Chapter 5: Care of the Neurological System

Concussion Assessment & Management

Seizure Management

Rectal Diazepam Administration

Vagal Nerve Stimulation

Ventricular Shunt

Concussion Management

Overview

A concussion is a type of brain injury that results from a blow or jolt to the head or body that causes a sudden jarring of the head. The brain bounces back and forth inside the bony skull. A concussion can occur with, or without, a loss of consciousness. Research shows that inability to remember what happened just prior to the injury and just after the injury may be a more reliable indicator of a concussion than loss of consciousness. Concussions can be more serious on young, developing brains. At school, concussions are most common in physical education classes and while playing athletics, but can occur in a classroom or hall if a student hits his/her head on a desk, floor, or other student. To prevent further injury, it is important to recognize when a student may have sustained a concussion and respond appropriately. The best treatment for a concussion is physical and cognitive rest.

Research has shown that metabolic changes take place in the brain as a result of a concussion. These changes make the brain susceptible to serious injury shortly after a concussion. If a student receives a second blow to the head, the brain's regulatory mechanisms can fail, causing massive cerebral edema, brain herniation, and sudden death. While this is rare, the devastating consequences of *Second Impact Syndrome* make it imperative that concussions are managed correctly.

Signs and Symptoms

Students who exhibit one or more of the signs and symptoms listed below after receiving a blow to the head should be referred to an appropriate health care provider experienced in evaluating concussions. Concussions do not show up on an MRI or CAT scan, but these tests may be done to rule out other serious brain injuries.

Signs of Concussion

- Appears dazed or stunned.
- Is confused about what has happened.
- Answers questions slowly or inaccurately.
- Slurs words.
- Repeats questions.
- Can't remember what happened *prior* to injury.
- Can't remember what happened *after* the injury.
- Exhibits difficulties with balance or coordination.
- Loses consciousness (even briefly).
- Shows behavior or personality changes.

Symptoms Reported by Student

Physical

- Headache or pressure in head.
- Nausea or vomiting.
- Fatigue or feeling tired.
- Blurry or double vision.
- Sensitivity to light or noise.
- Numbness or tingling.
- Dizziness or balance problems.
- Just does not "feel right"

Emotional

- Irritable.
- Sad.
- More emotional than usual.
- Nervous.

Thinking/Remembering

- Difficulty thinking clearly.
- Difficulty concentrating.
- Feeling slowed down.
- Feeling sluggish or groggy

Sleep

- Drowsy.
- Sleeps more than usual.
- Sleeps less than usual.
- Has trouble falling asleep.

Role of School Nurse

The primary role of the school nurse is to recognize when an injury may have caused a concussion and refer the student to appropriate resources to prevent further injury. When the student returns to school after a concussion, the nurse can assess for ongoing symptoms and help to develop a plan that will support recovery. It is important that the school and the nurse have plans and procedures in place ahead of time to deal with concussions. The CDC has developed a concussion action plan, which can be found under Resources at the end of this section. The nurse can also educate parents, staff, coaches, and students about concussions and how to manage them. The nurse can review school facilities and policies to help prevent concussions, especially repeat concussions, and help create a safe school environment. Most recently, the CDC is trying to reshape the culture around concussion and encourage student athletes to recognize the seriousness of concussions and to take time to heal before resuming activity (*Concussion at Play: Opportunities to Reshape the Culture Around Concussion,*

2015). School nurses can be an important influence in protecting students and promoting a safer culture around concussions.

Oklahoma Regulations

(See also Oklahoma Statute 70.24-155.rtf)

- Each school division must develop policies and procedures for suspected concussions in student-athletes, including both physical activity and academic guidelines
- Each student athlete and the student athlete's parent/guardian must review information on concussion signs and symptoms on an annual basis and sign that they have read and understand the information.
- If any student athlete is suspected to have sustained a concussion in a practice or game, the athlete shall be removed from the activity and **not** return to play that day. The student must be free of any concussion symptoms to resume play in the future and receive written clearance from a licensed health care provider.
- A licensed Health Care Provider (MD, NP, PA, licensed athletic trainer) will use a standardized concussion sideline assessment tool such as Sport Concussion Assessment Tool-3 (SCAT3), Sudden Assessment for Concussions (SAC), or Balance Error Scoring System (BESS) to test cognitive ability and postural stability.
- A concussion policy team will review and refine local concussion management policies annually.
- Each school division will develop policies to ensure staff and volunteers are trained in recognition of concussions and concussion management and may encourage other organizations using their athletic facilities to train their staff and volunteers in concussion management.

These regulations are often referred to as "**Return to Play**" guidelines. Although each student's care is individualized, in general, most guidelines recommend that student athletes resume a graduated, modified return to play schedule as recommended by the Zurich Consensus Statement and the American Academy of Pediatrics. This means that after a documented concussion, the student would not resume full play in a game for seven days after the injury and providing there are no remaining symptoms of concussion. This may include modifications for other physical activities in which the student participates, such as physical education classes and recess. If increasing activity results in symptoms, the activity is reduced until symptoms resolve. In encouraging student athletes to allow adequate healing time, the CDC has adopted the motto "Better to miss one game than the whole season." Research has shown that post-concussion symptoms are resolved in 7-10 days for 90% of students. Individualized return to play plans must be developed for the remaining 10%.

Return to Learning

As research determined the need for physical rest after a concussion, the need for cognitive rest also became apparent. Since one of the brain's primary functions is completing cognitive tasks, it was recognized that cognitive rest is also important to healing after a concussion. However, since most students look normal after a concussion, educators and parents may fail to recognize the need for academic adjustments. If a student sprains an ankle, adults typically would not force the student to walk with full weight-bearing immediately after injury and would allow time for healing. Similarly, allowing cognitive rest may help to minimize symptoms and facilitate a quicker recovery from a concussion. The more severe the concussion, the more time may be needed for rest and healing. Much more research needs to be done on this subject to determine evidence-based guidelines for mental rest after a concussion. In general, it has been recommended that if a student cannot concentrate without headache or other symptoms for 30 minutes, rest at home might be best. Rest also means no video games, texting, computer work, loud music, or heavy reading. Lighter activities such as watching television or interacting with family might be recommended until symptoms subside.

The CDC recommends that when students return to school after a concussion, school professionals should watch for:

- Problems concentrating or paying attention.
- Longer time needed to complete assignments.
- Difficulty remembering or learning new material.
- Difficulty organizing tasks or moving from one task to the next.
- Irritability.
- Inappropriate or impulsive behavior.
- Decreased ability to cope with stress.
- Being more emotional than usual.
- Fatigue or drowsiness.
- Difficulty handling the lights and sounds in a school environment.
- Physical symptoms such as headache, nausea, or dizziness.

If a student is still experiencing symptoms after a concussion, the following adjustments to their academic program can be considered:

- Absence, initially after concussion.
- Return to school but with a shortened day.
- Reduction in workload at school; prioritizing assignments.
- Allowance of more time to complete assignments.
- Postponement of standardized or any high stakes testing.
- Allowing student to take cognitive breaks in between classes in a quiet place.
- Modification or exclusion from physical education classes and recess--but not substituting a mental activity for them.
- Providing class notes from a teacher or fellow student.

- Limited screen time.
- Treatment with authorized medications.
- Allowing student to eat lunch in a quiet location.

During the student's recovery, it is essential for communication and collaboration between the educational staff, school nurse, family, and student. Schools might want to consider a case manager for the student until symptoms disappear. If the student's symptoms persist beyond 4 weeks and affect his ability to fully participate in his education, a team may need to develop accommodations or a 504 plan. It has been noted that students with special needs, attention deficits, and learning disorders may have greater difficulty recovering from a concussion. Moreover, students who have had more than one concussion may take longer to recover.

Return to Learn Protocol

1. A student recovering from a brain injury shall gradually increase cognitive activities progressing through *some or all* of the following phases. Some students may need total rest with a gradual return to school, while others will be able to continue doing academic work with minimal instructional modifications. The decision to progress from one phase to another should reflect the absence of any relevant signs or symptoms, and should be based on the recommendation of the student's appropriate licensed health care provider in collaboration with school staff, including teachers, school counselors, school administrators, psychologists, nurses, clinic aides, or others as determined by local school division concussion policy.

    a. Home: Rest

    Phase 1: Cognitive and physical rest may include:

    - Minimal cognitive activities – limit reading, computer use, texting, television, and/or video games.
    - No homework.
    - No driving.
    - Minimal physical activity.

    Phase 2: Light cognitive mental activity may include:

    - Up to 30 minutes of sustained cognitive exertion.
    - No prolonged concentration.
    - No driving.
    - Limited physical activity.

Student will progress to part-time school attendance when able to tolerate a minimum of 30 minutes of sustained cognitive exertion without exacerbation of symptoms or re-emergence of previously resolved symptoms.

b. School: Part-time

Phase 3: Maximum instructional modifications including, but not limited to:

- Shortened days with built-in breaks;
- Modified environment (e.g., limiting time in hallway, identifying quiet and/or dark spaces);
- Established learning priorities;
- Exclusion from standardized and classroom testing;
- Extra time, extra assistance, and/or modified assignments;
- Rest and recovery once out of school; and
- Elimination or reduction of homework.

