

# **INTRODUCTION TO ACQUIRED BRAIN INJURY**

## **HOW DOES THE BRAIN WORK?**

Parts of the brain operate much like a computer where other parts are responsible for intuition, emotions and planning, etc. The brain controls all body actions and functions. It is the control center for movement and for how a person may think, act and feel. It receives and interprets messages to the brain through the five senses (sight, sound, smell, taste and touch) and directs the body to respond, move or react. If injured, the brain affects the body's systems in unpredictable ways.

When there is a traumatic blow to the skull or a sudden acceleration or deceleration of the brain as when the head strikes an object, the brain continues to move in the skull, like jelly in a bowl. It slams against the inside of the skull at the point of impact and bounces back and forth causing repeated blows on all sides of the brain. The movement of the brain inside the rough skull causes lacerations and/or tears. The damage is then more widespread. It is common to hear such comments as, "he hit the left side of his head on the steering wheel so that's where the brain was injured". IN reality, the brain may have suffered from the impact at multiple sites. Problems with one part of the brain may cause problems with other parts as well.

A recently injured brain is particularly susceptible to damage from subsequent trauma to the head, particularly in the first year after injury. Generally, the injured person should be excluded from all contact sports or activities involving a risk of a blow to the head. The people involved in contact sports at a professional level are starting to look more seriously at the risks of concussions.

## **PARTS OF THE BRAIN**

Following is a brief (and simplified) overview of the anatomy of the brain. For further information consult your doctor, medical books found in most libraries, or the Saskatchewan Brain Injury Association (SBIA) or links at [www.sbia.ca](http://www.sbia.ca)

The brain is covered by a thick protective bone structure called the skull. Fluid surrounds the brain, letting it float within the skull. Thus fluid acts as a shock absorber to cushion the brain against injuries.

The brain is made up of three main structures;

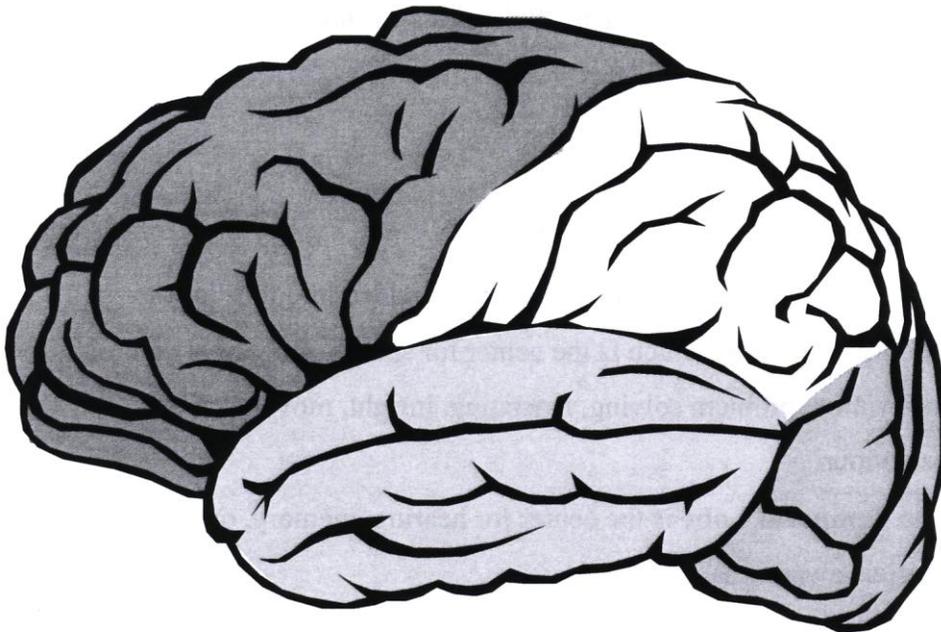
1. The cortex - most thinking occurs here and is the largest part of the brain and is divided into 4 lobes.
  - i. The Frontal lobe is the center for speech, emotional control, motivation, problem solving, reasoning, insight, movement and behavior.
  - ii. The Temporal lobe is the center for hearing, memory, organization and musical awareness.
  - iii. The Parietal lobe takes in understanding and uses information from the surroundings and sorts it out. This includes thinking, moving and positioning of the body.
  - iv. The Occipital lobe is the center for vision and recognition of things seen previously (people, objects, etc.).
2. The Cerebellum - coordinates movement and balance
3. The Brain Stem - controls consciousness, alertness, and basic bodily functions such as breathing and heart rate. It connects the brain to the spinal cord.

