrequent, these should be ruled out with a careful medical evaluation.
- If a child should have another febrile seizure, the home care measures should be followed.
- Even after a brief repeated febrile seizure, it is wise to take the child to the physician's office or hospital emergency department for an examination.
- Call for emergency medical transport in these cases:
  - The seizure lasts more than 5 minutes.
  - The child has serious trouble breathing or stops breathing.
  - The child develops cyanosis (blueness of the skin) indicating insufficient oxygen in the bloodstream.

## Exams and Tests

In evaluating a child with a febrile seizure, the physician is concerned about stopping the current seizure activity and then finding the causes of the seizures and the fever.

- Once seizure activity has stopped and the child's condition is stabilized, attention turns toward determining the cause of the seizure. The doctor will want to know this type of information:
  - Previous seizures without a fever (if so, then it is more likely the child has an underlying seizure disorder, such as epilepsy, rather than a febrile seizure)
  - Family history of seizures, febrile or otherwise
  - Presence of any known nervous system disorders in the child, such as delay in development or severe head injury
  - Any medications the child has been taking, including the possibility of poisoning
- The doctor will conduct a careful physical examination to detect any nervous system disorders.
- The physician will also try to determine the cause of the fever. In particular, [meningitis](#) may be a possibility, especially in a child with any of the following characteristics:
  - Younger than 12 months

- Appears particularly ill
- Stiffness of the neck (for example, difficulty flexing chin toward the chest)
- Unusually long period of drowsiness after the seizure
- Experiencing complex febrile seizure (often prolonged or repeated seizures)
- Other tests, such as blood and urine tests, and x-rays, such as a [chest x-ray](#), may be used in diagnosing the cause of fever. However, advanced studies such as head CT scan and EEG (electroencephalogram, brain wave tracing) are unlikely to be useful and are seldom used.

## Seizures and Fever Treatment (Self-Care at Home)

These aspects of home care need to be considered:

- Care of the child during the seizure: During a seizure, only a limited amount of intervention should be undertaken. The main objective is to protect the child's airway so that breathing is maintained. Protection from other injury is important.
  - Remove objects, such as food and pacifiers, from the mouth.
  - Place the child on his or her side or abdomen.
  - Clear the mouth with a suction bulb (if available) if there is vomiting.
  - Perform a jaw thrust or chin lift maneuver if there is noisy or labored breathing.
  - Do not try to restrain the child or try to stop seizure movements.
  - Do not force anything into the child's mouth. Don't try to hold the tongue. (It is not necessary to try to prevent the tongue from being swallowed.)
- Control of the fever: Because the seizure is being caused by fever, measures should be taken to lower the body temperature.
  - Remove clothing.
  - Apply cool washcloths to the face and neck.
  - Sponge the rest of the body with cool water (do not immerse a seizing child in the bathtub).
  - Give medication to lower the fever ([acetaminophen](#) suppositories in the rectum, if available). Oral medications should not be given until the child is awake.
  - Consider the cause of the fever: This is probably best left up to the doctor's medical evaluation.

## Medical Treatment

Should the child come to the hospital with persistent seizure activity (what is termed status epilepticus), the following interventions will be undertaken in the emergency department:

- Emergency treatment is begun to make sure the airway is open and oxygen intake is adequate. A monitor called a pulse oximeter will be used to measure oxygen content in the bloodstream. If additional oxygen is needed, a mask may be used.
- If necessary, the airway may be opened by means of a jaw thrust, chin lift, or a device known as an oral airway. In some cases, it may be necessary to breathe for the child, either with the use of a bag and mask or by placement of a tube in the trachea (windpipe).
- Additional interventions may be needed as a physical examination is performed.
  - Placement of an IV line to obtain blood for testing and to administer medication to stop the seizure
  - A rapid bedside test for blood sugar ([glucose](#)) to determine if it is low and if glucose needs to be given through the IV (low blood sugar can cause seizures)
  - Measuring vital signs (temperature, pulse, respiratory rate, and blood pressure)
  - Treatment to lower body temperature, if fever is present

## Next Steps

## Follow-up

The child's doctor should provide guidance as to when a follow-up visit is indicated. In the case of simple febrile seizure, the need for a short-term follow-up visit would depend on the nature of the illness causing the fever. The child's physician can use the follow-up visit as an opportunity to discuss febrile seizures with the parents.

