Understanding Traumatic Brain Injury

Part 2: Brain injury impact on individuals' functioning

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www.msktc.org/tbi/factsheets

TBI Factsheet

This factsheet explains the impact of TBI on individuals' functioning.

A traumatic brain injury interferes with the way the brain normally works. When nerve cells in the brain are damaged, they can no longer send information to each other in the normal way. This causes changes in the person's behavior and abilities. The injury may cause different problems, depending upon which parts of the brain were damaged most.

There are three general types of problems that can happen after TBI: physical, cognitive and emotional/ behavioral problems. It is impossible to tell early on which specific problems a person will have after a TBI. Problems typically improve as the person recovers, but this may take weeks or months. With some severe injuries changes can take many years.

Structure and function of the brain

The brain is the control center for all human activity, including vital processes (breathing and moving) as well as thinking, judgment, and emotional reactions. Understanding how different parts of the brain work helps us understand how injury affects a person's abilities and behaviors.

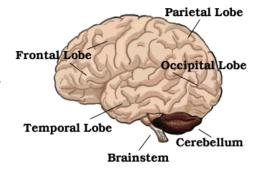
Left vs. Right Brain

- The brain is divided into two halves (hemispheres). The left half controls movement and sensation in the right side of the body, and the right half controls movement and sensation in the left side. Thus, damage to the right side of the brain may cause movement problems or weakness on the body's left side.
- For most people, the left half of the brain is responsible for verbal and logical functions including language (listening, reading, speaking, and writing), thought and memory involving words.
- The right half is responsible for nonverbal and intuitive functions such as putting bits of information together to make up an entire picture, recognizing oral and visual patterns and designs (music and art), and expressing and understanding emotions.

The Traumatic Brain Injury Model System is sponsored by the National Institute of Disability, Independent Living, and Rehabilitation Research, U.S. Department of Health and Human Services' Administration for Community Living. (See http://www.msktc.org/tbi/model-system-centers for more information).

Brain Areas & Associated Functions

The brain is made up of six parts that can be injured in a head injury. The effect of a brain injury is partially determined by the location of the injury. Sometimes only a single area is affected, but in most cases of TBI multiple areas have been injured. When all areas of the brain are affected, the injury can be very severe.







Six parts	Functions
Brain Stem	Breathing
	 Heart Rate
	Swallowing
	 Reflexes for seeing and hearing
	 Controls sweating, blood pressure, digestion, temperature
	 Affects level of alertness
	 Ability to sleep
	Sense of balance
Cerebellum	Coordination of voluntary movement
	Balance and equilibrium
	Some memory for reflex motor acts
Frontal Lobe	 How we know what we are doing within our environment
	 How we initiate activity in response to our environment
	 Judgments we make about what occurs in our daily activities
	 Controls our emotional response
	 Controls our expressive language
	 Assigns meaning to the words we choose
	 Involves word associations
	 Memory for habits and motor activities
	 Flexibility of thought, planning and organizing
	 Understanding abstract concepts
	Reasoning and problem solving
Parietal Lobe	 Visual attention
	 Touch perception
	Goal directed voluntary movements
	 Manipulation of objects
	 Integration of different senses
Occipital Lobe	■ Vision
Temporal Lobe	 Hearing ability
	 Memory acquisition
	 Some visual perceptions such as face recognition and object identification
	 Categorization of objects
	 Understanding or processing verbal information
	■ Emotion





Physical Problems

Most people with TBI are able to walk and use their hands within 6-12 months after injury. In most cases, the physical difficulties do not prevent a return to independent living, including work and driving.

In the long term the TBI may reduce coordination or produce weakness and problems with balance. For example, a person with TBI may have difficulty playing sports as well as they did before the injury. They also may not be able to maintain activity for very long due to fatigue.

Cognitive (Thinking) Problems

- Individuals with a moderate-to-severe brain injury often have problems in basic cognitive (thinking) skills such as paying attention, concentrating, and remembering newinformation and events.
- They may think slowly, speak slowly and solve problems slowly.
- They may become confused easily when normal routines are changed or when things become too noisy or hectic around them.
- They may stick to a task too long, being un-able to switch to different task when having difficulties.
- On the other hand, they may jump at the first "solution" they see without thinking it through.
- They may have speech and language problems, such as trouble finding the right word or understanding others.
- After brain injury, a person may have trouble with all the complex cognitive activities necessary to be independent and competent in our complex world. The brain processes large amounts of complex information all the time that allows us to function independently in our daily lives. This activity is called "executive function" because it means "being the executive" or being in charge of one's own life.

Emotional/Behavioral Problems

Behavioral and emotional difficulties are common and can be the result of several causes:

- First, the changes can come directly from damage to brain tissue. This is especially true for injuries to the frontal lobe, which controls emotion and behavior.
- Second, cognitive problems may lead to emotional changes or make them worse. For example, a person who cannot
 pay attention well enough to follow a conversation may become very frustrated and upset in those situations.
- Third, it is understandable for people with TBI to have strong emotional reactions to the major life changes that are
 caused by the injury. For example, loss of job and income, changes in family roles, and needing supervision for the
 first time in one's adult life can cause frustration and depression.

Brain injury can bring on disturbing new behaviors or change a person's personality. This is very distressing to both the person with the TBI and the family. These behaviors may include:

- Restlessness
- Acting more dependent on others
- Emotional or mood swings
- Lack of motivation
- Irritability
- Aggression
- Lethargy (sluggishness)
- Acting inappropriately in different situations
- Lack of self-awareness. Injured individuals may be unaware that they have changed or have problems. This can be due
 to the brain damage itself or to a denial of what's really going on in order to avoid fully facing the seriousness of their
 condition.





Fortunately, with rehabilitation training, therapy and other supports, the person can learn to manage these emotional and behavioral problems.

More in the Understanding TBI series

- Understanding TBI, Part 1: What happens to the brain during injury and in early stage of recovery from TBI?
- Understanding TBI, Part 3: The recovery process
- Understanding TBI, Part 4: The impact of a recentTBI on family members and what they can do to help with recovery

Authorship

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