Student will progress to the moderate instructional modification phase when able to tolerate part-time return with moderate instructional modifications without exacerbation of symptoms or re-emergence of previously resolved symptoms.

Phase 4: Moderate instructional modifications including, but not limited to:

- Established priorities for learning.
- Limited homework.
- Alternative grading strategies.
- Built-in breaks.
- Modified and/or limited classroom testing, exclusion from standardized testing.
- Reduction of extra time, assistance, and/or modification of assignments as needed.

Student will progress to the minimal instructional modification phase when able to tolerate full-time school attendance without exacerbation of existing symptoms or reemergence of previously resolved symptoms.

c. School: Full-time

Phase 5: Minimal instructional modification - instructional strategies may include, but are not limited to:

- Built-in breaks.
- Limited formative and summative testing, exclusion from standardized testing.
- Reduction of extra time, assistance, *and* modification of assignments.
- Continuation of instructional modification and supports in academically challenging subjects that require cognitive overexertion and stress.

Student will progress to no modified school participation when able to handle sustained cognitive exertion without exacerbation of symptoms or re-emergence of previously resolved symptoms.

Phase 6: Attends all classes; maintains full academic load/homework; requires no instructional modifications.

Progression through the above phases shall be governed by the presence or resolution of symptoms resulting from a concussion experienced by the student including, but are not limited to:

a. Difficulty with attention, concentration, organization, long-term and short-term memory, reasoning, planning, and problem solving.
b. Fatigue, drowsiness, difficulties handling a stimulating school environment (e.g., sensitivity to light and sound).
c. Inappropriate or impulsive behavior during class, greater irritability, less able to cope with stress, more emotional than usual.
d. Physical symptoms (e.g., headache, nausea, dizziness).

2. Progression through gradually increasing cognitive demands should adhere to the following guidelines:

    a. Increase the amount of time in school.
    b. Increase the nature and amount of work, the length of time spent on the work, or the type or difficulty of work (change only one of these variables at a time).
    c. Demands may be gradually increase if symptoms do not worsen

        1) Activity should be discontinued and allow the student to rest for at least 20 minutes if the symptoms are relieved with rest, the student may reattempt the activity at or below the level that produced symptoms.

        2) Discontinue the current activity for the day and begin again when symptoms have lessened or resolved (such as the next day) if the symptoms are not relieved with rest.

3. If symptoms persist or fail to improve over time, additional in-school support may be required with consideration for further evaluation. If the student is three to four

weeks post injury without significant evidence of improvement, a 504 plan should be considered.

4. A student-athlete shall progress to a stage where he or she no longer requires instructional modifications or other support before being cleared to return to full athletic participation (return-to-play).

The American Academy of Pediatrics (AAP) Return to Learn Following a Concussion Guidelines (October 2013), and the American Medical Society for Sports Medicine (AMSSM) Position Statement (2013), are available online to assist health care providers, student-athletes, their families, and school divisions, as needed.

Resources

HEADS UP toolkit. Comprehensive toolkit for concussions available from the Centers for Disease Control and Prevention (CDC) at http://www.cdc.gov/headsup/index.html

Acute Concussion Evaluation Care Plan. Available online: http://www.cdc.gov/concussion/headsup/pdf/ACE_care_plan_school_version_a.pdf

Concussion Signs and Symptoms Checklist. Available online: http://www.cdc.gov/concussion/pdf/TBI_schools_checklist_508-a.pdf

Concussion at Play: Opportunities to Reshape the Culture Around Concussion. A 2015 CDC report designed to build a culture in sports where athletes lower their chances of concussion and recognize and report concussion symptoms so they can properly recover. Available online: http://www.cdc.gov/headsup/pdfs/resources/concussion_at_play_playbook-a.pdf

Concussion in Sports--What You Need to Know. National Federation of State High School Associations' (NFHS) online coach education course, endorsed by the CDC, provides a guide to understanding, recognizing and properly managing concussion in high school sports. Available online: www.nfhslearn.com

Oregon Center for Applied Science (ORCAS) ACTive® course, an online training and certification program that gives sports coaches the tools and information to protect players from sports concussions. Funded by the National Institutes of Health, available online: http://activecoach.orcasinc.com

Guidelines for Policies on Concussions in Student- Athletes Title 70. Chapter 1 Article XXIV Section 24-155 *Sports Related Health Injuries – Concussion Management Guidelines - Penalties*

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Procedure to Follow After a Possible Concussion

1. Observe for concussion danger signs and contact Emergency Medical Services if any of the following are observed:
    a. Loss of consciousness.
    b. Headache that gets worse and does not go away.
    c. Does not remember what happened just prior to injury or what happened afterwards.
    d. Weakness, numbness, or decreased coordination.
    e. Repeated vomiting or nausea.
    f. One pupil larger than the other.
    g. Slurred speech.
    h. Seizures.
    i. Does not recognize people or places.
    j. Very drowsy or cannot be awakened.
    k. Becomes increasingly confused, restless, or agitated.
    l. Has unusual behavior or just doesn't "act right".

    The symptoms listed above may be signs of concussion or of more serious brain injury and needs to be evaluated immediately.

2. Observe student for signs and symptoms of a concussion for at least 30 minutes.
    Some symptoms might take time to develop.

3. Complete the Concussion Signs and Symptoms Checklist (on next page) and monitor during the observation period.
    The form includes an easy-to-use checklist to evaluate when the student arrives at the clinic, 15 minutes later, 30 minutes later, and ongoing assessment if symptoms persist.

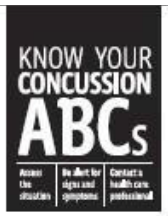
4. After 30 minutes, if there are no further symptoms return student to class but advise no participation in sports or other active activities for the rest of the day.

5. Notify the student's family that the student had an injury to the head. Send an information sheet home with student for parents describing how to monitor for further symptoms.
    Alert family to monitor for signs of head injury and gives them information on which signs to observe and report.

6. If student sees a health care provider, monitor for problems on return to school.

Concussion Signs and Symptoms

Checklist



Student's Name: _____ **Student's Grade:** _____ **Date/Time of Injury:** _____

Where and How Injury Occurred: *(Be sure to include cause and force of the hit or blow to the head.)* _____

_____

Description of Injury: *(Be sure to include information about any loss of consciousness and for how long, memory loss, or seizures following the injury, or previous concussions, if any. See the section on Danger Signs on the back of this form.)* _____

_____

_____

DIRECTIONS:

Use this checklist to monitor students who come to your office with a head injury. Students should be monitored for a minimum of 30 minutes. Check for signs or symptoms when the student first arrives at your office, fifteen minutes later, and at the end of 30 minutes.

Students who experience *one or more* of the signs or symptoms of concussion after a bump, blow, or jolt to the head should be referred to a health care professional with experience in evaluating for concussion. For those instances when a parent is coming to take the student to a health care professional, observe the student for any new or worsening symptoms right before the student leaves. Send a copy of this checklist with the student for the health care professional to review.

To download this checklist in Spanish, please visit: www.cdc.gov/Concussion.
Para obtener una copia electrónica de esta lista de síntomas en español, por favor visite: www.cdc.gov/Concussion.

OBSERVED SIGNS	0 MINUTES	15 MINUTES	30 MINUTES	☐ MINUTES Just prior to leaving
Appears dazed or stunned				
Is confused about events				
Repeats questions				
Answers questions slowly				
Can't recall events *prior* to the hit, bump, or fall				
Can't recall events *after* the hit, bump, or fall				
Loses consciousness (even briefly)				
Shows behavior or personality changes				
Forgets class schedule or assignments				
PHYSICAL SYMPTOMS				
Headache or "pressure" in head				
Nausea or vomiting				
Balance problems or dizziness				
Fatigue or feeling tired				
Blurry or double vision				
Sensitivity to light				
Sensitivity to noise				
Numbness or tingling				
Does not "feel right"				
COGNITIVE SYMPTOMS				
Difficulty thinking clearly				
Difficulty concentrating				
Difficulty remembering				
Feeling more slowed down				
Feeling sluggish, hazy, foggy, or groggy				
EMOTIONAL SYMPTOMS				
Irritable				
Sad				
More emotional than usual				
Nervous				

→More

Danger Signs:

Be alert for symptoms that worsen over time. The student should be seen in an emergency department right away if s/he has:

- ❒ One pupil (the black part in the middle of the eye) larger than the other
- ❒ Drowsiness or cannot be awakened
- ❒ A headache that gets worse and does not go away
- ❒ Weakness, numbness, or decreased coordination
- ❒ Repeated vomiting or nausea
- ❒ Slurred speech
- ❒ Convulsions or seizures
- ❒ Difficulty recognizing people or places
- ❒ Increasing confusion, restlessness, or agitation
- ❒ Unusual behavior
- ❒ Loss of consciousness (even a brief loss of consciousness should be taken seriously)

Additional Information About This Checklist:

This checklist is also useful if a student appears to have sustained a head injury outside of school or on a previous school day. In such cases, be sure to ask the student about possible sleep symptoms. Drowsiness, sleeping more or less than usual, or difficulty falling asleep may indicate a concussion.

