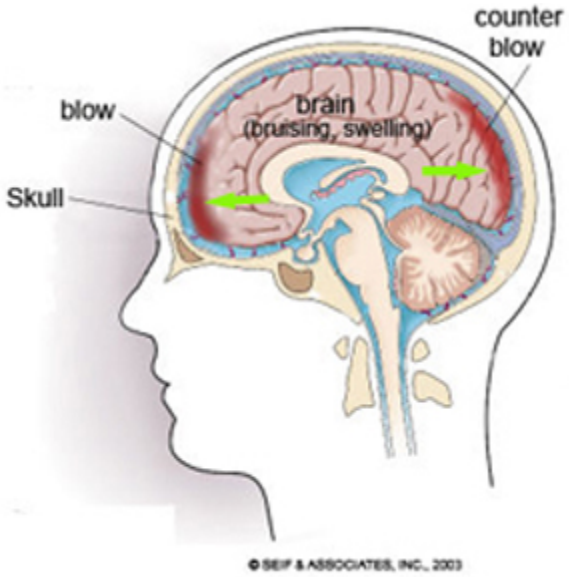
Brain Injuries

There are many changes that can result from brain injury. Brain injury affects:

- Who we are.
- The way we think.
- The way we act.
- The way we feel.

It can change everything about us in a matter of seconds. The most important things to remember about brain injury are:

- No two brain injuries are exactly the same.
- The effects of a brain injury are complex and may differ greatly from person to person.
- The effects of a brain injury depend on factors such as cause, location, and severity.



BRAIN FUNCTION

To understand what happens when the brain is injured, it is important to understand what a healthy brain is made of and what it does. The brain is enclosed inside the skull. The skull acts as a protective covering for the soft brain. The brain is made of nerve cells (*neurons*). The neurons form paths (*tracts*) throughout the brain. These nerve tracts carry messages to various parts of the brain. The brain uses these messages to perform the following functions:

- Body movements.
- Thinking.
- Behavior.
- Personality.
- Senses:
  - Vision.
  - Hearing.
  - Taste.
  - Smell.
  - Touch.
- Coordinating our body's systems of:
  - Breathing.
  - Heart rate.
  - Body temperature.
  - Metabolism.

Each part of the brain serves a specific function. Each part of the brain links with other parts of the brain to serve more complex functions.

When a brain injury occurs, it can affect the functions of the:

- Neurons.
- Nerve tracts.
- Sections of the brain.

If the neurons and nerve tracts are affected, they may have problems carrying messages, or may be unable to carry the messages that tell the brain what to do. This can change the way a person thinks, acts, feels, and moves the body.

Brain injury can also change the complex internal functions of the body, such as regulating:

- Body temperature.
- Blood pressure.
- Bowel control.
- Bladder control.

These changes can be temporary or permanent. They may cause reduced or complete inability to perform a function.

TRAUMATIC BRAIN INJURY

Traumatic brain injury is an injury to the brain not present since birth or caused by old age. It is an injury caused by an external physical force, which may cause you to be "knocked out," dazed, or confused. It results in problems with thinking and physical functioning. It can also result in the disturbance of behavioral or emotional functioning. These problems may be either temporary or permanent, may cause partial or total functional disability (*problems with daily activities*), or may cause negative thinking and social behavior changes.

A traumatic brain injury occurs when:

- Outside force impacts the head hard enough to cause the brain to move within the skull.
- The force causes the skull to break and directly hurts the brain.

This type of injury can occur from motor vehicle crashes, firearms, falls, sports, and physical violence, such as being hit or struck with an object.

A rapid acceleration and deceleration of the head can force the brain to move back and forth across the inside of the skull. The stress from the rapid movements pulls apart nerve fibers and causes damage to brain tissue. This type of injury often occurs as a result of motor vehicle crashes and physical violence, such as shaken baby syndrome.