The brain is divided into two hemispheres, the right and the left hemispheres. Generally, the right half of the brain controls the left side of the body and the left half of the brain controls the right side of the body.

## **THE BRAIN**

FRONTAL LOBE

PARIETAL LOBE



TEMPORAL LOBE

OCCIPITAL LOBE

## **COGNITION**

Cognition is a person's ability to think and make sense of what is happening around them. Depending on the damage done to the brain there may be different types of cognition (thinking) difficulties. Some difficulties which may arise are:

- Attention span
- Sequencing (in what order to do things)
- Short and long term memory
- Problem solving
- Finding the correct word or phrase
- Beginning a new task (initiation)
- Abstract thinking
- Safety awareness
- Retaining new knowledge

It is more difficult to recover from cognitive changes than from physical changes. The patient may not be aware of the cognitive changes and may try to do things they are unable to do. While it is important to allow the "survivor" the opportunity of risk and challenge, it is also important to keep them safe and protected. Family members may find this challenging, as the survivor may want to do things for themselves. Close supervision is often called for with the person with the brain injury.

Changes in cognitive thinking can range from mild to severe and may be permanent, improve somewhat or change over time.

## **INJURY TO THE BRAIN CAN AFFECT THE ENTIRE BODY**

Changes in **MOVEMENT** may appear as:

- Poor balance (they may lose their center of gravity)
- Paralysis or weakness on one or both side of the body
- Easily fatigued or may lack energy to move
- Difficulty planning motor activity (apraxia)

Changes in the **SENSES**:

- Loss of vision, blurry vision, double vision
- Difficulty judging how far away things are
- Decrease in what is seen and/or heard
- Increased sensitivity to movement or sound
- Loss of sense of smell and/or taste
- Difficulty recognizing objects and faces

Change in **SPEECH and LANGUAGE**:

- Difficulty understanding what is said or read
- Difficulty speaking or writing
- Slurring of words

**Other ways** the body may be affected:

- Easily tires and may sleep most of the time
- Changes in sleep pattern
- Changes in ability to control body temperature, blood pressure or breathing
- Uncontrolled appetite or thirst
- Loss of bladder and/or bowel control (incontinence)
- Difficulty swallowing
- Acne may appear (oil glands in the skin can overwork)

The following two problem areas are often evident with brain injuries.

Changes in the persons' ability to think

- Confusion as to who they are, where they are and who is present
- Easily distracted (short attention span)
- Difficulty concentrating
- Difficulty with memory (short term and long term)
- Poor judgment (a safety concern)
- Difficulty planning, making decisions and problem solving
- Repeat themselves
- Difficulty with changes to daily routine - they like structure/routine
- Difficulty with sense of direction
- Difficulty doing things in the correct order (sequencing - such as getting dressed)

Behavioral problems

- Lack of interest
  - Unable to start a task or once started unable to stay with a task
  - Mood swings
  - Crying or laughing at inappropriate times
  - Difficulty controlling emotions - temper, aggression, cursing and frustration
  - Depression
  - Irritability
  - Inappropriate sexual behavior
  - Change in sex-drive (increase or decrease)
  - Social immaturity
  - Focuses on self (self-centered)
  - Lacks sensitivity to others
  - Confusion
  - Impulsiveness
  - Restlessness, agitation
  - Not aware of physical and cognition difficulties
  - Believes will return to former job or lifestyle sooner than reasonably possible
  - Does not like to accept help from others (possible safety factors)
- \*\* Keep in mind that the person may not remember the problems the next time the situation occurs.