To maintain confidentiality and ensure privacy, this checklist is intended only for use by appropriate school professionals, health care professionals, and the student's parent(s) or guardian(s).

For a free tear-off pad with additional copies of this form, or for more information on concussion, visit: www.cdc.gov/Concussion.

Resolution of Injury:

__ Student returned to class
__ Student sent home
__ Student referred to health care professional with experience in evaluating for concussion

SIGNATURE OF SCHOOL PROFESSIONAL COMPLETING THIS FORM: _____

TITLE: _____

COMMENTS:

For more information on concussion and to order additional materials for school professionals **FREE-OF-CHARGE**, visit: **www.cdc.gov/Concussion**.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CDC

Acute Concussion Evaluation (ACE)
Care Plan

Gerard Gioia, PhD[1] & Micky Collins, PhD[2]
[1]Children's National Medical Center
[2]University of Pittsburgh Medical Center

Patient Name:_____
DOB:_____ Age:_____
Date:_____ ID/MR#_____
Date of Injury:_____

You have been diagnosed with a concussion (also known as a mild traumatic brain injury). This personal plan is based on your symptoms and is designed to help speed your recovery. Your careful attention to it can also prevent further injury.

You should not participate in any high risk activities (e.g., sports, physical education (PE), riding a bike, etc.) if you still have any of the symptoms below. It is important to limit activities that require a lot of thinking or concentration (homework, job-related activities), as this can also make your symptoms worse. If you no longer have any symptoms and believe that your concentration and thinking are back to normal, you can slowly and carefully return to your daily activities. Children and teenagers will need help from their parents, teachers, coaches, or athletic trainers to help monitor their recovery and return to activities.

Today the following symptoms are present (circle or check). ____**No reported symptoms**

Physical		Thinking	Emotional	Sleep
Headaches	Sensitivity to light	Feeling mentally foggy	Irritability	Drowsiness
Nausea	Sensitivity to noise	Problems concentrating	Sadness	Sleeping more than usual
Fatigue	Numbness/Tingling	Problems remembering	Feeling more emotional	Sleeping less than usual
Visual problems	Vomiting	Feeling more slowed down	Nervousness	Trouble falling asleep
Balance Problems	Dizziness			

RED FLAGS: Call your doctor or go to your emergency department if you suddenly experience any of the following			
Headaches that worsen	Look very drowsy, can't be awakened	Can't recognize people or places	Unusual behavior change
Seizures	Repeated vomiting	Increasing confusion	Increasing irritability
Neck pain	Slurred speech	Weakness or numbness in arms or legs	Loss of consciousness

— SCHOOL VERSION —

Returning to Daily Activities

1. Get lots of rest. Be sure to get enough sleep at night- no late nights. Keep the same bedtime weekdays and weekends.
2. Take daytime naps or rest breaks when you feel tired or fatigued.
3. **Limit physical activity as well as activities that require a lot of thinking or concentration. These activities can make symptoms worse.**
   - Physical activity includes PE, sports practices, weight-training, running, exercising, heavy lifting, etc.
   - Thinking and concentration activities (e.g., homework, classwork load, job-related activity).
4. Drink lots of fluids and eat carbohydrates or protein to main appropriate blood sugar levels.
5. **As symptoms decrease, you may begin to gradually return to your daily activities. If symptoms worsen or return, lessen your activities, then try again to increase your activities gradually.**
6. During recovery, it is normal to feel frustrated and sad when you do not feel right and you can't be as active as usual.
7. Repeated evaluation of your symptoms is recommended to help guide recovery.

Returning to School

1. If you (or your child) are still having symptoms of concussion you may need extra help to perform school-related activities. As your (or your child's) symptoms decrease during recovery, the extra help or supports can be removed gradually.
2. Inform the teacher(s), school nurse, school psychologist or counselor, and administrator(s) about your (or your child's) injury and symptoms. School personnel should be instructed to watch for:
   - Increased problems paying attention or concentrating
   - Increased problems remembering or learning new information
   - Longer time needed to complete tasks or assignments
   - Greater irritability, less able to cope with stress
   - Symptoms worsen (e.g., headache, tiredness) when doing schoolwork

~Continued on back page~

This form is part of the "Heads Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention (CDC).

Seizure Management

Overview

A *seizure* is an event in which there is a temporary change in behavior resulting from a sudden, abnormal burst of electrical activity in the brain. If the electrical disturbance is limited to only one area of the brain, then the result is a partial seizure. The location of the initial electrical malfunction and the extent of its spread determine the clinical manifestations of the seizure. For example, the student may experience confusion, loss of awareness, aimless movements, jerking movements or uncontrolled body movements. Sometimes the student may just exhibit purposeless, repetitive actions such as hand wringing or lip smacking. There may or may not be a loss of consciousness and awareness. If the electrical disturbance affects the entire brain, the result is a generalized seizure.

Epilepsy is defined as a chronic condition that is characterized by 2 or more recurrent seizures. Many students with epilepsy have more than one seizure type. Nearly 3 million people in the U.S. have epilepsy, and approximately 1 in 26 people will develop epilepsy at some point in their lifetime. Between 0.5 and 1% of students are affected. It may become less frequent and resolve as a child ages.

Some seizures may result from an acute medical illness (e.g., during a hypoglycemic episode for a diabetic) or an acute injury (e.g., head injury) and cease once the illness is treated. Some children may have one seizure without the cause ever being known.

Classification of Seizures

Seizures may be generalized motor or non-motor and affect the entire body, or focal aware and focal impaired awareness where one area of the brain is affected resulting in more localized symptoms. The following table summarizes the classification of seizures which was updated in 2016 by the International League Against Epilepsy:

Generalized Motor Seizures	Clinical Manifestations
Tonic-clonic seizures (*formerly known as* grand mal seizures; affects the entire brain at the onset)	The eyes roll upward, the student loses consciousness, falls to the ground, and becomes rigid as muscles tighten (tonic phase). This is followed by jerking movements of the entire body (clonic phase) as muscles undergo rhythmic tightening and relaxation. During this phase, the student may become incontinent of stool and urine as

Generalized Motor Seizures	Clinical Manifestations
Onset: any age	His/her muscles contract and relax. Breathing may be shallow or even stop briefly (rare), but renews as jerking movements end. Generalized seizures usually last 1-2 minutes. After the tonic-clonic phase, movement slows and is followed by drowsiness or deep sleep that can last several hours (postictal state).
Atonic seizures (*also known as drop attacks)* Onset: age 2-5	Manifested as a sudden, momentary loss of motor tone. The student may or may not lose consciousness. A mild atonic seizure may cause a sudden, brief head drop. During a more severe atonic seizure, the student may suddenly fall to the ground, lose consciousness briefly, and then get up as if nothing happened. If a student has frequent atonic seizures, a helmet may be worn to prevent injury to the head or face. These seizures tend to be resistant to drug therapy.
Myoclonic seizures	Characterized by sudden, brief contractures of a muscle or group of muscles without loss of consciousness and no postictal state.
Generalized Non-motor Seizures	**Clinical Manifestations**
Absence seizures (*formerly called* petit mal seizures, "lapses," or "staring spells") Onset: age 4-12	These seizures are characterized by a brief loss of consciousness with minimal or no alteration in muscle tone and sometimes go unrecognized. There is no warning and the seizures can be mistaken for daydreaming or inattentiveness. Students may: • Simply stare blankly for 5-10 seconds or blink • Drop objects because of loss of muscle tone • Have minor movements such as lip-smacking • Experience twitching or slight hand movements the student will be unable to recall what happened during these brief periods of "blankness." If untreated, seizures may occur many times a day.

Generalized Motor Seizures	Clinical Manifestations
	Seizures can be precipitated by fatigue, stress, hypoglycemia, or hyperventilation.

Focal Seizures	Clinical Manifestations
Focal aware seizures (*formerly called* "partial" or "simple partial" seizures) affects just one part of the brain Onset: any age	Manifestations are dependent on the area affected and tend to be localized. The student may be aware of the seizure, remember the experience, but may be limited in how he or she can interact while it is happening. For example, a student's eyes or eyes and head turn to one side and the arm on that side may be extended with the fingers clenched. The student may appear to be looking toward the closed fist. A focal aware seizure may also manifest as a tingling in the hand or face, as a visual distortion, or a sudden strange feeling. It is important for an eyewitness to give a clear description of the seizure, especially which body parts are initially involved, to aid in diagnosis and treatment. Also, noting the circumstances that precipitated the episode can help in treatment. Students may also experience a postictal stage after a partial seizure. Focal aware seizures may spread and become generalized. Consciousness is *never* impaired.
Focal Impaired Awareness Seizures (*formerly known as "complex partial" or "psychomotor" seizures*, begin in one area of the brain and spread to other areas) Onset: age 3 and up	The most common type of seizures. These seizures first begin with an *aura* or warning that the seizure is about to occur. The aura may be described as a strange feeling in the pit of the stomach that rises up to the throat, or a sensation that is accompanied by odd or unpleasant odors or tastes, auditory or visual hallucinations, or feelings of elation or strangeness. A student may cry or run for help. If a student experiencing a focal impaired awareness seizure is touched or restrained, he/she may become combative. During this time, the student is often unaware of his/her environment and unable to respond appropriately to the

Focal Seizures	Clinical Manifestations
	environment. After the aura, the student may suddenly become limp or stiff, appear dazed, and confused. The most obvious behaviors may be lip smacking, repeating words, chewing, picking at clothing, drooling, and swallowing. Focal impaired awareness seizures may spread and become generalized. Consciousness is *always* impaired.