SYMPTOMS

After a hit to the head, a person with a brain injury can experience a variety of symptoms. **Symptoms of a traumatic brain injury can include, but are not limited to:**

- Spinal fluid (*thin, water-like liquid*) coming out of the ears or nose.
- Dilated pupils (*black center of eye is large, and does not get smaller in light*) or unequal size of pupils.
- Dizziness, balance problems.
- Coma (*not alert, and unable to respond to others*) or semi-comatose state.
- Slow pulse.
- Vomiting.
- Headache.
- Body numbness or tingling.
- Ringing in the ears, or changes in ability to hear.
- Wrong or out of place emotional responses (irritability, easily frustrated, inappropriate crying or laughing).
- Loss of consciousness. However, loss of consciousness may not occur in some concussion cases.
- Vision changes (blurred vision, seeing double, not able to tolerate bright light, loss of eye movement, blindness).
- Respiratory failure (*not breathing*).
- Paralysis, difficulty moving body parts, weakness, poor coordination.
- Slow breathing rate, with an increase in blood pressure.
- Lethargy (*sluggish, sleepy, getting tired easily*).
- Confusion.
- Loss of bowel control or bladder control.
- Difficulty speaking, slurred speech, difficulty swallowing.
- Difficulty with thinking skills (trouble "thinking straight," memory problems, poor judgment, poor attention span, slowed thought processing speed).

A person with a suspected brain injury should contact a caregiver immediately, go to the emergency room, or call local medical emergency services (911 in the U.S.).

ACQUIRED BRAIN INJURY

An acquired brain injury often results in a change in neuron activity. This affects the cell's physical integrity, metabolic activity, or functional ability. An acquired brain injury may result in mild, moderate, or severe impairments. This can occur in one or more areas, including: cognition (*being aware or knowing*), speech-language communication, memory, attention and concentration, reasoning, abstract thinking, physical functions, psychosocial behavior (*causing bad behavior*), and information processing.

CAUSES OF ACQUIRED BRAIN INJURY

Acquired brain injury takes place at the cellular level within the brain. Therefore, acquired brain injury can affect cells throughout the entire brain, not just in specific areas as with traumatic brain injury.

An acquired brain injury is not hereditary (*passed down by parents*), congenital (*present at birth*), degenerative, or induced by birth trauma (*damage caused during birth*). **An acquired brain injury is an injury to the brain that has occurred after birth.** Causes of acquired brain injury can include, but are not limited to:

- Airway obstruction.
- Near-drowning, throat swelling, choking, strangulation, crush injuries to the chest.
- Electrical shock or lightning strike.
- Blow (*trauma*) to the head and/or neck.
- Traumatic brain injury with or without skull fracture (*broken bone*), blood loss from open wounds, artery pinching (*impingement*) from forceful impact, shock.
- Vascular disruption (*blood flow problems*).
- Heart attack, stroke (*not enough blood going to the brain*), arteriovenous malformation (AVM, *from birth, the veins and arteries are tangled*), aneurysm (*blood-filled bubble at a weak spot in the vessel wall*), intracranial surgery (*surgery inside the skull*).
- Infectious disease, intracranial tumors (*lumps inside the skull*), metabolism disorders.
- Diseases and conditions, including meningitis, certain venereal diseases, AIDS, insect-carried diseases, brain tumors, hypoglycemia or hyperglycemia (*low or high blood sugar*), hepatic encephalopathy (*liver problems, causing buildup of toxic substances in the blood*), uremic encephalopathy (*kidney problems, causing buildup of toxic substances in the blood*), seizure disorders.
- Toxic exposure to poisonous chemicals and gases, such as carbon monoxide poisoning.

SYMPTOMS

Most symptoms of acquired brain injuries are very similar to those of traumatic brain injuries. However, there are some difficulties that are experienced more often, or to a greater extent, by people with acquired brain injuries.

Symptoms can include:

- Cognitive impairment (*problems with thinking skills, especially memory*).
- Longer lengths of time spent in a vegetative state (*breathing, but not aware*).
- Severe behavior problems (psychosis, depression, restlessness, combativeness, hostility).
- Muscle movement disorders.

This information is not intended to be a substitute for medical advice or examination. **A person with a suspected brain injury should contact a caregiver immediately, go to the emergency room, or call local medical emergency services (911 in the U.S.).**

MAKE SURE YOU:

- Understand these instructions.
- Will watch your condition.
- Will get help right away if you are not doing well or get worse.

Information courtesy of Brain Injury Association of New Jersey.

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