## **BEHAVIORS**

Some behavior that might be exhibited by people who have sustained a brain injury has been listed above. There are some things you can do to help handle those situations. Talk to the health care professionals for additional information.

Some behaviors may include:

**Impulsiveness** (action done without thinking of consequences) can be a problem as the person usually has no concern for their own safety; they may move or talk without thinking about the consequences.

### **Suggestions:**

- Discuss the situation with the person and point out the possible negative side effects of their action
- Give positive feedback to the person when they show good judgment

**Denial** (refusal to accept the situation as it is) which may be good in some cases, not in others, and can often accompany brain injury - the person may not be aware that these things have changed. They simply deny or are not aware of the effects of the brain injury. The person may refuse to try to do certain tasks because it is "childish", or they've done that a thousand times, or they may make excuses for not being able to accomplish the task. Then again - they may simply not remember.

### **Suggestions:**

- Supervise in order to keep person safe
- Guide the activities in a gentle manner
- Provide encouragement

**Agitation** (constant activity) can involve physically striking out, not being able to pay attention, outburst of temper and restlessness. This is an expected and generally a temporary stage of the brain's recovery. The length of time the patient will be in this stage will vary from patient to patient. It is important to remember that the injured person's life is no longer normal and this in itself can cause confusion and fear.

The patient may exhibit almost constant movement whether in bed, wheelchair, or while walking. They may ask for help, then turn on the person who offers that help.

### **Suggestions:**

- Control their environment
- Keep lights and noise levels low
- Limit number of visitors and the length of visitations
- Keep to a routine
- Establish a scheduled rest period (no visitors during rest period)
- Avoid noisy situations (crowded malls, cafeterias, etc.)
- Give simple directions
- Respect the person's right to space and privacy
- Exhibit calm behavior yourself

**Once agitated it may be helpful to:**

- Direct person to a quiet area
- Direct person's attention away from source of agitation
- Avoid quick movements or abrupt changes in activities (unless unsafe to continue)
- Do not confront or scold, this may increase agitation

**Aggression** (hostile or destructive behavior) will occur if agitation continues. Aggression may decrease during recuperation. The injured person may bite, hit, spit, pull-out tubes/IVs, try to get out of bed when it is unsafe to do so, curse and make abusive remarks.

**Suggestions:**

- If possible, allow personal space
- Keep eye contact and speak in a calm voice
- Restrain the person as little as possible, restrain only if safety is a factor
- If necessary call for help keeping the person on sight
- Provide a safe environment (remove objects that might be thrown)
- Sedation may be required

**Irritability and Frustration** (quick to anger) may arise during recuperation. The person may have less control over emotions, over-reacting in some situations, and may have difficulty accepting change. The person may show frustration when unable to do tasks that they were able to do easily before the injury or even tasks that they were able to do yesterday. They become unreasonably irritated when kept waiting by someone else.

**Suggestions:**

- Irritability can increase with fatigue. Encourage frequent rest periods
- Ask person to suggest possible solutions and acknowledge effort
- Do not challenge or confront
- Try for a structured environment and stick to schedule, this causes less confusion and irritability
- Do not take this aggression and irritability personally
- Show some understanding of the frustration

**Inability to control emotions** (expressions and moods may change suddenly) such as sadness and happiness are very common. Sometimes the expressions of emotions may seem inappropriate. A person being praised for a job well done may begin to cry. The person may begin to laugh for no apparent reason.

**Suggestions:**

- Ignore inappropriate emotional outbursts
- Change the topic
- Ensure the person to get enough rest periods
- Praise the person when they have been able to control emotions
- Remember they will take their cue from your behavior and responses

**Immaturity in a social context** may seem apparent because social skills can be lost due to a brain injury. The person may seem unaware of the needs and feelings of others. They may interrupt a conversation with something totally unrelated. They may rebel with an outburst or tantrum because they do not get their own way.