In addition, a number of epilepsy syndromes have been identified. They include: Benign Rolandic Epilepsy, Lennox-Gastaut Syndrome, Landau-Kleffner Syndrome, Rasmussen's Syndrome, Juvenile Myoclonic Epilepsy, Frontal Lobe Epilepsy, Temporal Lobe Epilepsy, and Progressive Myoclonic Epilepsy.

Potential Settings

Many students with a history of seizures attend regular classrooms and participate in regular school activities, with modifications that are determined by the parents, health care provider, school nurse, and school staff. As with all medical conditions, every effort is made to protect the student's privacy, especially during the occurrence of a seizure. School personnel having contact with the student need to be familiar with the student's medications and potential side effects, be able to recognize signs of seizure-related behavior, know what to do when signs are observed, and know how to implement the established school emergency plan.

Medications Currently Used to Treat Seizures

(This list includes only some of the most common medications available to treat seizures.) Additional medications to treat seizures may become available for use in the U.S. *as approved by the FDA* and as prescribed by the health care provider**.**

Generic Name	Brand Name	Seizure Type	Adverse Reactions
Carbamazepine	*Tegretol*	Secondary tonic/clonic Focal Impaired awareness Focal aware	Allergic reactions, dizziness, ataxia, poor muscle coordination, nausea, behavioral changes, blurred or double vision,

Generic Name	Brand Name	Seizure Type	Adverse Reactions
			aplastic anemia, hepatitis
Clonazepam	*Klonopin*	Absence Myoclonic Tonic/clonic	Sedation, hyperactivity, aggressiveness, slurred speech, double vision, ataxia, behavior changes, increased salivation
Ethosuximide	*Zarontin*	Absence	GI upset, loss of appetite, headache, lethargy, behavior changes, dizziness, dystonia, myelosuppression, drug-induced lupus
Felbamate—used only with caution and informed consent due to serious adverse reactions	*Felbatol*	Focal and generalized (reserved for severe epilepsy)	**Aplastic anemia, hepatic failure,** anorexia, weight loss, nausea, insomnia, headache, fatigue
Gabapentin	*Neurontin*	Focal	Somnolence, dizziness, ataxia, fatigue, weight gain
Lacosamide	*Vimpat*	Focal	Dizziness, headache, nausea, double vision
Lamotigine	*Lamictal*	Focal Tonic-clonic Absence Myoclonic	Somnolence, dizziness, rash, nausea, blurred vision, tremor
Levetiracetam	*Keppra*	Focal Myoclonic	Drowsiness, dizziness, behavioral problems
Phenobarbital	*Luminal*	Tonic-clonic	Sedation, hyperactivity, changes in sleep pattern,

Generic Name	Brand Name	Seizure Type	Adverse Reactions
		Focal Febrile	inattention, irritability, cognitive impairment
Phenytoin	*Dilantin*	Tonic-clonic Focal impaired awareness Focal aware	Gingival hyperplasia, hirsutism, nystagmus, blurred or double vision, ataxia, rashes, folate deficiency, drug-induced lupus, myelosuppression
Pregabalin	*Lyrica*	Focal	Blurred vision, dizziness, dry mouth, weight gain, sleepiness, swelling of hands and feet, trouble concentrating
Primidione	*Mysoline*	Tonic-clonic Focal impaired awareness Focal aware	Sedation, hyperactivity, ataxia, behavior changes, rare hematological and hypersensitivity reactions
Rufinamide	*Banzel*	Lennox-Gestaut Syndrome (also known as myoclonic-astatic epilepsy)	Allergic reactions, dizziness, drowsiness, headache, nausea, fatigue, vomiting, appetite changes, sore throat, blurred vision, tremor, blood in urine, behavior and mood changes, insomnia, suicidal thoughts
Tiagabine	*Gabatril*	Focal	Dizziness, somnolence, headache, depression

Generic Name	Brand Name	Seizure Type	Adverse Reactions
Topiramate	*Topamax*	Focal Tonic-clonic Atonic Myoclonic Absence	Somnolence, anorexia, fatigue, difficulty with concentration, nervousness
Valium	*Diastat (rectal)*	See next section for more information	Dizziness, headache, insomnia. sleepiness, blurred vision, vomiting, nausea diarrhea, tremors, appetite loss
Valproate Valproic acid	*Depakote* *Depakene* *Depacon (injection)*	Myoclonic Absence Tonic-clonic Mixed seizures types	Hair loss, tremor, elevated liver enzymes and liver failure, irregular menses, increased appetite, upset stomach, nausea and vomiting, pancreatitis thrombocytopenia

Other new drugs being used include Celontin (Methsuximide), Clobazam (Onfi), Mebaral (Mephobarbital), Peganone (Ethotoin), Sabril (Vigabatrin), and Tridione (Trinethaione). Many antiepileptic drugs are now available as once a day or twice a day dosing formulations.

Diet Therapy

In specific cases, students with seizures may be prescribed a ketogenic diet for treatment and control of seizures. Usually this diet is prescribed for students with poorly controlled seizures who cannot tolerate the side effects of antiepileptic medications.

The ketogenic diet is designed to create a state of *ketosis* which has been found to metabolically improve seizure control in certain cases. It is most often used for myoclonic seizures, but has been used for tonic-clonic and complex partial seizures. The diet is high in fats (80-90%) and low in carbohydrates and proteins. Consumption of this diet forces the body to use fats as the primary energy source instead of glucose and causes ketosis.

It is a carefully calculated diet and requires daily monitoring to maintain ketosis. A student a ketogenic diet is followed by a registered dietitian and has a prescribed meal plan to follow

daily. Coordination between the student's neurologist, dietitian, family, and school is recommended for the development of a successful individualized health care plan (IHP). Even a small amount of sugar can disrupt the diet so the food consumed by students on it must be monitored closely. The diet is low in vitamins and minerals so vitamin supplements are usually recommended.

Monitoring

The purpose of seizure monitoring is to protect the student from injury during a seizure, to carefully observe the seizure in order to provide information for the management of the seizure disorder, and to distinguish between behaviors related to a seizure and those behaviors not related to it.

Monitoring provides the health care provider with the information needed to better manage the student's medication. An increase in the number of seizures may indicate that the student needs a change in medication, or that he/she is not receiving the prescribed medication. Approximately 30% of all people with epilepsy seizures are never controlled and are referred to as drug resistant epilepsy. In addition, antiepileptic medication can be toxic. Therefore, any side effects from the medication should be documented and reported to the family and/or health care provider. Careful monitoring of the student can improve the management of seizures.

Service Animals

Check local school district policies on service animals in the classroom

Signs of an Emergency

Most seizures are self-limiting and are not medical emergencies. A series of consecutive seizures in which the student does not regain consciousness is called *status epilepticus*, and is a medical emergency. Immediate medical care is required. Many students will have rescue medication ordered for seizure emergencies. Seizures which last longer than 5 minutes require emergency medical services. Seizures lasting longer than 30 minutes can cause brain damage. Status epilepticus can lead to respiratory failure, brain damage, and death. Therefore, it is critical that the student receive immediate medical attention.

Managing a Seizure

Managing a seizure in school consists of protecting the student, observing the student, and getting medical assistance when needed. The procedures on the following pages are guidelines for managing a student having a seizure and what to do after the student has a seizure. Included in the guidelines is the First Aid Flow Chart for Seizures algorithm.

Individualized Health care Plan

Each student's IHP must be tailored to the individual's needs. A sample plan is included in Appendix A. When preparing an IHP for a student with seizures, the following items should be considered:

- Student's underlying condition and possible problems associated with the condition or treatment.
- Type of seizures student experiences and typical course of seizure.
- Student's baseline or normal behaviors.
- Health care provider's orders for medications and care.
- Whether student experiences auras, or can anticipate when seizures may occur.
- Behaviors that indicate a seizure may be about to occur.
- Actions to take if the student has a seizure.
- Medications the student is taking and signs of adverse reactions or toxicity.
- Who is to be notified when the student has a seizure.
- Determining the need for seizure precautions, and what these precautions will be.
- Guidelines for service animal, if prescribed.
- Latex allergy precautions.
- Standard precautions.

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Note:

Epilepsy 101 power point slides and videos are available at
https://www.aesnet.org/epilepsy_101

Procedure for Managing a Seizure

If a student has a seizure:

1. Remain calm.

   No one can stop a seizure once it starts. If the first person remains calm, it will help others stay calm too. Talk calmly and reassuringly during and after the seizure, which will help as the student recovers from the seizure.

