

## Tutorial: Seizure Disorders and Seizure Management

### WHAT IS A SEIZURE DISORDER?

A seizure occurs whenever there is a sudden disruption of the brain's normal electrical activity, which results in a change in a person's alertness as well as other changes in behavior. There are many different types of seizure disorders, with some seizures more severe than others. The term epilepsy is used when a person experiences ongoing or repeat seizures. One to two percent of the population of the United States is diagnosed with epilepsy, with one of four cases developing before the age of five. Most seizures are harmless.

Seizures can be the result of a head trauma at birth, infection or blood incompatibilities in newborns, a head injury as a child or adult, alcoholism, a brain infection, or poisoning. Undiagnosed seizures can lead to conditions that are more serious and difficult to manage

The most common types of seizures include the following:

**Generalized (or grand mal) seizures** occur when electrical abnormalities exist throughout the brain. The seizure typically begins with a loud cry followed by the person losing consciousness and falling to the ground. This type of seizure is accompanied by involuntary muscle jerking, called convulsions, during which the body muscles become rigid (the tonic phase of the seizure) followed by a period of relaxation (the clonic phase of the seizure). A grand mal seizure typically is time limited, lasting between 2 and 5 minutes. The person may lose control of bowel and bladder during the seizure. After regaining consciousness, the person is usually confused and complains of headaches, weakness and fatigue.

**Status seizures or status epilepticus** is a serious and life threatening medical condition. In this type of seizure, the person experiences ongoing seizure activity for a prolonged period of time and does not regain consciousness between seizures. This situation requires intensive medical interventions to stop the seizure activity. This type of seizure can be due to a sudden discontinuing of anti-seizure medications, a blood infection, or a head injury.

**Absence (or petit mal) seizures** usually begin with a very brief loss of consciousness lasting between 1 and 15-20 seconds. During this type of seizure, a person may become very quiet, and may blink, stare blankly, roll his eyes, or move his lips. Following the seizure, the person resumes whatever activity he was doing before the seizure began. The person typically will not remember the seizure and may not realize that anything unusual has happened. Untreated, petit mal seizures can recur as many as 100 times per day and may progress to grand mal seizures.

**Partial Seizures:** There are two types of partial seizures: simple and complex. A simple partial seizure occurs when there is a local electrical activity within a specific area of the brain. The person will exhibit symptoms related to the areas of the brain involved. During the seizure, the person remains alert and can later describe the event in detail. In a complex partial seizure, the person will present with an aura, a distinctive smell, taste, or other unusual sensation. The aura starts as a simple partial seizure but then moves beyond the local area of the brain, often becoming a grand mal seizure.

**Febrile seizures** are convulsions brought on by high fevers. These seizures may look like a tonic clonic seizure in that the child loses consciousness and has convulsions, but they are not epileptic seizures.

### WHY IS SEIZURE IDENTIFICATION AND MANAGEMENT IMPORTANT FOR MANY STUDENTS AFTER TBI?

Persons of all ages are at increased risk of developing a seizure disorder after a brain injury; however, infants and small children are especially at risk of developing seizures, particularly when they have

experienced a severe brain injury or skull fractures at the time of the injury. The onset of seizures within the first seven days after brain injury is called an early onset seizure disorder. Early onset seizures increase the intracranial pressure within the brain and can lead to further brain damage. Thus management of these seizures is of utmost importance. Children less than 2 years of age have a three-fold greater risk of early onset seizure disorders compared to older children. Anti-seizure medications are typically used during the initial week of hospitalization as a prevention measure in these high risk children.

Late onset seizure disorders occur after the first week following brain injury. Children with skull fractures are at increased risk of developing this type of seizure with the risk increasing with age (i.e., 12% of children under 5 years of age, 20% of children between the age of 5 and 16 years). Thus, seizures are a neurological disorder directly related to injury to the brain.

### **WHAT ARE THE CLINICAL INTERVENTIONS AND SUPPORTS NEEDED FOR STUDENTS WITH SEIZURE DISORDERS AFTER TBI?**

Knowledge of symptoms and management of seizure disorders are important for students with brain injury, their family, and the school staff.

**1. Identifying a student with a previously undiagnosed seizure disorder:** The initial step in dealing with a child's potential new onset seizure disorder is for teachers and family to recognize the signs and symptoms of the seizure disorder. It is critical to verify that changes in a child's behaviors are truly reflective of an underlying seizure disorder. In the case of a grand mal seizure, the evidence is obvious: the child loses consciousness, experiences convulsions, and awakens confused.

