Pulling the pieces together after TBI:
A Resource Guide for Family Members

To Thrive. Not just Survive.
A Family Guide to Understanding Traumatic Brain Injury and the Early Recovery Process

This guide was developed to answer the most common questions families have in the first few hours, days, and weeks after a loved one's traumatic brain injury. Survivors with brain injury and their relatives, doctors, nurses, and other health care experts have contributed to the development of this guide with information obtained from several leading national and state resources.

In an instant, lives are changed forever. A brain injury often leaves a family with little time to prepare for, come to terms with, or adjust to the changes that such an injury brings. Not knowing what to expect or how to help can make the first hours, days, and weeks very hard for your loved one, family and your friends.

It's normal for you to feel overwhelmed by all of the new information you are getting at a time when you feel as if you just can't deal with anything more. But you have just become a very important member of your loved one's health care team. To help your loved one the most, you must learn as much as you can about his/her type of brain injury and how to choose the best medical care. If someone you love has had a brain injury, this guide will be helpful to you. It will help you understand what a brain injury is, what you may expect during the early recovery process, and what you can do to help your loved one, yourself, and others get through this very difficult time.

This guide answers many of the questions asked most often about brain injury. Understanding how the brain works can be helpful in terms of understanding traumatic brain injury and the recovery process, as well as prepare yourself and your family for the next few days and weeks. If you or your family still have questions after reading this guide, write them down in the back of this book, then ask one of the members of the health care team; they will be able to answer your questions. Also, it will be helpful to write down their answers so you can refer to them later. There is comfort in understanding what is happening and what to expect. This understanding can help you become more comfortable working with the health care team and supporting your loved one's recovery.

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BRAIN INJURY: Basic Questions Answered

1. What is traumatic brain injury?
Traumatic brain injury is an injury to the brain caused by an external physical force. It may produce a diminished or altered state of consciousness, which results in impairment of cognitive abilities and physical functioning. These impairments may be either temporary or permanent and cause partial or total functional disability or psychosocial maladjustment.

2. Who is at risk and what types of brain injuries are there?
The highest risk for traumatic brain injuries are children, young adults between the ages of 15-24, and adults 75 years and older. There are two types of traumatic brain injuries: penetrating brain injuries and closed head injuries. Penetrating head injuries occur when a foreign object enters the brain and causes damage to specific areas of the brain. Closed head injuries result from a blow to the head. A majority of survivors of traumatic brain injury experience brain swelling also called edema. Edema is a result of damage to blood vessels in the brain and is the body’s response to brain injury.

3. What is a concussion?
A concussion results from a blow to the head which causes the brain to strike the skull. A concussion does not cause any structural damage to the brain, but can cause temporary loss of functioning. Headaches, memory loss, and sleep disturbance are common symptoms a person may experience after such an injury.

4. What is a contusion?
A contusion is a more serious blow to the brain. Contusions result in bruising of the brain and more noticeable loss of functions. More comprehensive care is required for a contusion. Follow-up treatment and evaluation are required on a regular basis.

5. What is a skull fracture?
A skull fracture results in damage to the skin and bone of the skull as well as to the brain itself. The form of medical treatment varies with the location and severity of the fracture. Close observation and follow-up treatment are always required. Many skull fractures result in mild to severe problems associated with daily functioning such as walking, memory, vision, and behavior.

6. What is a hematoma?
The collection of blood in one or several locations of the brain creates a hematoma. A hematoma may be between the skull and the covering of the brain (epidural) or may occur between the membrane covering the brain and the brain itself (subdural). Hematomas may require surgery (a craniotomy) to be performed.

7. What is a coma?
Coma is defined as a prolonged state of unconsciousness. A person in a coma does not respond to external stimuli. There is no speech, the eyes are closed, and the person cannot obey commands. A coma can last from hours to days, depending on the severity of the brain damage. It is possible for a person to remain in a comatose state for months or even years. A person may eventually open their eyes, but remain unresponsive. See Glasgow Coma Scale, pg. 5.

8. What happens in the emergency room and intensive care unit?
Most accident victims enter the hospital through the emergency room. The injury is diagnosed and appropriate action is taken. Some patients must go to the hospital’s intensive care unit (ICU) for close, 24 hour monitoring. Other injuries sustained at the time of the brain injury may require ICU services not necessarily related to the head trauma.

9. What is medical stabilization?
Many patients with a brain injury require time in the hospital for other medical treatment such as recovery from surgery, healing of wounds, and setting of fractures. This is known as medical stabilization. This process can take from several days to several months. Patients may be transferred from the emergency room or ICU to a medical floor for observation, medical treatment, and the beginning of rehabilitation services such as physical therapy.
10. What happens after medical stabilization?
After the patient has gone through medical stabilization, there are a variety of directions that treatment can take.

The patient may be transferred to a physical rehabilitation unit within a general hospital, a specialized rehabilitation treatment center, or a skilled nursing unit. Physical, occupational, speech/cognitive, and neuropsychological services may be provided on an intensive basis in any area of these settings.

Some patients will not require skilled nursing care and may be transferred to a unit for brain injury patients. Some patients will go home with their families and return to the hospital or a specialized outpatient program for therapy and treatment. Patients who require extended skilled nursing care may be transferred to a long term care facility, while some patients will return home to receive therapy and around the clock nursing care.

11. What is rehabilitation?
Rehabilitation is the process which helps an individual reach optimum function by providing a variety of services. Rehabilitation hospitals should use a team concept which includes services of physicians, as well as physical, occupational, and speech therapists, neuropsychologists, social workers, therapeutic recreational specialists, and nurses. However, the most important members of the treatment team are the patient and the patient’s family.

12. What is the best choice?
The appropriate choice for continued treatment is a major decision to be made by the patient, family, and physician. It is important to talk to your treatment team and fully understand the patient’s needs. You must seek out as much information as possible to educate yourself about available resources.

13. What do families go through?
Shock, anger, hurt, denial, and depression are common reactions that families experience. A loved one’s brain injury can change the family’s life as well. Your adult child may require more attention from you. An injured parent may need the assistance of adult children. As the patient goes through the stages of recovery, so does the family. The key is to take it one day at a time.

14. Signs of stress?
The stress placed on the family is tremendous. Each individual and family will cope with stress differently. The signs of stress may include the following: inability to sleep, poor appetite, lack of interest in personal care or appearance, a strong sense of guilt, reduced self worth, loneliness, excessive use of drugs or alcohol, forgetfulness, or an inability to understand things that are said. When stress builds, seek support from friends, clergy, and the medical staff caring for your loved one.

15. What can the family expect?
Every brain injury is different. You cannot compare brain injuries to a broken arm or leg. The effects of each brain injury vary. No one person has all the answers. Begin to read and gather information about brain injury, its effects and possible treatments available. Educating yourself is important in setting realistic expectations.

16. Helpful suggestions for families.
- Establish a balance between pushing the person with the injury beyond his/her ability to function and not giving enough encouragement.
- Establish and maintain a daily routine.
- Approach the individual on their good side.
- Use familiar photographs of family members, friends, pets, or possessions.
- Speak of familiar names, places, interests, or activities.
- Be yourself with your family member.
- Do not overwhelm or overload the person with information.
- Provide the individual with ample time to respond.
- Do not present the person with a task that is too complex.
- Try to reduce confusion in his/her surroundings.
- Talk openly about his/her gains and abilities.
- Communicate with the doctors, nurses, therapists, and your loved one.
Clues That Brain Injury Has Occurred

If you have had a brain injury, or know someone who has, these are some of the natural reactions that the body exhibits behaviorally, emotionally, cognitively, physically, and with their personality. This information is provided so you can know what to expect when helping to care for a loved one, or if you are experiencing these symptoms.