2. Time the seizure. Document all of the student's activity during a seizure: time the seizure began, time the seizure ended, area of body where the seizure began, any movement of the seizure from one area of the body to another, type of movements of the head, face, and/or arms.

3. Check for medical alert I.D. and follow student's individualized health care plan (IHP) or seizure action plan. If applicable, provide seizure rescue treatment, if prescribed (medications, such as rectal diazepam, or treatments, such as a vagal nerve stimulator, which can be used as needed to stop clusters of seizures, seizures that last longer than usual, or seizures that occur at predictable times).

4. Have an adult stay with the student during the seizure to monitor his/her progress.

5. Put on gloves, if available.

6. If student is standing or sitting, gently lower student to the ground to avoid a fall. Clear the area of anything that could hurt the student. **Do not attempt to restrain student** or use force. If the student is wandering or confused, help steer him or her clear of unsafe situations.

   Restraining will not stop a seizure and can lead to injuries and make the student more confused and agitated, causing more injury. Do not remove the student from a wheelchair unless necessary.

7. Turn student on their side unless injury exists. If possible, put something flat and soft (like a folded blanket or jacket) under student's head so the student does not bang head against the floor.

   This positioning prevents the tongue from blocking airway and helps the student not to choke on secretions.

8. **Do not place anything in the student's mouth**.

   *Padded tongue blades and airways are not accepted practice because they may induce vomiting, cause potential damage to teeth, and may be aspirated. A person **cannot** "swallow their tongue."*

9. Loosen tight clothing, especially around the student's neck. Remove eyeglasses.

10. Do not give the student any oral medications or anything to drink during a seizure.

11. Provide emotional support. Keep additional, unneeded onlookers away.

    It can be embarrassing and confusing for a person to wake up to a crowd of people.

12. Call (911) Emergency Medical Services if:
    - Student stops breathing.
    - Seizure lasts more than 5 minutes or length of time stated by Seizure Action Plan.
    - This is student's first seizure.
    - Repeated seizures without regaining consciousness.
    - Student cannot be awakened and is unresponsive to pain after seizure ends.
    - Pupils are not equal in size after seizure.
    - There is evidence of student injury.
    - Student has diabetes or is pregnant.
    - Seizure occurs in water.
    - Parents request emergency evaluation.

Prepare school environment to be as safe as possible for the student who has a history of seizures.

Be aware of the potential for head injuries with uncontrolled seizures. The student may require a lightweight helmet for head protection, especially for seizures that produce sudden changes in muscle tone (atonic, myoclonic, akinetic). Prepare for potential problems associated with seizures. For example, if the student has copious secretions with a seizure, a bulb syringe or suction machine will need to be available.

Pathways and environments should be free of unnecessary objects. For example, unused toys, wheelchairs, storage boxes, etc. should be removed from the environment.

Supervision during use of hazardous machinery or equipment (such as that found in a shop class) should be available.

After a Student Has a Seizure:

1. After the seizure is over, clear secretions from the student's mouth with a bulb syringe or suction catheter. Keep student on his/her side.

   Do not try to clear the student's mouth until the seizure has ended.

2. Monitor student's breathing.

   Check position of head and tongue. Reposition if head is hyperextended. If student is not breathing, activate the school emergency plan and begin CPR.

3. Talk with student to determine student's level of awareness.

Seizure Care Plan

The seizure care plan defines all members of the team, communication guidelines (how, when, and how often), and all information necessary to support a child who may experience seizures while in child care.

Name of Child:_____ Date: _____

Facility Name: _____

Description of seizure condition/disorder: _____

_____

Describe what the child's seizures look like: (1) what part of the body is affected? (2) How long do the seizure episodes usually last?

_____

_____

Describe any know "triggers" (behaviors and/or symptoms) **for seizure activity**: _____

_____

Detail the frequency and duration of child's typical seizure activity: _____

Has the child been treated in the emergency room due to their seizures?_____How many times? _____

Has the child stayed overnight in the hospital due to their seizures?_____How many times? _____

Team Member Names and Titles (parents of the child are to be included)

Care Coordinator (responsible for developing and administering the Seizure Care Plan): _____

_____

_____

If training is necessary, then ALL team members will be trained.

Planned strategies to support the child's needs and safety issues when the child has a seizure:
(e.g., diapering/toileting, outdoor play, nap/sleeping, etc.) _____

_____

_____

o Individualized Family Service Plan **(IFSP)** attached. o Individualized Education Plan **(IEP)** attached.

PROBLEM	TREATMENT	EXPECTED RESPONSE
At risk for injury due to uncontrolled seizure activity.	If a seizure occurs, staff will remove objects from the area and place a folded towel/clothing beneath the child's head. Protective helmet is worn as prescribed.	Injuries related to seizure activity will be prevented.
At risk for aspiration of respiratory secretions or vomitus during seizure activity.	If a seizure occurs, staff will roll the child onto his/her side.	Child will not aspirate during seizure activity.
Self-esteem disturbance related to occurrence of seizure or use of protective helmet.	Provide many opportunities for success. Praise achievements and accomplishments. Provide opportunities for child to express feelings about seizures and any activity restrictions. Reassure the other children in the group that the child will be OK if a seizure occurs.	The child will successfully adapt to requirements of living with a seizure disorder. The child will demonstrate a positive attitude toward learning activities. Other children will feel safe.
Parent and child may not be aware of possible triggers.	Staff will document the occurrence of any seizure activity on attached *Seizure Activity Log*.	Parents, staff and the child will learn to identify triggers and how to avoid them.
Child may be very sleepy, but not unresponsive after a seizure occurs.	Staff will make sure that the child is responsive after a seizure, then will allow the child to sleep/rest after the seizure.	The child may safely sleep/rest, if needed, after seizure occurs.

Communication

What is the team's communication goal and how will it be achieved (e.g., notes, communication log, phone calls, meetings, etc.): _____

_____

How often will team communication occur: o **Daily** o **Weekly** o **Monthly** o **Bi-monthly**

Date and time specifics: _____

Other Professionals Involved **Telephone**

Health Care Provider (MD, NP, etc.): _____ _____

Occupational Therapist: _____ _____

Physical Therapist: _____ _____

Neurology Specialist: _____ _____

Other: _____ _____

Specific Medical Information

❖ Medical documentation provided & attached: o Yes o No

o **Information Exchange Form** completed by Health Care Provider on-file.

Any known allergies to food and/or medications: _____

❖ Medication to be administered: o Yes o No

o **Medication Administration Form** completed by Health Care Provider and parents is on file (including: type of medications, method, amount, time schedule, potential side effects, etc.)

Special Staff Training Needs

Type (be specific): _____

Training done by: _____ Date of Training: _____

Additional Information (include any unusual episodes/behavior changes that might arise while in care and how the situation should be handled)

_____

_____

_____

Support Program the Child is Involved With Outside of Child Care

Name of program: _____

Address and telephone: _____

Contact person: _____

Emergency Procedures

o *Special emergency and/or medical procedure required.* Emergency instructions: _____

_____

❖ Call 911 if: o Seizure lasts longer then_____minutes. o Child is unresponsive after seizure.

o Other: _____

Emergency contact: _____ Telephone: _____

Follow-up: Updates/Revisions

This *Seizure Care Plan* will be updated/revised whenever medications or child's health status changes, or at least every 12 months as a result of the collective input from team members.

Date for revision and team meeting: _____

Note if the student is alert, confused, drowsy, etc. and document findings.

If student remains unconscious after seizure is over, maintain open airway and assess breathing. If necessary, begin rescue breathing or CPR.

4. Determine and document whether or not the student is able to move arms and legs, or if there is change in the student's ability to move.
5. Check for injuries and provide care, if needed. If student remains unconscious after seizure is over, maintain open airway and continue to assess breathing. If necessary, start Rescue Breathing or CPR.
6. Check for loss of control of urine and stool, and for any injuries. Provide privacy.

   Loss of control is very embarrassing to the student. Clean the student to make him/her more comfortable.
7. **Remain with the student until he or she has regained full awareness** of his or her surroundings. Make the student comfortable; allow him/her to sleep as needed. Do not give food or liquids until fully alert and swallowing reflex has returned.

   After the seizure, the student may sleep for 30 minutes up to a number of hours (postictal period). Refer to the First Aid Flow Chart for Seizures to determine the disposition of the student post seizure.
8. Document the length of seizure, what happened during and after the seizure. Report if there is a change in the frequency or type of seizure activity.

   Notify school nurse, family and/or health care provider as designated in the IHP.

Resources for Learning to Manage Seizures:

The National Association for School Nurses, in partnership with the Epilepsy Foundation, has a video continuing education program available online for school nurses, *Managing Students with Seizures: School Nurse Training Program* at http://www.epilepsy.com/get-help/services-and-support/training-programs/managing-students-seizures-school-nurse-training.

