



Severe Traumatic Brain Injury

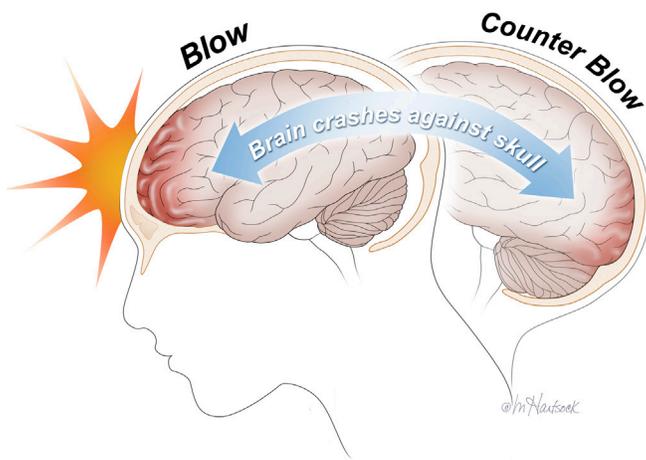
NEUROTRAUMA CENTER

Severe Traumatic Brain Injury

What is traumatic brain injury?

Traumatic Brain Injury (TBI) is any injury that results from a blow or jolt to the head from blunt or penetrating trauma. TBI can be the result of any blunt head injury, but common causes include falls, sports injuries, vehicle accidents and assault. There are different degrees of head injury ranging from a mild concussion to severe traumatic brain injury. The information in this guide is related to severe injuries.

The initial injury is known as the primary injury. Primary injuries can affect the entire brain or a specific section.



The initial injury occurs at the time of impact. Your loved one will be watched carefully over the next several days after the initial injury for signs of secondary injury. Secondary injury is the swelling that happens within the brain as a result of the initial injury. This is a risk for several days after the injury and the patient will generally be monitored closely in a hospital setting during this period of time.

Neurologic Surgery Terms

Surgery is sometimes necessary to repair skull fractures, repair bleeding vessels or remove large blood clots.

- **Craniotomy** is a procedure that involves removing a section of skull bone in order to access the brain. After the intended procedure is completed the bone is put back on and secured in place.
- **Craniectomy** is the removal of a portion of the skull bone to allow room for the brain to swell. This procedure is typically done when a patient has a large amount of damage to an area of the brain and the swelling becomes life-threatening. The bone will be removed in the operating

room and frozen. It will be safely stored in a freezer. The swelling will slowly decrease over the next few weeks to months. Patients will require the use of a helmet for protection while the bone is out. The patient will be discharged to a facility for recovery and then return to the hospital to have the bone replaced in a procedure called a **cranioplasty**.

- **Neuromonitoring** is a procedure that involves placing a probe in the brain to measure brain pressure. This is done to help prevent and treat brain swelling.

Recovery & Prevention

The recovery process varies by patient depending on the severity of the injury, but typically progresses through three stages: coma, confusion/amnesia and recovery.

Your loved one may be different from the way they were before injury. There are resources available to help you cope. Please visit our website for a list of local TBI support groups.

The Family's Role

Family members often express feelings of helplessness when their loved one is in the neuroscience intensive care unit (NSICU). You are not alone. Please take care of yourself and use your energy wisely. Once your loved one is discharged from the hospital, you will be able to make the biggest impact on their recovery.

- During the most critical period following the injury, too much stimulation can cause increased brain pressure. During the day, spend time with your loved one. Offer calming reassurance and gentle touch. Support the nursing and medical staff's care. As your loved one becomes less critical, bring in pictures and small items that can help with memory. Once at rehab or in a skilled nursing environment, easy games can help with memory and cognition. Allow time for you and your loved one to rest at night. Meaningful nighttime rest will help with participation in activities during the daytime.
- Sharing your loved one's journey can help you see the support and love from the community outside the hospital or rehab facility. Please see our website for helpful resources and support group information.

Levels of Care for Recovery:

Patients are discharged from the hospital when their condition has stabilized and they no longer require intensive care. At this point they can be safely monitored in an environment for long-term care. This means your loved one no longer requires hourly attention from the nursing and physician staff. Depending on the patients' needs and abilities, it may be appropriate for them to go to a long-term acute care, acute inpatient rehabilitation or skilled nursing facility. See below for descriptions of each:

- A long-term acute care (LTAC) facility is a place for patients who have stabilized from their initial head injury, but still require a ventilator or frequent nursing care. Many patients are discharged to an LTAC after their injury to continue being weaned from the ventilator or breathing machine. Once off the ventilator, they can be moved to a rehabilitation or skilled nursing facility where they will continue their recovery.
- Rehabilitation facilities are places for patients who do not require a ventilator, but still require help with basic daily activities. Physical, occupational and speech therapists work with patients to help them achieve their maximum potential for recovery. Rehab facilities are either an Acute Patient Rehab that require three or more hours of rehab a day, or a Skilled Nursing Facility (SNF) that will provide one to three hours of rehab a day. This depends on what patients can tolerate and their other medical needs at the time of discharge.