**Behavioral Issues**
- Wanders off/runs away
- Impulsive (acts without thinking)
- Reduced self-esteem
- Repeated invasion of personal space
- Short fuse – unable to control outbursts
- Difficulty maintaining relationships

**Cognitive Issues**
- Easily distracted
- Seems to “space out”
- Difficulty understanding
- Difficulty with reality
- Seems confused
- Poor memory
- Decreased safety awareness
- Slow to answer questions
- Difficulty organizing (time, etc.)

**Personality Issues**
- Denies deficits
- Irritable
- Egotistical
- Doesn’t listen
- Asks a lot of questions
- Argumentative
- Manipulative
- Appears unmotivated
- Moody – laughs or cries easily
- Depressed
- Face shows little or no emotion

**Physical Issues**
- Fatigue and/or weakness
- Spasticity and tremors
- Motor coordination
- Speech difficulties
- Seizures
- Balance
- Mobility
- Sense of taste or smell changes

**Social Issues**
- Inappropriate social interaction (overly formal or overly friendly)
- Interrupts conversations
- Fabricates stories/lies
- Inappropriate conversation (sex, drugs, alcohol abuse, etc.)
- Poor eye contact
- Goes off on tangents

**Verbal Issues**
- Poor speech
- Speaks in a monotone
- Vulgarity/swearing
- Talks too loud or too soft
- Has difficulty “finding” words
- Broken speech
Glasgow Coma Scale

The Glasgow Coma Scale (GCS) is an assessment tool that helps medical professionals to determine the severity of the brain injury. The Glasgow Coma Scale measures motor response, eye opening, and verbal response on a scale between 3 and 15. GCS scores between 3 and 8 indicate a severe brain injury.

Most severe brain injuries occur from open head injuries. Such injuries can cause a wide range of functional short or long-term changes that affect thinking, sensation, language, and emotion.

Moderate brain injuries have a GCS between 9 and 12. Moderate brain injuries occur when a person experiences changes in brain function for longer than a few minutes following trauma.

Mild brain injuries have a GCS between 13 and 15. These injuries occur when an individual sustains a blunt trauma or acceleration force to the head. The individual can experience disorientation, dizziness, and irritability.

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<table>
<thead>
<tr>
<th>EYE OPENING</th>
<th>BEST VERBAL RESPONSE</th>
<th>BEST MOTOR RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous: Indicates arousal mechanisms in brain stem are active.</td>
<td>Oriented: Patient knows who and where he or she is, the year, the season and month.</td>
<td>Obeyes Commands: Note: a gasp reflex or a change in posture does not count as a response.</td>
</tr>
<tr>
<td>To Sound: Eyes open to any sound stimulus.</td>
<td>Confused: Responses to questions indicate varying degrees of confusion and disorientation.</td>
<td>Localized: Moves a limb to attempt to remove a painful stimulus.</td>
</tr>
<tr>
<td>To Pain: Apply stimulus to limbs, not face.</td>
<td>Inappropriate: Speech is intelligible, but sustained conversation is not possible.</td>
<td>Flexion: Normal Entire shoulder or arm is flexed in response to painful stimuli.</td>
</tr>
<tr>
<td>No Response</td>
<td>Incomprehensible: Unintelligible sounds such as moans and groans are made.</td>
<td>Flexion: Abnormal: The patient is rigidly still with arms flexed, fists clenched, and legs extended</td>
</tr>
</tbody>
</table>

Select one number above that best describes patient’s response.

The Patient’s Glasgow Score is the total of the numbers selected per Column

ENTER TOTAL: 

Resource Guide | Arkansas Trauma Rehabilitation Program
Rancho Los Amigos Scale

The Rancho Los Amigos Scale is an assessment tool that provides a description of various behavioral stages of an individual with a brain injury. Medical professionals use the Rancho Los Amigos Scale to monitor a patient’s behavior while he or she progresses through rehabilitation. The Rancho Los Amigos Scale is most useful during the first few weeks or months following a brain injury.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Patient has no response to pain, touch, sound or sight.</td>
</tr>
<tr>
<td>II</td>
<td>Generalized Response—regardless of type and location of stimuli.</td>
</tr>
<tr>
<td>III</td>
<td>Localized Response. Blinks to strong light, turns toward or away from sound, and responds to physical discomfort, inconsistent response to commands.</td>
</tr>
<tr>
<td>IV</td>
<td>Confused/Agitated. Alert, very active, aggressive or bizarre behavior, non-purposeful motor movement, short attention span, inappropriate verbalization.</td>
</tr>
<tr>
<td>V</td>
<td>Confused/Inappropriate/Non-agitated. Gross attention to environment, distractible, requires continual redirection, agitated by too much stimuli, inappropriate social interactions.</td>
</tr>
<tr>
<td>VI</td>
<td>Confused/Appropriate. Inconsistent orientation, recent memory attention impaired, follows simple directions, goal-directed with assistance, begins to recall past, emerging awareness of self.</td>
</tr>
<tr>
<td>VIII</td>
<td>Purposeful/Appropriate. Stand-by assist. Uses memory device with intermittent assist, over or under estimates abilities, irritable, self-centered, acknowledges other’s feelings with minimal assist, low frustration tolerance, carries out familiar tasks with intermittent assist.</td>
</tr>
<tr>
<td>IX</td>
<td>Purposeful/Appropriate. Stand-by assist on request. Completes familiar tasks independently, independently shifts between tasks, self-monitors and anticipates problems with stand-by assist, uses assistive memory devices to recall schedule.</td>
</tr>
<tr>
<td>X</td>
<td>Purposeful/Appropriate. Modified independence. Handles multiple tasks simultaneously, independently initiates and carries out unfamiliar routines, anticipates impact of impairments, independently thinks about consequences of decisions, social interaction is consistently appropriate.</td>
</tr>
</tbody>
</table>
CONTINUUM OF CARE: TBI Recovery Stages

Each patient’s experience will be different, and the care they receive will be tailored to their needs. Not all patients will need each treatment option listed. We’ve included a description of the type of patients who are treated on the different phases, as well as the goals that are worked towards for each.

Our resource section provides tools and information that you can use, depending on where you are on the road to healing and coping.

Emergency Care and Critical Care
Emergency care is the first medical treatment administered after a traumatic brain injury. Some patients are treated by emergency medical technicians (EMT) at the scene of their injury. Others are treated in the emergency room (ER) at the nearest hospital.

The goal of critical care is to ensure that the patient is stabilized, and to prevent further neurological damage. EMT and ER staff makes sure that the patient has enough oxygen to the brain, and they reestablish blood pressure to the body and to the brain.

Acute Care
Acute care is administered to patients with a brain injury in the hospital after their initial emergency care is complete. Acute care is active, short-term treatment for severe brain injury, typically provided in the hospital’s intensive care unit. Medical and surgical specialists care for patients in acute care and work to optimize a person’s medical condition. Diagnostics, surgery, and follow-up with coordinating teams help to ensure the stability of the patient. The goal of acute care is to stabilize the patient’s condition, and direct the patient to another unit for further treatment.

Acute Rehabilitation
Acute rehabilitation is for patients with a brain injury that need ongoing therapy to improve his/her functional abilities. Therapy focuses on improving bowel and bladder control, communication, mobility, basic hygiene, orientation, and learning.

Rehabilitation is an important component of healing after a brain injury. It is here that patients relearn basic skills for everyday living and move toward re-integration into their community. Lengths of stay are variable.

Sub-Acute Rehabilitation
Sub-acute rehabilitation is a hospital-based or skilled nursing-based program for brain injury patients who are still medically dependent after given acute care, or for those who have complex nursing needs. The average stay is 2-3 months, and patients are given 1-3 hours of therapy per day. The goal of this care is to help each person reach their highest level of functioning, and to help recreate the safest, most active lifestyle possible when they return home.