The Epilepsy Foundation also has developed *Seizure Training for School Personnel* which is appropriate for teachers, bus drivers, instructional assistants, and other education staff. It can be accessed online or using a kit with a DVD, PowerPoint, and facilitator's guide, which can be ordered at *http://www.epilepsy.com/get-help/services-and-support/training-programs/seizure-training-school-personnel.* They also have another video *Seizure First Aid* available online at http://www.epilepsy.com/get-help/seizure-first-aid.

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Available online at: http://www.epilepsychicago.org/seizure-action-planning-

Seizure Observation Record

Student Name:				
Date & Time				
Seizure Length				
Pre-Seizure Observation (Briefly list behaviors, triggering events, activities)				
Conscious (yes/no/altered)				
Injuries? (briefly describe)				
Muscle Tone/Body Movements	Rigid/clenching			
	Limp			
	Fell down			
	Rocking			
	Wandering around			
	Whole body jerking			
Extremity Movements	(R) arm jerking			
	(L) arm jerking			
	(R) leg jerking			
	(L) leg jerking			
	Random Movement			
Color	Bluish			
	Pale			
	Flushed			
Eyes	Pupils dilated			
	Turned (R or L)			
	Rolled up			
	Staring or blinking (clarify)			
	Closed			
Mouth	Salivating			
	Chewing			
	Lip smacking			
Verbal Sounds (gagging, talking, throat clearing, etc.)				
Breathing (normal, labored, stopped, noisy, etc.)				
Incontinent (urine or feces)				
Post-Seizure Observation	Confused			
	Sleepy/tired			
	Headache			
	Speech slurring			
	Other			
Length to Orientation				
Parents Notified? (time of call)				
EMS Called? (call time & arrival time)				
Observer's Name				

Please put additional notes on back as necessary.

TIPS FOR SEIZURE OBSERVATION AND RECORDING

When watching a seizure, try to note what happens before, during and after the event. Write down what happened as soon as you can. Include as much information as possible about the following areas:

BEHAVIOR BEFORE THE SEIZURE – what was person doing at time of event, change in mood or behavior hours or days before, 'warning' or 'aura' shortly before event

WHEN EVENT OCCURS – date, time

POSSIBLE TRIGGERS OR FACTORS THAT MAY MAKE EVENT MORE LIKELY TO OCCUR

- ☐ Time of day or month
- ☐ Menstruation, pregnancy, changes in contraception or other hormonal treatment
- ☐ Missed, late, or changes in medicines
- ☐ Irregular sleep patterns, not enough sleep, other sleep problems
- ☐ Irregular eating patterns, specific foods
- ☐ During or after exercise or hyperventilation (fast breathing)
- ☐ Alcohol or other drug use
- ☐ Emotional stress, worry, excitement
- ☐ Sounds, flashing lights, bright sunlight
- ☐ Other illnesses or infections

WHAT HAPPENS DURING THE EVENT

- ☐ Change in awareness, alertness, confusion
- ☐ Ability to talk and understand
- ☐ Changes in thinking, remembering, emotions, perceptions
- ☐ Sensations – changes in seeing, hearing, smells, tastes, feelings
- ☐ Facial expression – staring, twitching, eye blinking or rolling, drooling
- ☐ Changes in muscle tone – body becomes stiff or limp
- ☐ Movements – jerking or twitching movements, unable to move, body turning, falls
- ☐ Automatic or repeated movements – lipsmacking, chewing, swallowing, picking at clothes, rubbing hands, tapping feet, dressing or undressing
- ☐ Walking, wandering, running
- ☐ Changes in color of skin, sweating, breathing
- ☐ Loss of urine or bowel control

PART OF BODY INVOLVED – where symptom started, spread to other areas, side of body (right, left or both)

WHAT HAPPENS AFTER EVENT

- ☐ Response to voice or touch
- ☐ Awareness of name, place, time
- ☐ Memory for events
- ☐ Ability to talk or communicate
- ☐ Weakness or numbness
- ☐ Changes in mood or how person acts
- ☐ Tired, need to sleep

HOW LONG IT LASTED - length of aura, seizure, after-effects or postictal phase, how long before person returns to normal activity.

Adapted with permission from the Comprehensive Epilepsy Center, Beth Israel Deaconess Medical Center, Boston, Massachusetts, 2006.

EPILEPSY FOUNDATION®
Not another moment lost to seizures

Seizure Action Plan

Effective Date

This student is being treated for a seizure disorder. The information below should assist you if a seizure occurs during school hours.

Student's Name | Date of Birth

Parent/Guardian | Phone

Other Emergency Contact | Phone

Treating Physician | Phone

Significant Medical History

Seizure Information

Seizure type	Length	Frequency	Description

Seizure triggers or warning signs:

Student's response after a seizure:

Basic First Aid Care Comfort

Please describe basic first aid procedures:

Emergency response

A "seizure emergency" for this student is defined as:

Does student need to leave the classroom after a seizure? ❒ Yes ❒ No

If YES, describe process for returning student to classroom:

Seizure Emergency Protocol
(Check all that apply and clarify below)

- ❒ Contact school nurse at _____
- ❒ Call 911 for transport to _____
- ❒ Notify parent or emergency contact
- ❒ Administer emergency medications as indicated below
- ❒ Notify doctor
- ❒ Other _____

Basic Seizure First Aid

- Stay calm & track time
- Keep child safe
- Do not restrain
- Do not put anything in mouth
- Stay with child until fully conscious
- Record seizure in log

For tonic-clonic seizure

- Protect head
- Keep airway open/watch breathing
- Turn child on side

A seizure is generally considered an emergency when

- Convulsive (tonic-clonic) seizure lasts longer than 5 minutes
- Student has repeated seizures without regaining consciousness
- Student is injured or has diabetes
- Student has a first-time seizure
- Student has breathing difficulties
- Student has a seizure in water

Treatment Protocol During School Hours include daily and emergency medications

Emerg. Med. ✓	Medication	Dosage Time of Day Given	Common Side Effects Special Instructions

Does student have a **Vagus Nerve Stimulator** ❒ Yes ❒ No If YES, describe magnet use:

Special Considerations and Precautions regarding school activities, sports, trips, etc.

Describe any special considerations or precautions:

Physician Signature _____ **Date** _____

Parent/Guardian Signature _____ **Date** _____

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First Aid for Seizures

It is most important to protect a person from harm during a seizure. Here are some tips:

What to do during a Generalized Tonic Clonic Seizure (Grand Mal Seizure)

- ☑ Stay calm and keep track of time.
- ☑ Look for medical identification.
- ☑ Protect from nearby hazards.
- ☑ Loosen any tight clothing, like tie or collar.
- ☑ Cushion head to protect from injury.
- ☑ Turn on side to keep airway clear unless injury exists. Reassure as consciousness returns.
- ☑ If single seizure lasted less than 5 minutes, ask if hospital evaluation wanted.
- ☑ If multiple seizures, or if one seizure lasts longer than 5 minutes, call an ambulance.
- ☑ Stay with person until he/she regains consciousness.

What NOT to do during a seizure

- ☒ Do NOT put anything in a person's mouth during a seizure. This could injure their jaw and gums or break their teeth.
- ☒ Do NOT hold them down or restrain them.
- ☒ Do NOT attempt to give them oral medication or anything to drink during a seizures.
- ☒ Do NOT try to "shake the person out of it".

What to do during a Complex Partial (Psychomotor or Temporal Lobe Seizure)

- ☑ Speak calmly and reassuringly to person having the seizure and to others around them.
- ☑ Guide gently away from obvious hazards.
- ☑ Stay with person until completely aware of environment.
- ☑ Offer to help afterwards, including helping them to get home.

What to do during Myoclonic Seizures

- ☑ No first aid is needed, but the person should be given a thorough medical evaluation.

When is a Seizure an Emergency?

- ☑ First time seizure (no known history of seizures).
- ☑ Convulsive seizure lasts more than 5 minutes.
- ☑ Person is having repeated seizures without regaining consciousness.
- ☑ There has been a change in frequency or type of seizure activity.
- ☑ Person is injured, has diabetes or is pregnant.
- ☑ Normal breathing doesn't resume.
- ☑ Seizure occurs in water.

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Available online at: http://end-epilepsy.org/pdf/2014-09-07/8-Seizure%20First%20Aid.pdf

General Information for Students Who May Have a Seizure

Date: _____

To: _____

(Teachers, Instructional assistants, Bus drivers, etc.)

Name of Student: _____

This student has had seizures in the past. He or she may be taking medications to prevent a seizure from occurring again. A *seizure* is an event in which there is a temporary change in behavior resulting from a sudden, abnormal burst of electrical activity in the brain.

Most students who experience seizures are able to participate in regular school activities. Some students may be able to anticipate when they are getting ready to have a seizure. If a seizure is noted, or if the student tells you that a seizure is about to occur, remain calm and contact the school nurse, family, or designated contact person. Some students may have a service dog which can warn them of an impending seizure.

Seizures usually last less than 5 minutes. Call for help, but do not leave the student. Do **NOT** try to put anything in the student's mouth during a seizure. If student is standing or sitting, gently lower student to the ground to avoid a fall. Place student on side or stomach. Monitor the student's ability to breathe and remove hard objects that might accidentally be hit.