**Suggestions:**

- Tell the person that this is an inappropriate time or topic without embarrassing them
- Change the subject
- Be direct and clear

**CHANGES IN DAILY LIVING:**

We have listed here some changes that may occur at various stages of recovery. We want to stress to you again that we offer this information from our own experience and we are not offering this information as medical advice. We also wish to mention that we do not offer this information to alarm you, but merely to reassure you that if changes do occur, it is not unusual.

**Nutrition and Appetite:**

Good nutrition is very important for recovery, it is important to eat a balanced diet. After a brain injury, eating habits and nutrition needs to change. Extra calories and protein may be needed for a few months following a brain injury and can sometimes be supplied by supplemental drinks and snacks. Seek advice from a nutritionist/dietician.

A brain injury can affect the ability to swallow. Often a therapist will be consulted to determine what type of food is appropriate at different stages of recovery.

Some eating behavioral problems, that may occur, are:

- Constant urge to eat (may have forgotten that they just ate). They may have no sense of satiation (no sense of hunger being satisfied and will continue to eat as long as there is food available). It may become necessary to limit snacking. Direct attention away from food to another activity.
- May eat only from one side of plate. In this case turn the plate for them so they will eat the other portions of food.
- May pick up anything and start to eat it (drinks left by other people on the counters, may chew on a Styrofoam cup, etc.). Protect the person when you are out in public as they may see a discarded cup and begin to drink from it.
- They may lose their appetite. Do not make eating a major issue. You could bring some small portions of their favorite food from home. Also, work with the dietary staff to make them aware of the patient's food preferences prior to injury.

- They may become confused and/or distracted during mealtime. Some suggestions are to use only the silverware necessary for that part of the meal; provide a quiet environment (turn off TV/radio); could serve one food at a time
- Acts impulsively while eating. They may put too much food in their mouth at one time, may not chew their food properly, or may eat too fast (all safety issues). Remind the person to slow down and to chew their food properly, use a blender if you feel they are not chewing their food well.
- There may be also a loss of appetite, particularly for those with a loss of smell. This can also be caused by depression. It is important to monitor food intake to be sure nutritional needs are met.

### **Continence/Incontinence:**

After a brain injury the injured person may no longer have the ability to control bowel and bladder. They do not feel the urge to use toilet facilities until it is too late.

In a case such as this, it is often advisable to toilet the person approximately every two hours or set a schedule, such as, right after meals and upon arising from sleep. In some cases it may be necessary to use products on the market such as incontinent pads or "Attends". Keep in mind their human dignity and assist them to keep clean at all times.

### **Menstrual Cycles:**

Menstrual cycles often become irregular because of the trauma to the body. It is often not unusual for the female to stop having her monthly cycle for a few months, stop completely or to have prolonged or frequent cycles.

Sleep patterns may change:

The person with a brain injury generally requires more sleep. They may need to go to bed much earlier and require one or more naps during the day. They tire easily from physical and mental tasks (concentration takes a lot of energy). If they don't nap during the day, it is a good idea to at least have a rest period with no visitors, TV, or other distractions.

The patterns of sleep may also vary:

- Some people seem to be sleepy all day and unable to sleep at night; in this case try to keep them from sleeping during the day with exercise and fresh air and other activities, allowing for rest periods as needed.
- It is often difficult to get them up in the morning. Start early enough in the morning to allow for delays. Be cheerful, as the person with the injury will take their cue from your attitude.

- It is important to remember that the injured person may require much more sleep than before the injury, be sure to allow them to schedule their sleep as much as their body requires.

### **Sexual habits:**

The sexual habits can be affected following a brain injury; therefore sexuality should not be overlooked. A person who sustains a brain injury may experience a loss of closeness to their partner, decreased social interaction, and decreased ability in dating skills.