Patients with a brain injury are sent to sub-acute rehabilitation if they need help mastering a particular task, even if they have met their main goals, and if their muscles are not yet strong enough for more intense therapies.

Neurobehavioral Unit
Patients with a brain injury receive treatment at the neurobehavioral unit if they have difficulty controlling behaviors and impulses. The goal of this highly specialized treatment is to assist patients to ultimately live independently. It is also important for patients to be able to adapt to a less structured environment in terms of their behavioral and cognitive stability.

Community
The community is a term that signifies where you live—whether that is with a family, or in a common location, as well as the group of people that surrounds and supports you. Patients with a brain injury at this stage begin living at home while receiving support services from a variety of agencies and medical professionals. The goal for patients living in their community is to receive ongoing support needed to thrive at the greatest possible level of independence.
CONTINUUM OF CARE: TBI Recovery Stages

All levels of care may not be available in your area.
Cognitive Skills of the Brain

Understanding how the brain works can be helpful in terms of understanding Traumatic Brain Injury.

There are six components inside the brain: the frontal lobe, parietal lobe, occipital lobe, temporal lobe, cerebellum and the brain stem. The following pages can be helpful in terms of understanding the functions of each part of the brain, the roles they play in the body’s overall health, and observed problems in behavior or well being if that particular part of the brain is injured.

To Thrive. Not just Survive.
Obtaining a general understanding of the brain and its functions is important to understanding the rehabilitation process. It is very important, however, to understand that the rehabilitation professional is concerned with the whole person. Identifying individual problems gives the rehabilitation team areas in which to develop treatment plans. All of these plans are designed to work toward the rehabilitation of the whole person.

Each problem area is connected to other areas. Often resolving one problem area has an impact on another area. For example, reestablishing postural balance and eliminating dizziness greatly enhances concentration and attention which allows for improved cognition and problem solving.

**Cerebrum**

The cerebrum is the largest portion of the brain and is responsible for most of the brain’s function. It is divided into four sections: the frontal lobe, parietal lobe, temporal lobes, and the occipital lobe. The cerebrum is divided into a right and left hemisphere which are connected by axons that relay messages from one to the other. This matter is made of nerve cells which carry signals between the organ and the nerve cells which run through the body.

**Frontal Lobe:** The frontal lobe is one of four lobes in the cerebral hemisphere. This lobe controls several elements including creative thought, problem solving, intellect, judgment, behavior, attention, abstract thinking, physical reactions, muscle movements, coordinated movements, smell, and personality.

**Parietal Lobe:** Located in the cerebral hemisphere, this lobe focuses on comprehension. Visual functions, language, reading, internal stimuli, tactile sensation and sensory comprehension are centered here.

**Temporal Lobes:** The temporal lobes control visual and auditory memories. It includes areas that help manage some speech and hearing capabilities, behavioral elements, and language. It is located in the cerebral hemisphere.

- **Wernicke’s Area**—this portion of the temporal lobe is formed around the auditory cortex. While scientists have a limited understanding of the function of this area, it is known that it helps the body formulate or understand speech.

**Occipital Lobe:** The occipital lobe is located in the cerebral hemisphere in the back of the head. It helps to control vision.

- **Broca’s Area**—this area of the brain controls the facial neurons as well as the understanding of speech and language. It is located in the triangular and opercular section of the inferior frontal gyrus.
Cerebellum

This is commonly referred to as "the little brain," and is considered to be older than the cerebrum on the evolutionary scale. The cerebellum controls essential body functions such as balance, posture, and coordination, allowing humans to move properly and maintain their structure.

Limbic System

The limbic system contains glands which help relay emotions. Many hormonal responses that the body generates are initiated in this area. The limbic system includes the amygdala, hippocampus, hypothalamus and thalamus.

- **Amygdala**—the amygdala helps the body respond to emotions, memories, and fear. It is a large portion of the telencephalon, located within the temporal lobe which can be seen from the surface of the brain. This visible bulge is known as the uncus.

- **Hippocampus**—this portion of the brain is used for learning memory, specifically converting temporary memories into permanent memories which can be stored within the brain. The hippocampus also helps people analyze and remember spatial relationships, allowing for accurate movements. This portion of the brain is located in the cerebral hemisphere.

- **Hypothalamus**—the hypothalamus region of the brain controls mood, thirst, hunger and temperature. It also contains glands which control the hormonal processes throughout the body.

- **Thalamus**—the Thalamus is located in the center of the brain. It helps to control the attention span, sensing pain, and monitors input that moves in and out of the brain to keep track of the sensations the body is feeling.

Brain Stem

All basic life functions originate in the brain stem, including heartbeat, blood pressure, and breathing. In humans, this area contains the midbrain, pons, and medulla. This is commonly referred to as the simplest part of the brain, as most creatures on the evolutionary scale have some organ that resembles the brain stem.

- **Midbrain**—the midbrain, also known as the mesencephalon, is made up of the tegmentum and tectum. These parts of the brain help regulate body movement, vision, and hearing. The anterior portion of the midbrain contains the cerebral peduncle which contains the axons that transfer messages from the cerebral cortex down the brain stem. This allows voluntary motor function to take place.

- **Pons**—this portion of the metencephalon is located in the hindbrain, and links to the cerebellum to help with posture and movement. It interprets information that is used in sensory analysis or motor control. The pons also creates the level of consciousness necessary for sleep.

- **Medulla**—the medulla or medulla oblongata maintains vital body functions such as the heart rate and breathing.
The human brain is ultimately responsible for all thought and movement that the body performs. Many different parts of the brain and their functions relate information to specific centers of the brain.

The brain is made up of nerve cells which interact with the rest of the body through the spinal cord and nervous system. These cells relay information back to specific centers of the brain where it can be processed and an appropriate reaction can be generated. Several chemicals are also located in the brain. These help the body maintain homeostasis, or a sense of overall comfort and calm as its basic needs are met. Keeping these chemicals balanced and the nerve cells firing properly are essential to healthy brain function.

The Brain is divided into four sections, known as lobes. Their functions support the responses and actions of the human body.

- The frontal lobe
- The parietal lobe
- The temporal lobe
- The occipital lobe
Functions of the Lobes

The frontal lobe has many functions, most of which center on regulating social behavior. Injury to parts of the frontal lobe may cause an inability to move part of the body or a whole side of the body. Speech may become halting, disorganized, or stopped, except for single explosive words. One’s personality may change. Social rules of behavior may be disregarded. The executive functions (planning, abstract reasoning, impulse control, sustained attention, and insight) are all located here.

Here are some of the important functions of the frontal lobe:

- Cognition, problem solving, and reasoning
- Motor skill development
- Parts of speech
- Impulse control
- Initiation
- Judgment
- Inhibition of behavior
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of abilities/limitations
- Organization
- Attention/concentration
- Mental flexibility
- Speaking (expressive language)
- Spontaneity
- Regulating emotions
- Regulating sexual urges

It is more common to injure the frontal lobe than the other lobes of the brain because the lobe is located at the front of the skull. The effects of damage to the frontal lobe often result in personality changes, difficulty controlling sexual urges, and other impulsive and risk-taking behaviors.

The parietal lobe—has several functions including sensation, perception, and spatial reasoning. This lobe is responsible for processing sensory information from various parts of the body.