This student should have an Emergency Action Care Plan and **all staff** that has contact with this student should be familiar with how to initiate the plan. Any unusual behaviors or seizure activity should be reported to the school nurse and family.

Additional training for staff can be found in the Seizure Training for School Personnel guide at www.epilepsy.com website and specific information and video for bus drivers can be found on YouTube at https://www.youtube.com/watch?v=_I6UKZOelXk.

Please contact_____at_____(phone number) for additional information or if the student experiences any problems with seizures.

Rectal Diazepam for Seizures

E*pilepsy* is a chronic condition that is characterized by recurrent seizures. A *seizure* is an event in which there is a temporary change in behavior resulting from a sudden, abnormal burst of electrical activity in the brain. Many students with epilepsy have more than one seizure type and may have other symptoms as well. Some students continue to experience seizures despite medical treatment. Acute prolonged or repetitive seizures are detrimental to a student's health.

Studies show that rectal diazepam can be a safe and effective treatment for acute repetitive or prolonged seizures. Although intravenous diazepam can produce serious respiratory depression, published studies of rectal diazepam have found no instances of serious respiratory depression. The most common side effect of rectal diazepam is sleepiness. Other side effects that have been reported include dizziness, headache, poor coordination, pain, nervousness, slowed speech, diarrhea, and rash. The greatest incidence of side effects is when more than one dose is given.

Rectal diazepam is available as a rectal gel. The most commonly prescribed form is Diastat®, a rectal gel that comes pre-packaged as a quick delivery set in a syringe with a flexible, molded tip. Diastat Acudial 10 mg or 20 mg syringes are dialed and locked to the prescribed dose. A 2.5 mg Diastat syringe is also available. It can be stored for three years at room temperature.

Settings and Staff

The need to give rectal diazepam can occur anywhere. Measures should be taken to protect the privacy of the student as much as possible. Students who may require rectal diazepam on the bus should have an adult aide available on the bus. Guidelines regarding where and how diazepam can be administered should be covered in the student's individualized health care plan (IHP).

Rectal diazepam can be administered by a registered nurse, licensed practical nurse, or other adult with **specialized** training in appropriate techniques and problem management. Guidelines regarding who can administer rectal diazepam should be included in the student's health care plan. It has been approved by the U.S. Food and Drug Administration for use by family members or other non-medical caregivers. These persons should also have training in cardiopulmonary resuscitation. Any school personnel who has regular contact with a student who requires rectal diazepam should receive **general** training covering the student's specific needs, potential problems and implementation of the established school emergency plan.

Individualized Health care Plan

Each student's IHP must be tailored to the individual's needs. A sample plan is included in Appendix A. When preparing an IHP for a student who requires rectal diazepam for seizures, the following items should be considered:

- Must have parental consent
- Details of events which would necessitate the administration of rectal diazepam
- Need to call 911 and activate the emergency plan when rectal diazepam is given
- Health care provider's order for rectal diazepam
- Student's underlying condition and possible problems associated with the condition or treatment
- Type of seizures student experiences and typical course of seizure
- Actions to take when the student has a seizure
- Side effects to monitor
- What to do if respiratory depression is noted
- Student's baseline or normal behaviors
- Whether student experiences auras, or can anticipate when seizures may occur
- Behaviors that indicate a seizure may be about to occur
- Other medications the student is taking and signs of adverse reactions or toxicity
- Who is to be notified when the student has a seizure
- Latex allergy precautions
- Standard precautions

Sources:

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Procedure for Administering Rectal Diazepam

Note: Equipment, medication and supplies provided by parents.

1. Review procedure prior to having to implement it
2. Verify the medication order--including dosage, and circumstances under which rectal diazepam should be administered
3. Put on gloves
4. Obtain assistance of another adult, if possible. **Ensure student privacy during administration**
5. **Call 911 and activate the emergency plan**

   911 must be called and the emergency plan activated whenever rectal diazepam is given by school personnel
6. Remove protective cover from the medication syringe and lubricate the rectal tip with lubricating jelly (comes with syringe)
7. Turn the student on his or her side (left side preferable) facing you. Bend the upper leg forward and separate the buttocks to expose the rectum. Place soft item under head, if possible
8. If using Diastat© Acudial syringe, make sure that dose display window indicates prescribed dose and that green "ready ban" is visible
9. Separate the buttocks and gently insert the syringe tip into the rectum. The rim should be snug against the rectal opening. Slowly count to three while gently pushing in the plunger. Count to three again before removing the syringe. Hold the buttocks together while counting to three one more time to prevent leakage. ***Rim should be snug against rectal opening***
10. Keep the student on his/her side facing you and note the time the medication was given.
11. Keep the student on his or her side and observe for side effects. Monitor respiratory status throughout the seizures and afterwards.

    Respiratory depression can be a consequence of a seizure and/or of seizure medications.
12. Remove gloves and wash hands when appropriate.
13. Document the administration of diazepam, student's response, and implementation of the school emergency plan. Dispose of rectal syringe according to package insert instructions. Make sure someone remains with the student to observe for side effects and seizure activity.

Sources:

Epilepsy Foundation. (2015). *Epilepsy*. Available online: http://www.epilepsy.com/learn/about-epilepsy-basics

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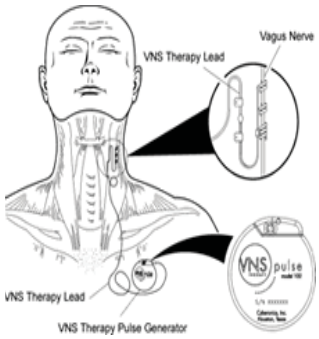
Vagal Nerve Stimulation for Seizures

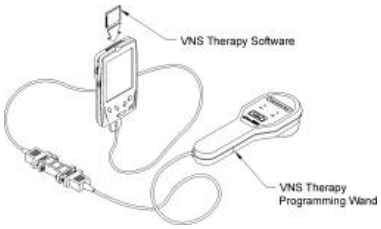
E*pilepsy* is a chronic condition that is characterized by recurrent seizures. A *seizure* is an event in which there is a temporary change in behavior resulting from a sudden, abnormal burst of electrical activity in the brain. Many students with epilepsy have more than one seizure type and may have other symptoms as well. Some students continue to experience seizures despite medical treatment. Acute prolonged or repetitive seizures are detrimental to a student's health.



Vagal nerve stimulation (VNS) has been found to reduce the frequency and intensity of some seizures. It involves the insertion of a device similar to a pacemaker under the skin on the left side of the chest. This vagal nerve stimulator sends intermittent electrical signals to the brain by stimulating the left vagus nerve in the neck. The vagus nerve is one of the cranial nerves (X) that controls the muscles responsible for swallowing, coughing and voice sounds. It is not fully understood how VNS works, but the theory is that the stimulation alters nerve pathways that lead to a seizure. Benefits of VNS are not always apparent immediately. Seizure activity may improve immediately, or it may improve over a two-year time period.

The vagal nerve stimulator works in two ways. It is automatically programmed to deliver stimulation; typically the stimulator activates "on" for 30 seconds once every 5 minutes, but has many other settings set by the health care provider. It can also be activated to give extra stimulations manually between pre-programmed stimulations by placing a magnet over the stimulator and then removing the magnet. A newer VNS device, AspireSR has been designed to detect possible seizure activity and can automatically deliver additional stimulation when it detects a rapid heart rate rise, an indication of an impending seizure in 82% of patients with epilepsy.

VNS is FDA approved for children and adults 12 years of age and older, but is used in many young children.



The VNS system consists of a pulse *generator* which is battery-operated and looks much like a pacemaker implanted under the skin of the chest. Programming of the generator is accomplished with a wand attached to a computer. A strong magnet can also be used to activate the VNS on demand if the student senses that a seizure is about to occur or has just started. In addition, the magnet can temporarily suspend activity of the VNS if activation of the VNS affects normal eating, speaking, or singing. Portable magnets can be carried or worn by students.

The most common side effects of VNS are hoarseness and tingling or pain in the throat or neck. Cough, headache, and ear pain have also been reported. Side effects tend to diminish over time. Equipment that could interfere with the stimulator should be avoided. This includes strong magnets, MRI scanners, hair clippers, computers, and loudspeaker magnets. Areas which display pacemaker warning signs should also be avoided. The additional handheld magnets supplied for manual stimulation of the system can damage credit cards, and cell phones.

Settings and Staff

The VNS system delivers stimulation on a regular, ongoing basis. The need for additional VNS to prevent a seizure can occur anywhere. Measures should be taken to protect the privacy of the student.

VNS can be administered by the student or by an adult with training in appropriate VNS techniques and problem management. Any school personnel who has regular contact with a student who requires VNS should receive general training covering the student's specific needs, potential problems and implementation of the established emergency plan. This training should include what to do when a seizure occurs and how and when to activate VNS.

