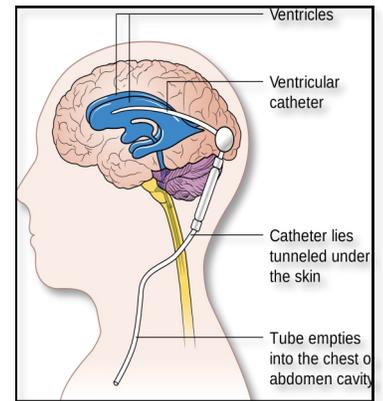


SHUNT

What is it?

A shunt is an implanted device used to drain extra cerebral spinal fluid (CSF) that circulates around the brain and spine. It is most often used to treat a condition known as hydrocephalus. Without a release of excessive fluid, pressure in the brain will increase and cause damage. Congenital hydrocephalus exists at birth while acquired hydrocephalus is the result of a problem after birth such as prematurity, hemorrhage, infection, cysts, brain tumor, and trauma.

During surgical placement of a shunt, a pressure responding catheter is implanted in the lateral ventricle which extends to its distal location. The shunt is named for the specific organs involved. Most often, shunts are placed in the lateral brain ventricle and drain to the abdomen; known as the ventriculoperitoneal (VP) shunt. Drainage into the chest is known as a ventriculopleural shunt and into the heart is known as a ventriculoatrial shunt. Shunt tubing can often be palpated behind the child's ear and down along the neck. Shunts can be programmable and the healthcare provider can adjust how much fluid will be drained from the brain ventricle and reabsorbed by the body.



What are the complications?

Shunt complications can occur on either the ventricular or distal catheter and include obstruction, infection, and equipment malfunction (i.e. kinked tubing). A shunt can become obstructed by blood cells or tissue causing a blockage of flow. On the contrary, a shunt can also drain too quickly. Over-drainage can cause the ventricles to collapse, tearing blood vessels and causing headache or further complications. As a foreign object within the body, a shunt can cause infection. A VP shunt is most at risk for an infection secondary to an abdominal infection. However, VP shunt complications are often less severe. Shunt complications can be serious and life threatening and a student should be referred for immediate medical treatment if a shunt complication is suspected.

Signs and symptoms of shunt malfunction	Headache, nausea, vomiting, irritability, changes in vision, lethargy Poor coordination, decrease in sensory or motor function, worsening gait or balance Deterioration in school performance, personality changes Swelling along the shunt tract
Signs and symptoms of infection	Fever, chills Neck stiffness, tenderness, pain, Redness or drainage at healing site

Precautions to consider

According to *Memorial Sloan Kettering Cancer Center (2015)*:

- Keep all products with magnets at least 2 inches away from the valve implant site
- Do not use magnetic therapy pads and pillows
- Do not use the iPad 2 if you have a Medtronic Strata® programmable VP shunt
- Do not use audio headsets without checking the shunt manufacturer's guidelines
- MRI precautions



Kennedy Krieger Institute

The Specialized Health Needs Interagency Collaboration (SHNIC) program is a collaborative partnership between the Kennedy Krieger Institute and the Maryland State Department of Education.

Suggested school accommodations

Once the shunt has been placed, short and long term effects on the brain still exist because of pressure on the brain. Often these children experience some degree of learning difficulty including issues with abstract concepts, retrieving stored information and spatial/perception disorders. They can also have poor motor coordination making them appear clumsy as well as poor fine motor skills that can affect handwriting, use of scissors, etc. Supporting students with this medical device in the school requires educators and parents/guardian to work as a team. Some accommodations to consider for a 504/IEP could include:

- PT/OT/Speech consult to identify needs
- Monitoring for visual impairment
- Use of assistive technology
- Offering clear, concise directions
- Providing clear schedules
- Allowing extended time for response
- Use of discussion rather than lecture
- Staff education/training as appropriate
- Emergency Evacuation Plan (EEP)

Specific health issues for Individualized Healthcare Plan

- Diagnosis including type and location of shunt
- Documented shunt settings
- Date of last appointment to have shunt checked, how frequent are checks
- Child specific signs and symptoms of increased intracranial pressure
- Safety restrictions or precautions per manufactures guidelines
- Physical activity and positioning restrictions
- Physical education and contact sports limitations (i.e. rope climbing)
- Communicate with family any concerns about field trips (i.e. amusement parks)
- Orders for orthotics or braces
- Orders for bowel and bladder program, if applicable
- Communicate with school staff, parents, and provider any changes or concerns about the student's disease or device
- Medical device information (see SHNICs "Medical Device Information Guide")
- Consideration of team discussion for a possible 504/IEP and Emergency Evacuation Plan
- Emergency Care Plan (ECP) related to medical needs in the school setting and staff education/training as appropriate for each

Resources & Manuals

Kennedy Krieger Institute— Programs and Services at the Philip A. Keelty Center for Spina Bifida and Related Conditions

<https://www.kennedykrieger.org/patient-care/centers-and-programs/center-for-spina-bifida-and-related-conditions/programs-and-services>

Hydrocephalus Association

<https://www.hydroassoc.org/>

Memorial Sloan Kettering Cancer Center

<https://www.mskcc.org/cancer-care/patient-education/about-your-programmable-vp-shunt-pediatric-patients>

A Teachers Guide to Hydrocephalus

http://www.hydroassoc.org/docs/A_Teachers_Guide_to_Hydrocephalus.pdf