Here are some of the functions of the parietal lobe:

- Sensing pain, pressure, and touch
- Regulating and processing the body’s five senses
- Movement and visual orientation
- Speech
- Visual perception and recognition
- Cognition and information processing

Damage to the parietal lobe can result in problems with spatial reasoning, reading, writing, and understanding symbols and language. Damage to the right side of the parietal area can affect a person’s ability to dress or groom him or herself, while damage to the left side can result in language disorders and disorders with perception.
The temporal lobes—there are two temporal lobes located on either side of the brain, in close proximity to the ears. The primary function of the temporal lobes is to process auditory sounds.

These lobes are among the most frequently injured parts of the brain. A person may have difficulty screening out distractions. Injury to the upper temporal area can cause someone to misunderstand what is said. They may make sounds like words, but are not recognizable as words. They may also misunderstand body language. Emotional changes such as unexplained panic or unexpected tearfulness may occur. The left temporal area includes production of speech, naming, and verbal memory. The right temporal area includes musical abilities, foreign languages, visual memory, and comprehension of the environment.

Other functions of the temporal lobes include:
- The transformation of short-term memories into long-term memories and processing of new information occurs in the hippocampus.
- The formation of visual and verbal memories.
- The interpretation of smells and sounds.

The type of impairment that results from damage to the temporal lobe depends on where the damage occurred in the lobe. Temporal lobe damage can lead to difficulty processing auditory sensations and visual perceptions, problems concentrating on visual and/or auditory stimuli, long-term memory problems, changes in personality, and changes in sexual behavior.

The occipital lobe—the smallest of the four lobes, is located near the posterior region of the cerebral cortex, near the back of the skull. The occipital lobe is the primary visual processing center of the brain.

Other functions of the occipital lobe:
- Visual-spatial processing
- Movement and color recognition

Since the skull protects the occipital lobe, injury is less likely to occur. However, severe damage to the occipital lobe can result in a variety of visual problems, including the loss of color recognition, visual hallucinations or illusions, problems recognizing objects, and difficulty understanding language.
REHABILITATION: After Brain Injury

Rehabilitation is the process by which specialized health care professionals work to improve, maintain, or restore the patient’s physical strength, cognition, and/or mobility. The purpose of rehabilitation is to help the patient gain greater independence and return to home, work, and community. The patient begins the rehabilitation process after discharge from acute care.

The patient may receive rehabilitation care at a brain injury rehabilitation center, inpatient rehabilitation hospital, outpatient rehabilitation hospital, or other facility. Many skilled nursing facilities provide rehabilitation services. Check with the attending physician and/or social worker to determine what rehabilitation services are most appropriate for your loved one. The best rehabilitation care may be available at a facility outside of Arkansas.

MEMBERS OF THE REHABILIATION TEAM

The rehabilitation team consists of many medical professionals. The rehabilitation staff will vary on the bases of the hospital, level of care, and severity of injury. The rehabilitation team commonly consists of the following hospital staff:

- **Physiatrist**: A doctor of physical medicine and rehabilitation whose primary focus is the restoration of impaired function.
- **Nursing Staff**: Serve as 24-hour coordinators of patient care. Nursing Staff provide ongoing assessments and evaluations of each patient’s care plan.
- **Physical Therapist (PT)**: The physical therapist helps individuals maintain and improve the movement of joints and limbs and to restore the highest level of motor function possible.
- **Occupational Therapist (OT)**: The occupational therapist helps individuals overcome the physical, cognitive, and perceptual problems that limit their ability to perform functional tasks.
- **Speech-Language Pathologist (SLP)**: The speech-language pathologist evaluates and treats communication and swallowing problems. The SLP also provides instruction and education to improve overall communication and swallowing abilities.
- **Therapeutic Recreational Specialist (TR)**: The Therapeutic Recreational Specialist evaluates the patient’s interests and hobbies and combines them with basic therapy goals.
- **Rehab Care Associate or Therapy Aide (RCA)**: The rehab care associate or therapy aide performs therapy tasks under the direction of the therapist.
- **Care Coordinator**: The care coordinator serves as the coordinator of patient care while one is a patient. The Care Coordinator will initially evaluate the overall social situation and gather social history. They generally assist with the discharge planning process.
- **Dietitian**: The dietitian will evaluate the patient’s nutritional needs and administer a proper diet.
- **Respiratory Therapist**: The respiratory therapist specializes in the techniques and technology used to help a patient breathe and keep his/her airway open.
- **Neuropsychologist**: The neuropsychologist tests brain behavior functions. Their work includes redeveloping cognitive and social skills.
- **The Family**: The family provides very important and valuable information about the patient.
Rehabilitation Team

Patient

Physiatrist

Physical Therapist (PT)

Occupational Therapist (OT)

Speech-Language Pathologist (SLP)

Therapeutic Recreational Specialist

Rehab Care Associate or Therapy Aide (RCA)

Dietitian

Respiratory Therapist

Neuro (Neuropsychologist)

The Family

Nursing Staff (RN, LPN, & Certified Nursing Assistant)

Resource Guide | Arkansas Trauma Rehabilitation Program
CHOOSING A REHABILITATION HOSPITAL

A rehabilitation hospital is a medical center that specializes in the rehabilitation of patients with various disabilities resulting by the following circumstances:

- Strokes
- Spinal cord injuries
- Head injuries
- Orthopedic injuries
- Sports injuries
- Neurological conditions
- Amputations
- Knee or hip replacements
- Arthritis
- Multiple Sclerosis
- Burns

The rehabilitation facility can provide services such as physical therapy, occupational therapy, speech therapy, dietician, counseling, and mental health. Some rehabilitation hospitals offer both inpatient and outpatient care. The goal is to return the patient to home, work, and normal activities, making the patient’s life as active and productive as possible. Below is a list of factors to consider when choosing a rehabilitation hospital for your loved one.

- Accredited by The Joint Commission and/or the Commission on Accreditation of Rehabilitation Facilities (CARF).
- Licensed by the Agency for Health Care Administration.
- City or County licenses, if required.
- Admit and treat a required minimum number of new patients with a brain and/or spinal cord injury annually.
- Facility staff should have specialized training to treat people that have suffered traumatic injuries.
- Rehabilitation teams should meet a minimum of once a week to review the patient’s progress and to plan for continued care. Therapy services should be provided a minimum of three hours per day during weekdays and include limited therapy on weekends, if prescribed by the treating physician.
- Patients and their families should receive education about the unique medical needs associated with a traumatic injury diagnosis. Educational materials should include information about bladder and bowel management, skin care and prevention of pressure sores, autonomic dysreflexia, sexuality and fertility, medication management and drug abuse, nutrition, tube feeding, equipment care and maintenance, community resources, care giving, ventilator care, behavior management, and cognitive stimulation/learning.
- In addition to rehabilitation therapy services, facilities should provide, or make available through contractual service providers, family, vocational, sexual, and substance abuse counseling, peer support groups, assistive technology evaluations, orthotics (braces and splints), prosthetics, and pastoral care.
- Specialized equipment suppliers and onsite equipment should be available for therapists to access during therapy sessions with patients. Onsite equipment would include specialized wheelchairs, cushions, assistive technology equipment, and other durable medical equipment, such as walkers, bath benches, transfer equipment, canes, etc.
- Facilities should have an organized program to help patients adapt to activities outside of the facility. Supervised community excursions and therapeutic home visits prior to discharge should be available.
- Facilities should provide a formalized discharge plan to facilitate and support the patient’s rehabilitation process and to ensure long-term sustainability in the community. They should provide follow-up care for patients remaining in the geographical area and/or provide information about appropriate healthcare and equipment providers, as well as community organizations and resources.
- Take a tour of the rehabilitation hospital if possible.
PULLING THE PIECES TOGETHER: ONE STEP AT A TIME

The information you receive as you talk with doctors, nurses, specialists, and therapists can feel overwhelming—unfamiliar medical terms, types of treatment procedures, and various medical professionals. The future may look very uncertain as you try to understand what it means when your loved one has a brain injury. You may be asking, “Where do I go from here?”