## Prevention

- Fever control is important, so it seems reasonable to try to take these measures to control fever during an illness. Give acetaminophen (Tylenol, Tempra, and other children's formulas as directed by your doctor or on the label) or [ibuprofen](#) (Motrin, Advil, and others).
- Alternating doses of acetaminophen and ibuprofen such that medication is given every 3-4 hours is common, although some authorities are concerned that this practice is of unproven safety and benefit.
- Sponge bathing with lukewarm water must be done for 15-20 minutes. The water must not be so cool that the child shivers (shivering tends to keep body temperature up). The lowering effect of sponge bathing on body temperature will not last unless the child has also been given acetaminophen or ibuprofen.

## Outlook

Parents commonly ask 3 questions about febrile seizures.

- **Are they harmful to my child?**
  - Parents should feel reassured that febrile seizures, except in the very rare cases in which they are extremely prolonged and last 20-30 minutes, do not result in any lasting ill effects such as brain damage, decreased intelligence, behavioral problems, or delay in development.
  - Although otherwise healthy children who have had a simple febrile seizure may have a slightly higher risk of epilepsy later in life (1% vs. 0.5% for other children), there is no evidence that the febrile seizure itself causes epilepsy. There is a somewhat higher incidence of later epilepsy (1-2%) if certain risk factors are present: complex febrile seizure, family history of nonfebrile seizures, or preexisting neurologic abnormality or prior delay in development. Placing a child on continued antiseizure (anticonvulsant) medication after a febrile seizure does not prevent later epilepsy.
- **What are the chances they will reoccur?**
  - In general, 30-40% of children who have had a febrile seizure will experience more. If a child has had 2 febrile seizures, there is a 50% chance of an additional episode.
  - Factors that increase this risk are children younger than 12 months at the time of the first episode and fever higher than 102°F at the time of the first episode.
- **Should my child be put on medication to prevent more seizures?**
  - Even without anticonvulsant medication, 60-70% of children will never have a recurrence. Febrile seizures themselves cause no lasting ill effects such as brain damage or epilepsy. Certain anticonvulsant medications, such as phenobarbital, [valproic acid](#), and diazepam, can lower the recurrence rate to about 10%. Each of these medications has drawbacks:

- Phenobarbital was once widely used to prevent recurrences. However, it must be given on a daily basis to maintain adequate blood levels. Although febrile seizures themselves have no effect on behavior or learning, phenobarbital does.
- Valproic acid (brand names Depakene and Depakote) must also be given daily. Although side effects are rare, some, such as liver damage, have been fatal.
- Rectal diazepam (brand name Diastat—it is the same medicine in Valium) has the advantage in that it only needs to be used when the child has fever. However, it is not unusual that a child may have a febrile seizure before the parent is even aware there is a fever. Also, because diazepam is a sedative, the drowsiness it causes may make an already sick child appear more ill, creating difficulty in determining whether the child has a serious infection.
- Doctors have concluded that the drawbacks of anticonvulsant treatment generally outweigh the benefits and do not routinely prescribe these medications. A physician may prescribe such medication for children with special circumstances, such as developmental problems or very strong family history of such seizures. Children outgrow febrile seizures by age 5-6 years.

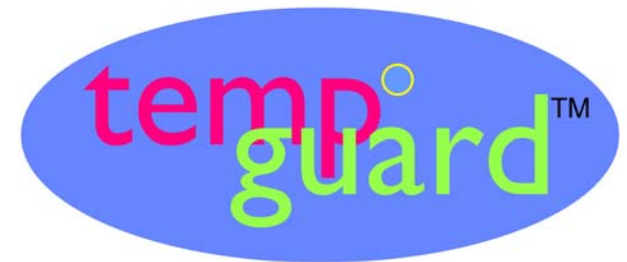
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