There are different forms the changes may take:

- Changes in body image
- Changes in sex drive (either increased or decreased)
- May lose interest in sex, display inappropriate sexual activity such as sexual advances to those around them
- Fatigue may lead to a lack of interest or lack of stamina
- May lose self-esteem and feel they are unattractive
- Spousal interest/fatigue will be involved as well

### **Caffeine:**

Caffeine is a stimulant. As was mentioned previously, over stimulation can cause difficulties for an individual with a brain injury. Stimulants increase physical and mental activity in a person. The doctor may recommend that the injured person reduce their intake of caffeine. The injured person may be requested to reduce some of the following:

Regular coffee and tea	Foods made with chocolate
Coffee-flavored drinks	Soft drinks with caffeine

Some suggestions that might take their place are:

Fruit juices	Milk
Water	Decaffeinated coffee or tea
Decaffeinated soft drinks	Fruit based drinks

### **Alcohol:**

In general, the effects of alcohol and other psychoactive drugs are much more unpredictable in the injured brain. The effects are usually much more pronounced and therefore the best policy is abstinence. Remember that alcohol kills brain cells. Obviously, the person with the brain injury must not suffer any further loss of or damage to brain cells. There is always the danger that the use of drugs and/or alcohol will be a dangerous combination with the drugs the person is being prescribed by the physician and may cause further injury.

A good reference on this topic is "Acquired Brain Injury (ABI) Alcohol & Drugs", produced by S.G.I. and Saskatchewan Health.

The physician should be made aware of any past or present abuse of either alcohol or drugs.

### **Seizures:**

Seizures can be brought on by a brain injury.

When a person is having a seizure it is important to remember:

- Do not place anything in the mouth of the individual
- Do not restrain the individual
- Move furniture and other objects away so they will not hurt themselves
- Be sure the airway is not blocked. Turn the individual onto their side and the head to the side to allow saliva etc. to drain from the mouth
- Observe what happens during the seizure so you can accurately report this to the doctor
- Reassure and offer help to the individual after the seizure
- Call their doctor and be sure to inform the doctor that the individual has sustained a brain injury previously
- Call an ambulance if seizures last more than a few minutes

A seizure may be brought on by the use of illicit drugs, alcohol, or lack of sleep and can often be controlled by prescribed drugs

### **Post-Traumatic Amnesia:**

Amnesia is a loss or impairment of memory.

There are two types of Amnesia.

1. Retrograde Amnesia - is a loss of memory of events before the injury. Events immediately prior to the trauma may never be recalled.
2. Anterograde Amnesia - is a loss of memory for events following the injury. The person cannot store new information; therefore information is lost and cannot be learned and remembered. At times they may be able to do the things they used to do, at other times they may not remember how to do those same things.

Here are some suggestions to help those with Post-Traumatic Amnesia:

- A calendar in their room
- A clock on the wall and wristwatch to wear
- A daily schedule of events, showing time and place - posted prominently in their room
- Labels on drawers as to what is in each
- Labels on pictures to identify the people and places in the pictures

- Name tags on those around them
- A Day Book/Journal to record the days events and visitors. Either the individual, or if they are unable to write, someone on staff or at home can record events. Therapists can also make notes as to what was done and how the individual responded in the therapy session that day
- A list posted in their room to show sequencing regarding personal hygiene and dressing

### **Fatigue:**

Fatigue will play a large part in how much the person with the brain injury will be able to do different tasks. Be understanding and try to add routine to their daily life that incorporates rest periods and a regular bedtime.

### **Motivation:**

The survivor may not show much interest in certain tasks or activities. They may also need a lot of encouragement and prompting to begin a task or activity. Try to encourage participation without intimidation. Give them choices (just a couple to prevent confusion) don't always decide for them. Be careful not to confuse them with too many suggestions. Perhaps you could start a project by doing the first step and encourage them to finish the task.

They may not want to finish a task (dressing, finishing and activity or job-related task); explain why the task needs to be completed. Be sure to encourage and positive feedback on a job well done.

### **Lack of initiation:**

"This is quite a serious after effect of brain injury, if it persists, and it is not to be confused with lack of motivation or depression," says Dr. Capp, of the Wascana Rehabilitation Center in Regina. He continues, "I like to think of it as a broken starter. A person may sit in front of a plate of food, be hungry and know this is food and yet not be able to initiate eating. A verbal or physical cue may be necessary to get them started."