The Arkansas Trauma Rehabilitation Family Resource Guide will provide basic information to help you bring together and understand a lot of information.

- Understand your loved one’s condition
- Become familiar with stages of care and treatment
- Identify financial resources
- Find support and assistance from family and friends
- Learn about services in the community and state

ESTABLISH YOUR SUPPORT TEAM:

Medical Team
After you, the medical team is probably the most important support group. Be sure to keep track of the doctors, their specialties, and contact information. Write down your questions and seek answers when the doctors make their rounds. It’s also important to share your observations with the medical team as your loved one makes progress.

Family and Friends
Family and friends are invaluable resources. They want to help you but often are not sure how. Assign tasks to them you may not be able to do yourself. This will relieve some of your burden and help you spend more time by your loved one’s bedside.

Family and friends can help you in the following ways:
- Research medical information and resources
- Fill out hospital paperwork
- Watch your children
- Bring meals to the hospital
- Help with laundry, feeding pets, walking the dog, etc.
- Notify your employer
- Pick up mail

If you are fortunate to have a strong family unit, use them! If this is not the case for you, seek support from the professionals around you such as the hospital social worker who can provide guidance and support.

Consider your younger children - When a serious injury occurs, it is very common for families to spend a significant amount of time at the hospital especially during the critical stage. If you have young children, this can be a scary and confusing time for them.

Here are tips or suggestions for helping them cope:
- Explain progress in terms they can understand
- Describe what the person who has been injured is unable to do
- Spend quality time alone with the children
- Encourage them to ask questions and express their feelings

For additional downloadable materials, visit Brian Injury Association of America’s website at www.biausa.org.
HELPFUL INFORMATION

Medical Insurance
Your primary health insurance will be considered first. Educate yourself on the benefits and limits of your coverage.

Workers’ Compensation
If the injury occurred at work, your loved one may be eligible for workers’ compensation insurance. As someone recovers from a brain injury, it’s common for them to appear “okay” physically, yet have significant cognitive impairments. A competent workers’ compensation professional will help advocate on your loved one’s behalf.

Medicaid
In many cases where the patient does not have health insurance, the hospital will help you apply for Medicaid to help pay doctor and hospital bills. Medicaid has certain eligibility requirements for someone to qualify.

To apply for Arkansas Medicaid, contact your local county DHS office.

Social Security Disability Insurance (SSDI)
Eligibility is based on prior work history under Social Security. The worker must have earned sufficient credits based on taxable work to be “insured” for Social Security benefits. The amount of the monthly disability benefit is based on the Social Security earnings record of the worker (or the parent in the case of a child who becomes disabled). In order to qualify for SSDI, the injured person must have a medical condition that prevents working for a minimum of one year. Please do not be discouraged if your application is denied. You may appeal within 60 days. You may hire an attorney to assist with this process.

To apply, visit: http://ww.ssa.gov/disability or call (800) 772-1213.

Supplemental Security Income (SSI)
SSI provides payments to persons who are disabled and meet income guidelines. Children or young adults who do not have a work history may also qualify for SSI. Generally, those that qualify for SSI are eligible for Medicaid. The qualifying process can be lengthy so it is important to begin this process as early as possible during the hospital stay.

To apply, visit: http://www.ssa.gov/disability or call (800) 772-1213.

Disability Benefits through Work
Many employers offer disability benefits. It’s important to contact your loved one’s employer to notify them of the injury and request assistance from their human resources person or office manager. That person can inform you of any possible benefits that may be available.

Arkansas Crime Victims Reparations Program
If your loved one is a victim of a crime, he/she may be eligible for financial help. The Arkansas Crime Victims Reparations program provides a method of compensating and assisting victims and their dependents who have suffered personal injury or death as a result of violent crimes, including DWIs committed in Arkansas. Claimants may request compensation for medical care, counseling, lost wages, replacement services, funeral expenses, loss of support, and crime-scene cleanup. Eligible victims may be awarded reparations regardless of whether there has been an arrest or conviction related to the crime.

For more information about the crime victims reparations program visit: http://arkansasag.gov/programs/criminal-justice/crime-victim-reparations

Arkansas Attorney General’s Office (501) 682-1020 or (800) 448-3014
323 Center Street, Suite 200, Little Rock, Arkansas 72201
Legal Aid of Arkansas
Legal Aid of Arkansas is a 501(c)3 nonprofit organization that provides free legal services to low-income individuals residing in Arkansas in civil (non-criminal) cases. Income eligibility guidelines must be met.

For more information about Legal Aid of Arkansas visit:
http://www.arlegalservices.org/legalaid

Legal Aid of Arkansas’ Office (870) 972-9224 or (800) 9 LAW AID (800-952-9243)
714 South Main Street Jonesboro, AR 72401

SEEK AND USE AVAILABLE RESOURCES
Quick reference of helpful resource websites and contact information:

Brain Injury Association of America (BIAA)
http://www.biausa.org
Information Center: (800) 444-6443

Centers for Disease Control and Prevention (CDC)
http://www.cdc.gov/ncipc
(800) CDC-INFO
(800) 232-4696

Disability Rights Center of Arkansas
http://www.arkdisabilityrights.org
1100 N. University, Suite 201
Little Rock, AR 72207
(800) 482-1174

Medicare
http://www.medicare.gov
(800) 633-4227

Social Security Administration
Disability Programs
http://www.ssa.gov/disability
(800) 772-1213

Travis Roy Foundation
http://www.travisroyfoundation.org
(617) 227-0781
Hemenway & Barnes LLP
60 State Street, 8th Floor
Boston, MA 02109

Veteran’s Administration Central Area Office
http://www.va.gov
(800) 827-1000
Local Support Groups
Support groups can be a very effective coping tool and can help family members understand they are not alone.

**TBI Support Group**
Baptist Health Rehabilitation Institute
9601 Interstate 630, Exit 7
Little Rock, AR 72205-7299
Diane Gottsponer, Brain Injury Team Care Coordinator
Phone: (501) 202-7047
E-mail: Diane.Gottsponer@baptist-health.org

**Christus St. Michael Rehab TBI Support Group**
Christus St. Michael Rehabilitation Hospital
2400 St. Michael Drive
Texarkana, TX 75503
Elizabeth O’Rand, RN
Phone: (903) 614-4000
E-mail: elizabeth.dalby@christushealth.org
[http://www.christusstmichael.org/body.cfm?id=177&action=detail&ref=21](http://www.christusstmichael.org/body.cfm?id=177&action=detail&ref=21)

Online Support Groups
Currently, there are brain injury support groups available online. Feel free to visit the ones listed below.

[http://www.dailystrength.org/c/Brain-Injury/support-group](http://www.dailystrength.org/c/Brain-Injury/support-group)
[http://www.tbihome.org](http://www.tbihome.org)
[http://www.48friend.org](http://www.48friend.org)

National Resource
The Brain Injury Association of America (BIAA) is the leading national organization serving and representing individuals, families, and professionals who are touched by a life-altering, traumatic brain injury (TBI). Together with its network of more than 40 chartered state affiliates, the BIAA provides information, education, and support to assist the millions of Americans currently living with traumatic brain injury and their families.

**Brain Injury Association of America**
Phone: (703) 761-0750
[http://www.biausa.org](http://www.biausa.org)

For more information on local and national resources contact the Arkansas Traumatic Rehabilitation Program (501) 683-0537 or email: atrp.info@arkansas.gov.
RECOMMENDED BOOKS

The Brain Injury Association of America has an extensive list of recommended material on their website. Order education materials at [http://www.biausa.org](http://www.biausa.org).