Individualized Health care Plan

Each student's IHP must be tailored to the individual's needs. A sample plan is included in Appendix A. When preparing an IHP for a student who might require vagal nerve stimulation, the following items should be considered:

- Student's underlying condition and possible problems associated with the condition or treatment.
- Type of seizures student experiences and typical course of seizure
- Whether student experiences auras, or can anticipate when seizures are about to occur
- Behaviors that indicate a seizure may be about to occur
- Actions to take when the student has a seizure
- When and how to use VNS magnets
- When to check Pulse Generator battery
- Side effects to monitor
- Student's baseline or normal behaviors.
- Other medications the student is taking and signs of adverse reactions or toxicity
- Standard precautions

Sources:

Oklahoma Guidelines for Healthcare Procedures
i

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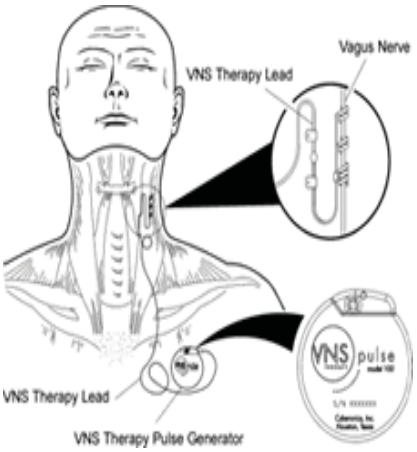
U.S. Food and Drug Administration. (2013). *For Vagus Nerve Stimulation with the VNS Therapy System*. Accessed July 25, 2015 online: http://www.fda.gov/ohrms/dockets/ac/04/briefing/4047b1_05_Depression%20Patient's%20Manual.htm

Procedure for Activating Vagal Nerve Stimulation

Note: Equipment and supplies provided by parents/guardians.

1. Review literature that comes with the vagal nerve stimulator
2. Student or trained caregiver should keep magnet with student at all times. The watch-style magnet attaches to the wrist with a wristband. The pager-style magnet comes with a belt clip so that the magnet and clip can be removed as a unit from the belt without coming apart. Always keep magnets at least 10 inches away from tablet computers, credit cards, televisions, computers, microwave ovens, watches, or other magnets



3. If student senses a seizure is about to occur, place the magnet over the Pulse Generator site for one second and then move it away. This will cause the VNS system to deliver extra stimulation. This can be done by the student or by any adult trained in using VNS

   To use the pager-style magnet, remove the belt clip and magnet from the belt and place the label against the Pulse Generator. To use the watch-style magnet, position the wrist so that the label can be placed over the generator.

4. To temporarily stop stimulation (turn "off" the Pulse Generator) when student needs to sing or speak in public, while eating, or if stimulation is ever painful, put the magnet over the Pulse Generator and leave it there. The Pulse Generator will not stimulate while the magnet is in place over top of it, but it will start when the magnet is removed. The magnet should not be used for more than four hours in a row because it can decrease the Pulse Generator battery.
5. Check the pulse generator battery on a regular basis. Pass the magnet over the Pulse Generator for one second to see if it causes stimulation and is working.
6. If stimulation ever hurts, hold the magnet in place to stop stimulation and contact school nurse, family, and health care provider immediately.
7. If student complains, of sore throat, hoarseness, or any other problems with the VNS, document in student log and notify the school nurse and family.

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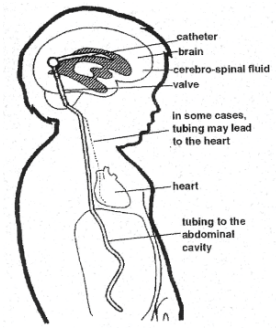
Ventricular Shunt

Overview

A ventricular shunt is a method of treatment for hydrocephalus, excess cerebrospinal fluid in the ventricles of the brain. A ventricular shunt is surgically placed to drain the excess fluid from the ventricles in the brain into another part of the body. The most common type is the ventriculoperitoneal shunt (VP-shunt), which drains fluid from the ventricles of the brain to the peritoneal (abdominal) cavity. A ventriculoatrial shunt (VA-shunt) drains the excess fluid to the right chamber of the heart, the right atrium.



Students who have a shunt need routine monitoring to ensure the proper functioning of the shunt. Shunts can become infected, obstructed, disconnected, or kinked. If the shunt malfunctions, cerebrospinal fluid does not drain properly and the student with hydrocephalus can develop increased intracranial pressure and possible brain damage. Shunt malfunctions can be detected by a change in behavior, headache, irritability, vomiting, and/or difficulties with coordination. Shunt monitoring involves watching for behaviors that may indicate the shunt is not functioning. The family is the best source of information with regards to what signs the student is most likely to exhibit when the shunt is not functioning properly. Any such signs should be reported to the school nurse, family and/or health care provider immediately.

Settings and Staff

Students with a shunt can attend a regular classroom. Many students with a shunt are able to participate in regular school activities, with modifications determined by the family, health care provider, school nurse, and school staff. Activities that may result in damage to the shunt, such as contact sports, may be restricted.

Monitoring of a ventricular shunt may be performed by the school nurse, family, teacher aide, or other staff person who has training in monitoring the shunt of the student. General training should cover the student's specific health care needs, signs of increased intracranial pressure, potential problems, and how to implement the established emergency plan.

Individualized Health care Plan

Each student's IHP must be tailored to the individual's needs. A sample plan is included in Appendix A. When preparing an IHP for a student with a ventricular shunt, the following items should be considered:

Student's underlying condition and possible problems associated with the condition or treatment

- Student's baseline or normal behaviors
- Behaviors that indicate that there may be a malfunction of the shunt. The family can usually describe which behaviors are specifically indicative of shunt malfunction in their child
- Symptoms and behaviors which should be reported to the school nurse and family
- Medications the student is taking and signs of adverse reactions or toxicity
- Health Care Providers orders regarding shunt and monitoring
- Determination of the need for seizure precautions
- Latex allergy precautions
- Standard precautions

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Illustration sources:

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Procedure for Monitoring a Ventricular Shunt

1. Document observations of the student's:
   - Behavior
   - Level of activity
   - Response to, and awareness of, the environment
   - Coordination

   Using knowledge of the student's usual behavior can help staff discriminate between usual and unusual behavior.
2. Obtain baseline measurements of student's vital signs, especially blood pressure and pulse rate.
3. Document any signs of shunt malfunction or signs of infection in the school health record or student's log. Alert school nurse and family of any changes or concerns.

   See below for signs of shunt malfunction or infection.

Possible Problems with Ventricular Shunts

- **Signs of Increased Intracranial Pressure**
  - Headache
  - Nausea
  - Vomiting
  - Double vision or blurred vision
  - Irritability or restlessness
  - Personality change
  - Lethargy or drowsiness
  - Inability to follow simple commands
  - Decreased orientation to time and place
  - Seizures

When a shunt malfunctions, the fluid in the ventricles builds up, resulting in increased intracranial pressure (increased pressure in the brain). School personnel who are uncertain of their observations should consult with the school nurse and/or family to determine if the health care provider should be notified.

It is **important** that the school staff learn what normal behavior is for the individual student and what behaviors indicate the presence of increased intracranial pressure. Seizures must be monitored by the school staff and treated appropriately. (See section on Seizures in this manual).

- **Persistent Increased Pressure**

If the pressure continues to increase in the ventricles, the student's pupils (the dark area in the center of the eye) may become smaller and react very slowly to light. If the pressure continues to increase, the student may complain of increased headache and the student's pupils may enlarge and become fixed when exposed to light. The pulse may decrease, breathing may become irregular, and eventually, death may occur.

The physician may determine that the valve of the shunt must be pumped to reduce intracranial pressure. **The risks involved with the pumping of the shunt are great**. If too much cerebrospinal fluid is removed, there is a resulting decrease in the amount of pressure in the brain. The ventricles may collapse inward, resulting in additional brain damage. **This procedure should never be done in a school setting by non-physician school staff.**

- **Signs of shunt infection**
  - Nausea
  - Vomiting
  - Headache
  - Lethargy
  - Fever
  - Feeding problems

Any signs of shunt infection should be reported to the school nurse, family and/or health care provider. A shunt infection requires administration of antibiotics. The shunt may need to be replaced if the infection is not treated successfully.

Sources:

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General Information for Students with Ventricular Shunts

Date: _____

To: _____
(Teachers, Instructional assistants, Bus drivers, etc)

Name of Student: _____

This student has a ventricular shunt used to drain excess fluid from the brain. The shunt is under the skin and is not visible except for a slight bulge.

Most students with ventricular shunts are able to participate in regular school activities, but may need to avoid contact sports. Blows to the head should be avoided. If a blow to the head occurs, the school nurse and family should be notified and the student should be observed closely for any changes in behavior.

Any other changes in behavior should be reported to the school nurse and family.

Contact_____at_____(phone number) for additional information or if the student experiences any problems with the ventricular shunt.

Source: Adapted from: Porter, S, Haynie, M, Bierle, T, Caldwell, TH, & Palfrey, JS (Eds.). (1997). *Children and youth assisted by medical technology in educational settings: Guidelines for care* (2nd ed.). Baltimore: Paul H. Brookes Publishing.