More often, families and school personnel may be called upon to determine if the child is experiencing new onset petite mal or partial seizures. Parents and school staff are keen observers of a child's unexplained changes in behaviors and often the "front line" identifiers of the child's previously undiagnosed seizures, including symptoms possibly related to either a late onset seizure disorder or break-through seizures in children already on medications for grand mal seizures. Consultation with parents and teachers may be helpful to determine if the student presents with similar altered behaviors in all or only select settings. For example, in the case of petit mal seizures, parents may be concerned about a young child presenting with "lapses in attention" at home, while consistently oriented and alert during the school day; or an adolescent may present with periods of being "empty and vacant" during select academic classes, yet remain fully and consistently engaged at home and during leisure activities. These later behaviors would argue for situation-specific inattention rather than provide evidence for a possible undiagnosed seizure disorder.

**2. Timely diagnosis of a student's new onset seizure disorder:** If the child's behavior suggests a possible petite mal or partial seizure disorder, the child should be seen by a neurologist, who will rely on parents, teachers, and other professionals' reports to help determine a diagnosis. A thorough neurological examination and an electroencephalogram (EEG) usually complete the diagnosis. Anti-seizure medications are typically prescribed, with family and staff encouraged to monitor the child's behaviors at home and school to ensure that the medication is stopping the seizure activity.

**3. Timely notification of the student's family and physician if anti-seizure medications appear to be interfering with the child's academic functioning:** Occasionally, medications may cause unwanted side effects such as extreme fatigue or significant reductions in overall alertness. When such side effects interfere with the child's ability to learn in school, the parents should be encouraged to discuss these negative side effects with the student's physician. Medication dosage should never be stopped or dosage reduced without physician oversight, since lowering a dose or sudden stopping of an anti-seizure medication can precipitate break through seizures.

**4. Timely interventions for a student having a grand mal seizure:** If the child is known to have epilepsy, he should be encouraged to wear an identification bracelet or necklace identifying his seizure disorder and listing the medications taken for its management. Despite medication compliance, the child may

experience periodic "break through" grand mal seizures.

Several first aid interventions are required:

**Remain calm:** A grand mal seizure is the most dramatic seizure and frightening to watch. It is important to realize that the child having the seizure is unconscious and feels no pain. It is also important that parents and teachers remain calm during the child's seizure. There is nothing to do to stop the seizure. The seizure must run its course, with the child regaining consciousness in a few moments. Other children should be removed from the immediate area.

**Protect the child from injury:** A child having a seizure is almost sure to fall. Try to break the fall and keep the child from hitting sharp objects around him. Ease the child to the floor and loosen tight clothing, especially around the neck. Place a soft item under his head, and turn the child's head to the side so that saliva can flow from the mouth. Wipe away discharge from the nose and mouth to aid in breathing.

**Do not try to restrain the child's movements:** Restraints can lead to even more violent convulsing. Do not put anything in the child's mouth.

**Help the child recover from the seizure:** After the seizure, the child should be told what has happened and reminded where he is. The child should be allowed to rest or sleep in a quiet place after the seizure is over.

**Notify the family:** The family should be alerted to the child's seizure. Follow-up consultation with the physician is recommended and the child's medications re-evaluated.

**When to seek additional medical help:** If a child has a series of convulsions with each successive one occurring before he has regained consciousness, or a single seizure that last longer than 10 minutes, contact the parent or guardian and seek emergency medical attention.

**5. Ensuring that the student is compliant with taking anti-seizure medications:** Management of seizure disorders depends on the severity and symptoms of the disorder and the degree of compliance of the student in taking prescribed anti-seizure medications. The choice of medications may shift over time as a child ages, with new medications substituted or added to established medications to ensure seizure prevention. Family and school staff will need to ensure that the student complies with taking all anti-seizure medications prescribed.

**6. Helping students manage their own seizures:** There are many ways to help students manage and/or minimize their seizures:

**Encourage the child to minimize stressful events.** Stress can increase seizure activity in 30% of persons with epilepsy. School psychologists can teach older adolescents to use either relaxation techniques (e.g., deep breathing) and/or meditation as a means of gaining some sense of control over the disorder. Biofeedback can also be useful to teach older adolescents how to recognize an aura and what to do to stop its spread.

**Encourage the student to avoid potential triggers of a seizure.** The student should be encouraged to eat properly and get enough sleep. He should be encouraged not to hyperventilate. A child who experiences an aura should be taught to find a safe place and lie down until the seizure passes. The student needs to understand the importance of ongoing anti-seizure medication compliance and should be cautioned about stopping medications suddenly.

**Educate the student's classmates about seizures:** Teachers should provide education about seizures to the student's classmates. This knowledge will help alleviate the other children's anxiety reactions and minimize

rejection and stigmatization of the student by his peers.

**Encourage the student's maximal involvement in school-based activities:** The student with epilepsy should be involved in all relevant school and extracurricular activities with supervision provided in specific situations, such as water sports.

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