*Successfully Surviving a Brain Injury A Family Guidebook* by Gary Prowe (2010).


*Brain Injury Survival Kit* by Dr. Cheryle Sullivan, MD (2008).


*Unthinkable: A Caregiver’s Companion* by Dixie Fremont-Smith Coskie (2010).


*Brain Injury It is a Journey* by Flora Hammond, MD, and Tami Guerrier, Editors (2010).


*Managing Care and Services after Brain Injury: A workbook for families and caregivers* by Don Hood, Marilyn Lash, Ann Glang, and Bonnie Todis (2010).

*Survival Kit, A Planner and Organizer for Survivors of Brain Injury* by Debbie Leonhardt (2002).

References


*Brain Injury: A Family Guide by the Brain Injury Association of Florida.* (Copyright 2011)

*Brain Injury Resource Manual* Baptist Health Rehabilitation Institute, Little Rock, AR. (Copyright 2009)


*Frank Toral, Founder*, [http://www.toralfamilyfoundation.org](http://www.toralfamilyfoundation.org) Toral Family Foundation (855) 867-2533
Glossary of Terms
About Traumatic Brain Injury

This is only a partial list of the hundreds of terms and specialties associated with brain injuries.

Traumatic Brain Injury glossary of terms contains definitions and explanations for common brain injury terms and phrases. Compiled to provide helpful information and understanding for brain injury survivors, families, and caregivers.

This glossary is only a partial list of the hundreds of terms and specialties associated with brain injuries.

To Thrive. Not just Survive.
**GLOSSARY of TERMS**

**A**

**Affect:** The observable emotional condition of an individual at any given time.

**Agnosia:** Failure to recognize familiar objects although the sensory mechanism is intact. This may occur for any sensory modality.

**Agraphia:** The inability to express thoughts in writing.

**Alexia:** The inability to read.

**Alertness:** Being awake and able to respond to stimulation.

**Ambulate:** To walk.

**Amnesia:** Lack of memory about events occurring during a particular period of time.

**Aneurysm:** Localized abnormal balloon like deformity in the wall of a blood vessel, usually an artery, that weakens the wall of the vessel. If dilation increases, the wall weakens as the balloon grows larger, and may eventually burst, causing a hemorrhage.

**Anomia:** Inability to recall names of objects. Persons with this problem often can speak fluently but have to use other words to describe familiar objects.

**Anosmia:** Loss of the sense of smell.

**Anoxia:** Lack of oxygen to the brain. Cells of the brain need oxygen to stay alive. When blood flow to the brain is reduced or when oxygen in the blood is too low, brain cells are damaged.

**Anterograde Amnesia:** Inability to consolidate information about ongoing events. Difficulty with new learning.

**Anticonvulsant:** Medication used to decrease the possibility of a seizure (e.g., Dilantin, Phenobar, Mysoline, Tegretol).

**Antidepressants:** Medication used to treat depression.

**Aphasia:** Loss of the ability to express oneself and/or to understand language. Caused by damage to brain cells rather than deficits in speech or hearing organs.

**Apraxia:** Inability to carry out complex or skilled movement; not due to paralysis, sensory changes, or deficiencies in understanding. (See parietal lobe, page 13)

**Aprosodia:** A condition in which there is a loss of production or comprehension of the meaning of different tones of voice.

**Arousal:** Being awake. Primitive state of alertness managed by the reticular activating system (extending from medulla to the thalamus in the core of the brain stem) activating the cortex. Cognition is not possible without some degree of arousal.

**Articulation:** Movement of the lips, tongue, teeth, and palate into specific patterns for purposes of speech (Also, a movable joint).

**Aspiration:** When fluid or food enters the lungs through the wind pipe. This can cause a lung infection or pneumonia. A problem with muscle coordination.

**Ataxia:** A problem of muscle coordination not due to apraxia, weakness, rigidity, spasticity, or sensory loss, caused by lesion of the cerebellum or basal ganglia. Can interfere with a person’s ability to walk, talk, eat, and to perform other self-care tasks.

**Atrophy:** A wasting away or decrease in size of a cell, tissue, organ, or part of the body caused by lack of nourishment, inactivity, or loss of nerve supply.

**Attention/Concentration:** The ability to focus on a given task or set of stimuli for an appropriate period of time.

**Augmentative and Alternative Communication:** Use of forms of communication other than speaking, such as: sign language, "yes/no" signals, gestures, picture board, and computerized speech systems to compensate (either temporarily or permanently) for severe expressive communication disorders.

**ADL:** Activities of daily living. Routine activities carried out for personal hygiene and health (including bathing, dressing, feeding), and for operating a household.
Behavior: The total collection of actions and reactions exhibited by a person.

Bilateral: Pertaining to both right and left sides of the body.

Brain Injury, Acquired: The implication of this term is that the individual experienced normal growth and development from conception through birth, until sustaining an insult to the brain at some later time which resulted in impairment of brain function.

Brain Injury, Closed: Occurs when the head accelerates and then rapidly decelerates or collides with another object (for example the windshield of a car) and brain tissue is damaged, not by the presence of a foreign object within the brain, but by violent smashing, stretching, and/or twisting, of brain tissue. Closed brain injuries typically cause diffuse tissue damage that result in disabilities which are generalized and highly variable.

Brain Injury, Mild: A patient with a mild traumatic brain injury is a person who has had a traumatically-induced physiological disruption of brain function, as manifested by at least one of the following: 1) any period of loss of consciousness, 2) any loss of memory for events immediately before or after the accident, 3) any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused), 4) focal neurological deficit(s) which may or may not be transient; but where the severity of the injury does not exceed the following: a) loss of consciousness of approximately 30 minutes or less; b) after 30 minutes, an initial Glasgow Coma Scale score of 13-15; c) Post Traumatic Amnesia not greater than 24 hours.

Brain Injury, Traumatic: Damage to living brain tissue caused by an external, mechanical force. It is usually characterized by a period of altered consciousness (amnesia or coma) that can be very brief (minutes) or very long (months/indefinitely). The specific disabling condition(s) may be orthopedic, visual, auditory, neurologic, perceptive/cognitive, or mental/emotional in nature. The term does not include brain injuries that are caused by insufficient blood supply, toxic substances, malignancy, disease-producing organisms, congenital disorders, birth trauma, or degenerative processes.

Brain Stem: The lower extension of the brain where it connects to the spinal cord. Neurological functions located in the brain stem include those necessary for survival (breathing, heart rate) and for arousal (being awake and alert).

Catheter: A flexible tube for withdrawing fluids from, or introducing fluids into, a cavity of the body. A catheter is frequently used to drain the urinary bladder (Foley catheter).

Cerebral-spinal Fluid (CSF): A liquid solution similar to plasma protecting the brain and spinal cord from physical impact. Usually shrinking or expanding of the cranial contents is quickly balanced by increase or decrease of this fluid. CSF circulates through the subarachnoid space. For diagnosis purposes, a lumbar puncture (spinal tap) is used to draw CSF.

Clonus: A sustained series of rhythmic jerks following quick stretch of a muscle.

Cognitive Impairment: Difficulty with basic brain functions- perception, memory, attention or reasoning.

Cognitive Process: Higher mental functioning; learning, memory, imagination, comprehension, decision making; the means by which an individual becomes aware of people, objects, and situations in the environment and their subjective symbolic meaning.

Coma: State of unconsciousness from which the patient cannot be awakened or aroused, even by powerful stimulation; lack of any response to one’s environment; defined clinically as the inability to follow a one-step command consistently (Glasgow Coma Scale of 8 or less).

Communicative Disorder: A impairment in the ability to 1) receive and/or process a symbol system, 2) represent concepts or symbol systems, and/or 3) transmit and use symbol systems.
Impairment may be observed in disorders of hearing, language, and/or speech processes.