All members of the health care team are here to help during your loved one's recovery. You are welcome to ask questions at any time for an explanation specific to your family member's injury. Our team is invested in providing the highest quality care to all of our patients and their families.

Head Injury Prevention Tips

Please follow these simple tips to reduce the risk of head injuries:

- Always wear your helmet when riding a bicycle, motorcycle, skateboard or all-terrain vehicle.
- Never drive under the influence of alcohol or drugs.
- Always wear your seatbelt and ensure that children are secured in the appropriate child safety seats.

- Avoid falls in the home by keeping unsecured items off the floor, installing safety features such as non-slip mats in the bathtub, handrails on stairways and keeping items off the stairs.
- Avoid falls by participating in an exercise program to increase strength, balance and coordination.
- Store firearms in a locked cabinet with bullets in a separate location.
- Wear protective headgear while playing sports.

Resources

UCHealth.com/neurotrauma

Books and Online Resource Guides:

- Traumatic Brain Injury Survival Guide (tbiguide.com)
- Injury Prevention and Control: Traumatic Brain Injury (cdc.gov/TraumaticBrainInjury/index.html)
- [A Guide to Traumatic Brain Injury: The Intensive Care Unit](https://pathlms.com/ncs-ondemand/courses/1282) (pathlms.com/ncs-ondemand/courses/1282)

Organizations:

- The Brain Injury Association
 - www.biak.us
 - www.biaoh.org
 - www.biaindiana.org
 - www.biausa.org
- Family Caregiver Alliance
 - www.caregiver.org

Sources:

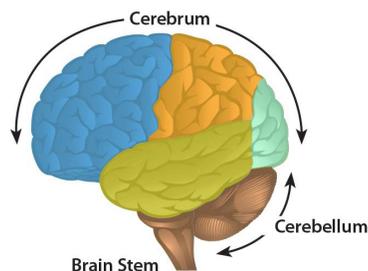
1. Brain Trauma Foundation: Guidelines for the Management of Severe Traumatic Brain Injury. 4th Edition. 2016 braintrauma.org/coma/guidelines
2. Johnson G. Traumatic Brain Injury Survival Guide, 2004. tbiguide.com

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This information is not intended as a substitute for professional medical care. Always follow your healthcare professional's instructions.

IMPACT OF A BRAIN INJURY



KEY

- Frontal lobe
- Parietal lobe
- Occipital lobe
- Temporal lobe

HEALTHY BRAIN	INJURED BRAIN
Frontal lobe	
Personality and emotions	Changes in social behavior and personality
	Mood swings, irritability, impulsiveness
Intelligence	Repetition of a single thought
Attention and concentration	Unable to focus on a task
Judgment	Impaired judgment
Body movement (motor strip)	Loss of movement (paralysis)
Problem solving	Difficulty with problem solving
Speech (speaking & writing)	Difficulty with language; can't get the words out (aphasia)
Sense of smell	Loss of smell
	Loss of appetite
Parietal lobe	
Sense of touch, pain and temperature (sensory strip)	Lack of awareness or neglect of certain body parts
Distinguishing size, shape and color	Difficulty distinguishing left from right
Spatial perception	Difficulties with hand-eye coordination
Visual perception	Problems with reading, writing, drawing and naming
	Difficulty with mathematics
Occipital lobe	
Vision	Defects in vision or blind spots
	Blurred vision
	Visual illusions/hallucinations
	Difficulty reading and writing
Temporal lobe	
Speech (understanding language)	Difficulty understanding language and speaking (aphasia)
Memory	Difficulty recognizing faces
Hearing	Difficulty identifying/naming objects
Sequencing	Problems with short-term and long-term memory
Organization	Changes in sexual behavior
	Increase in aggressive behavior
Cerebellum	
Balance	Difficulty walking
Coordination	Difficulty coordinating fine movements
	Tremors
	Dizziness (vertigo)
	Slurred speech
Brainstem	
Breathing	Changes in breathing
Heart rate	Difficulty swallowing food and water (dysphagia)
Alertness and consciousness	Problems with balance and movement
	Dizziness and nausea (vertigo)