**Comprehension:** Ability to understand spoken, written, or general communication.

**Concentration:** Maintaining attention on a task over a period of time; remaining attentive and not easily diverted.

**Concrete Thinking:** A style of thinking in which the individual sees each situation as unique and is unable to generalize from the similarities between situations. Language and perceptions are interpreted literally so that a proverb such as "a stitch in time saves nine" cannot be readily grasped.

**Concussion:** The common result of a blow to the head or sudden deceleration usually causing an altered mental state, either temporary or prolonged. Physiologic and/or anatomic disruption of connections between some nerve cells in the brain may occur. Often used by the public to refer to a brief loss of consciousness.

**Confabulation:** Verbalizations about people, places, and events with no basis in reality. May be a detailed account delivered.

**Confusion:** A state in which a person is bewildered, perplexed, or unable to self-orient.

**Conjugate Movement:** Both eyes move simultaneously in the same direction. Convergence of the eyes toward the midline (crossed eyes) is a disconjugate movement.

**Contracture:** Loss of range of motion in a joint due to abnormal shortening of soft tissues.

**Contrecoup:** Bruising of brain tissue on side opposite where the blow was struck.

**CT Scan/Computerized Axial Tomography:** A series of computerized tomography X-rays taken at different levels of the brain that allows the direct visualization of the skull and intracranial structures. A scan is often taken soon after the injury to help decide if surgery is needed. The scan may be repeated later to see how the brain is recovering.

**Decerebrate Posture (Decerebrate Rigidity)**
Exaggerated posture of extension as a result of a lesion to the preptoine area of the brain stem, and is rarely seen fully developed in humans. In reporting, it is preferable to describe the posture seen.

**Decreased Insight:** Patient may not recognize problems he is having or may attempt to rationalize or minimize problems.

**Depression:** The person may be understandably sad or depressed because of his/her injury. Depression is difficult to clearly diagnose, but several treatment approaches are available.

**Diplopia:** Seeing two images of a single object; double vision. See also vision after head injury.

**Disinhibition (Lack of inhibition):** Inability to control impulsive behavior and emotions.

**Disorientation:** Not knowing where you are, who you are, or current date. Health professionals often speak of a normal person as being oriented "times three" which refers to person, place, and time.

**Dysarthria:** Difficulty in forming words or speaking them because of weakness of muscles used in speaking. Speech is characterized by slurred, imprecise articulation. Tongue movements are usually labored and the rate of speaking may be very slow. Voice quality may be abnormal, usually excessively nasal; volume may be weak; drooling may occur. Dysarthria may accompany aphasia or occur alone.

**Dysphagia:** Difficulty in swallowing. It also includes difficulty in moving material from the mouth to the stomach. This also includes problems in positioning food in the mouth.

**Edema:** Collection of fluid in the tissue causing swelling.

**EEG (Electro-encephalogram):** A procedure that uses electrodes on the scalp to record electrical activity of the brain. Used for detection of epilepsy, coma, and brain death.
Endotracheal Tube: A tube that serves as an artificial airway and is inserted through the patient’s mouth or nose. It passes through the throat and into the air passages to help breathing. To do this it must also pass through the patient’s vocal cords. The patient will be unable to speak as long as the endotracheal tube is in place. It is this tube that connects the respirator to the patient.

Flaccid: Lacking normal muscle tone; limp.

Flexion: Bending a joint

Frustration Tolerance: The ability to persist in completing a task despite apparent difficulty. Individuals with a poor frustration tolerance will often refuse to complete tasks which are the least bit difficult. Angry behavior, such as yelling or throwing things while attempting a task, is also indicative of poor frustration tolerance.

Generalization: Being able to carry learning from one setting into another (learning to transfer from the wheelchair to the bed in the hospital; then being able to do the same at home).

GI Tube: A tube inserted through a surgical opening into the stomach. It is used to introduce liquids, food, or medication into the stomach when the patient is unable to take these substances by mouth.

Glasgow Coma Scale (GCS): A standardized system used to assess the degree of brain impairment and to identify the seriousness of injury in relation to outcome. The system involves three determinants: eye opening, verbal responses and motor response. These three determinants are evaluated independently according to a numerical value. The resultant value indicates the level of consciousness and degree of dysfunction. Scores run from a high of 15 to a low of 3. Persons are considered to have experienced a ’mild brain’ injury when their score is between 13 and 15. A score of 9 to 12 is considered to reflect a ’moderate’ brain injury and a score of 8 or less reflects a ’severe’ brain injury.

Grief Process: Emotional responses to grief which progress from alarm to disbelief and denial, to anger and guilt, to finding a source of comfort, and finally to adjustment.

Head Injury: Refers to an injury of the head and/or brain, including lacerations and contusions, to the head/forehead.

Hematoma: Collection of blood in tissue or a space following the rupture of blood vessel. Types include:
- Epidural Hematoma—outside the brain and its fibrous covering but under the skull.
- Subdural Hematoma—between the brain and its fibrous covering (dura).
- Intracerebral Hematoma—in the brain tissue.
- Subarachnoid Hematoma—around the surface of the brain, between the dura and arachnoid membranes.

Hemianopsia/Hemianopia: Visual field cut, blindness for one half of the field of vision. This is not the right or left eye, but the right or left half of vision in each eye. See also vision after head injury.

Hemiparesis: Weakness, paralysis or loss of movement on one side of the body.

Heterotopic Ossification (HO): Extra bone that sometimes forms after in the soft tissue. It can decrease range of motion and flexibility or it can cause pain.

Hydrocephalus: Enlargement of fluid-filled cavities in the brain, not due to brain atrophy.

Hypoxia: Insufficient oxygen reaching the tissues of the body.

Impulsivity: Ability to withhold inappropriate verbal or motor responses while completing a task.

Impulsively: The person may act suddenly without considering the consequences.

Incontinent: Inability to control bowel and bladder functions. Many people who are incontinent can become continent with training.
J

Judgment: Evaluating information and making a decision that is safe and appropriate for the situation.

K

Kinesthesia: Sensory awareness of body parts as they move.

L

Lability: Notable shifts in emotional state (e.g., uncontrolled laughing or crying)

Lack of Inhibition: Due to the injury, systems in the brain that monitor behavior can be impaired. Person may no longer be restrained by society’s idea of proper behavior. He may be very angry and hostile, use profanity frequently, or make inappropriate sexual remarks.

Lack of Initiation: The person may find it very difficult to initiate action, even though he may know what to do.

Leg Bag: A small, thick plastic bag that can be tied to the leg and collects urine. It is connected by tubing to a catheter inserted into the urinary bladder.

Locked-in-Syndrome: A condition resulting from interruption of motor pathways in the ventral pons, usually by infarction. This disconnection of the motor cells in the lower brain stem and spinal cord from controlling signals issued by the brain leaves the patient completely paralyzed and mute, but able to receive and understand sensory stimuli. Communication may be possible by code using blinking or movements of the jaw or eyes.

M

Magnetic Resonance Imaging (MRI): A type of diagnostic radiography using electromagnetic energy to create an image of soft tissue, central nervous system, and musculoskeletal systems.

Memory: Being able to remember information from the past and day to day. Problems remembering the recent past are common.

Memory, Episodic: Memory for ongoing events in a person’s life. Sometimes more easily impaired than semantic memory, perhaps because rehearsal or repetition tends to be minimal.

Memory, Immediate: The ability to recall numbers, pictures, or words immediately following presentation. Patients with immediate memory problems have difficulty learning new tasks because they cannot remember instructions, relies upon concentration and attention.

Memory, Long Term: In neuropsychological testing, this refers to recall thirty minutes or longer after presentation. Long term memory exceeds the limit of short term memory because it requires storage and retrieval of information.

Memory, Short Term: Primary or ‘working’ memory, its contents are in conscious awareness—A limited capacity system that holds up to seven chunks of information over periods of 30 seconds to several minutes, depending upon the person’s attention to the task.

Motor Control: Regulation of the timing and amount of contraction of muscles of the body to produce smooth and coordinated movement. The regulation is carried out by operation of the nervous system.

Muscle Tone: Used in clinical practice to describe the resistance of a muscle to being stretched. When the peripheral nerve to a muscle is severed, the muscle becomes flaccid (limp). When nerve fibers in the brain or spinal cord are damaged, the balance between facilitation and inhibition of muscle tone is disturbed. The tone of some muscles may become increased and they resist being stretched—condition called hypertonicity or spasticity.

N

Nasogastric Tube (NG tube): Tube that passes through the person’s nose and throat and ends in the person’s stomach. This tube allows for direct “tube feeding” to maintain the nutritional status of the person or removal of stomach acids.

Neglect: Paying little or no attention to a part of the body.

Neuropsychologist: A psychologist who specializes in evaluating (by tests) brain/behavior relationships, planning training programs to help
the survivor of brain injury return to normal functioning, and recommending alternative cognitive and behavioral strategies to minimize the effects of brain injury. Often works closely with schools and employers as well as with family members of the injured person.

**Nystagmus:** Involuntary horizontal, vertical or rotary movement of the eyeballs.

**Orientation:** Awareness of one's environment and/or situation, along with the ability to use this information appropriately in a functional setting. Knowing who you are, where you are, what day it is, etc.

**Perception:** Ability to make sense of what one sees, hears, feels, tastes, or smells. Perceptual losses are often very subtle and the patient and/or family are unaware of them.

**Perseveration:** The inappropriate persistence of a response in a current task which may have been appropriate for a former task. Perseverations may be verbal or motor.

**Plateau:** A temporary or permanent leveling off in the recovery process.

**Post Traumatic Amnesia (PTA):** A period of hours, weeks, days or months after the injury when the patient exhibits a loss of day-to-day memory. The patient is unable to store new information and therefore has a deceased ability to learn. Memory of the PTA period is never stored; therefore things that happened during that period cannot be recalled. See also Anterograde Amnesia.

**Posture:** The attitude of the body. Posture is maintained by low-grade, continuous contraction of muscles which counteract the pull of gravity on body parts. Injury to the nervous system can impair the ability to maintain normal posture (for example holding up the head).

**Pre-Morbid Condition:** Characteristics of an individual present before the disease or injury occurred.

**Problem-Solving:** Ability to consider the probable factors that can influence the outcome of each of various solutions to a problem and to select the most advantageous solution. Individuals with deficits in this skill may become "immobilized" when faced with a problem. By being unable to think of possible solutions, they may respond by doing nothing.

**Prognosis:** The prospect as to recovery from a disease or injury based on nature and symptoms of the case.

**Proprioception:** The sensory awareness of the position of body parts with or without movement.

**Quadriparesis:** Partial loss of function all four extremities of the body.

**Range of Motion (ROM):** The normal range of movement of any joint in the body. Range of motion also refers to exercises designed to maintain this range and prevent contractures.

**Reasoning:** Ability to think and reach conclusions in an orderly, rational way. Information processing is another term used for all the elements of cognition. Processing involves taking in information from the environment, remembering it, understanding it, breaking it down into parts and using these parts separately or in combination with other knowledge.

**Reasoning, Abstract:** Mode of thinking in which the individual recognizes a phrase that has multiple meanings and selects the meaning most appropriate to a given situation. The term "abstract" typically refers to concepts not readily apparent from physical attributes of an object or situation.

**Reasoning, Concrete:** The ability to understand the literal meaning of a phrase.

**Reasoning, Sequencing:** The ability to organize information or objects according to specified sequencing rules, and arrange information or objects in a logical progressive manner. Nearly every activity, including work and leisure tasks, requires sequencing. For example, when cooking certain foods ingredients must be added and mixed in a specified order; in dressing,
undergarments must be put on prior to outer garments.

**S**

**Seizure:** An uncontrolled discharge of nerve cells which may spread to other cells nearby or throughout the entire brain. It usually lasts only a few minutes. It may be associated with loss of consciousness, loss of bowel and bladder control, and tremors. Also may cause aggression and other behavioral changes.

**Selective Attention:** Being able to tell the difference between two or more kinds of stimulation and focus on one by choice.

**Selfishness:** Injury may cause the person to be very wrapped up in him or herself and his or hers problems, often to the point that family members think the patient is unfeeling.

**Sensation:** Feeling stimuli which activate sensory organs of the body, such as touch, temperature, pressure and pain. Also seeing, hearing, smelling, and tasting.

**Sensorimotor:** Refers to all aspects of movement and sensation and the interaction of the two.

**Sensory Integration:** Interaction of two or more sensory processes in a manner that enhances the adaptiveness of the brain.

**Sequencing:** Reading, listening, expressing thoughts, describing events or contracting muscles in an orderly and meaningful manner.

**Shunt:** Procedures to draw off excess fluid in brain. Surgically-placed tube running from ventricles deposits fluid into abdominal cavity, heart, or large veins of the neck.

**Skin Breakdown/Pressure Sore:** Pressure area, bed sore, skin opening, skin breakdown. A discolored or open area of skin damage caused by pressure. Common areas most prone to breakdown are buttocks or backside, hips, shoulder blades, heels, ankles, and elbows.

**Spasticity:** Involuntary increase in muscle tone (tension) that occurs following injury to the brain or spinal cord, causing muscles to resist being moved. Characteristics may include increase in deep tension reflexes, resistance to passive stretch, clasp knife phenomenon, and clonus.

**Subdural:** Beneath the dura (tough membrane) covering the brain and spinal cord.

**T**

**Tactile Defensiveness:** Being overly sensitive to touch; withdrawing, crying, yelling, or striking when one is touched.

**Tracheostomy:** Temporary surgical opening at the front of the throat providing access to the trachea or windpipe to assist in breathing.

**Tracking, Visual:** Visually following an object as it moves through space.

**Temor, Intention:** Course, rhythmical movements of a body part that become intensified the harder one tries to control them.

**Temor, Resting:** Rhythmical movements present at rest and may be diminished during voluntary movement.

**U**

**Unilateral Neglect:** Paying little or no attention to things on one side of the body. This usually occurs on the side opposite from the location of the injury to the brain because nerve fibers from the brain typically cross before innervating body structures. In extreme cases, the patient may not bathe, dress, or acknowledge one side of the body.

**Urinary Tract Infection:** When bacteria have reproduced to a large number in the bladder. This can cause fever, chills, burning on urination, urgency, frequency, incontinence, or foul smelling urine.

**V**

**Ventilator:** Machine which helps an individual to breathe, keeps airway passages in the throat clear, and provides adequate oxygen to the body.

**Verbal Apraxia:** Impaired control of proper sequencing of the muscles used in speech (tongue, lips, jaw muscles, vocal cords). These muscles are not weak but their control is defective. Speech is labored and characterized by sound reversals, additions, and word approximations.
**Whiplash Injury:** An injury to the neck that causes violent back and forth movement of the head and neck such as in a rear end car collision. Such injuries have been known to cause brain damage.

**Withdrawal:** A response to physical danger or severe stress characterized by a state of apathy, lethargy, depression, and retreat into oneself.

*Resources for this glossary*
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**NOTES:**

Information contained in this resource guide is not meant to replace, or substitute, advice from a medical professional. Always consult your physician and qualified health care professionals regarding specific medical concerns or treatment.