Assisting People with Brain Injuries and Their Families

April, 2019

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The North Dakota Statewide Developmental Disabilities Community Staff Training Program

Minot State University Center of Excellence
Assisting People with Brain Injuries and Their Families

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a center of excellence in disability research and education at Minot State University
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Lesson 1: Introduction to Brain Injury

Thanks to the revolutionary advances in medical care over the past 20 years there has been a dramatic increase in the number of people who survive Brain Injuries.

Many people with brain injuries find themselves totally unprepared to address the problems caused by the injury once they return home. These individuals often experience a number of complex physical, cognitive, and psychological difficulties that require intensive support from their family. Upon discharge from the hospital these problems can persist and intensify, leading those affected to seek the assistance of community-based health care and educational professionals.

The purpose of this training module is to provide a comprehensive overview of brain injuries and how to assist people with brain injuries and their families. The content will address a number of topics such as mechanism of injury, classification of injury severity, and common "real life" consequences of acquired neurological impairments (e.g., medical, physical, cognitive, behavioral, social, psychological, family, etc.).

The emphasis is on detailing practical principles that all levels of staff can use to help select treatment goals and appropriate intervention techniques. Treatment and evaluation methods are discussed.

The material covered in this module is to assist individual staff members as well as organizations to build both skills and confidence in addressing brain injuries.

DEFINITION

The terms Acquired Brain Injury (ABI) and traumatic brain injury (TBI) differ in their meanings. Acquired brain injury is “an injury to the brain that is not hereditary, congenital, degenerative, or induced by birth trauma.” (Brain Injury Association of America, 2019). Essentially, this injury occurs after birth and changes the brain’s neuronal activity impacting physical integrity, metabolic activity, or function of brain nerve cells. There are two types of ABI: traumatic and non-traumatic.

<table>
<thead>
<tr>
<th>Causes of Traumatic Brain Injury</th>
<th>Causes of Non-Traumatic Brain Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls</td>
<td>Stroke (Hemorrhage, Blood Clot)</td>
</tr>
<tr>
<td>Assaults</td>
<td>Infectious Disease (Meningitis, Encephalitis)</td>
</tr>
<tr>
<td>Motor Vehicle Accidents</td>
<td>Seizure</td>
</tr>
<tr>
<td>Sports/Recreation Injuries</td>
<td>Electric Shock</td>
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<tr>
<td>Abusive Head Trauma (Shaken Baby Syndrome)</td>
<td>Tumors</td>
</tr>
<tr>
<td>Gunshot Wounds</td>
<td>Toxic Exposure</td>
</tr>
<tr>
<td>Workplace Injuries</td>
<td>Metabolic Disorders</td>
</tr>
<tr>
<td>Child Abuse</td>
<td></td>
</tr>
</tbody>
</table>
A **traumatic brain injury** is defined as “an alteration in brain function, or other evidence of brain pathology, caused by external force” (Brain Injury Association of America, 2019). Traumatic impact injuries can be defined as *closed* or *open*. A **non-traumatic brain injury** is an alteration in brain function caused by an internal force.

**GENERAL STATISTICS**

- The number of deaths from head injuries over the last 12 years has surpassed the number of deaths from battle in all wars since the founding of the Republic.

- 5.3 million Americans, approximately 2% of the population, currently live with disabilities related to brain injury (caregiver.com).
- Males are more than twice as likely as females to experience ABI (caregiver.com).

- In 2010, about 2.5 million emergency department (ED) visits, hospitalizations or deaths were associated with TBI—either alone or in combination with other injuries—in the United States (cdc.gov).

- From 2001 to 2009, the rate of ED visits for sports and recreation-related injuries with a diagnosis of concussion or TBI, alone or in combinations with other injuries, rose 57% among children (age 20 or younger) (www.cdc.gov)

- When an individual experiences TBI the risks of experiencing a second injury is three times greater; and, after the second injury the risk for experiencing a third injury is eight times greater (Brain Injury Association, Inc., 1996).

- TBI is the leading cause of death and disability in children and young adults (The Brain Injury Association Of Connecticut, 2019).

- Children are at a higher risk for receiving a brain injury in the hours following school dismissal (Brain Injury Association, Inc., 2019).

- The direct medical costs and indirect costs of brain injury, such as lost productivity, total an estimated $60 billion in the United States (www.cdc.gov).

**CAUSES**

- Child abuse accounts for over half of all infant head injuries.
• Alcohol is involved in more than 50% of ABI.

RESULTS

• Brain injury can result in a multitude of conditions. The major problems encountered by individuals who have experienced a head injury are the changes in cognitive, behavioral and emotional functioning. These changes affect the individual, the family and the work-site.

• Often times, individuals cannot return to the vocational setting they held before the injury occurred, therefore vocational rehabilitation is necessary.
Lesson 1: Feedback Exercise

1. Define a traumatic brain injury.

2. List 6 causes of traumatic brain injury:

   True or False

3. T  F The terms "acquired brain injury" and "traumatic brain injury" are interchangeable terms.

4. T  F Less than 1 million brain injuries occur annually.

5. T  F Brain injury is the leading cause of death and disability in children.

6. T  F Females are more likely to experience a brain injury than males.

7. T  F Automobile accidents account for over 75% of brain injuries.

8. T  F Alcohol is involved in half of brain injuries.
Lesson 2: Types of Head Injuries

Brain injuries occur in a variety of manners. Automobile accidents, bodily assault, bicycle accidents and falls may all lead to head injury. Regardless of the cause, head trauma will result in one of two types of injury: open head injury or closed head injury. Open head injuries are often thought of as being more severe than closed head injuries due to bleeding and visible damage; however, open head injuries are neither more nor less damaging than closed head injuries. In fact, both open and closed head injuries can result in a multitude of problems which are inconspicuous at the time of injury.

OPEN HEAD INJURIES

An open head injury, also known as a penetrating head injury, is a head injury in which the dura mater (the outer layer of the meninges) is breached. Penetrating injury can be caused by high-velocity projectiles or objects of lower velocity such as knives, or bone fragments from a skull fracture (www.biaia.org).

For example, injury to the temporal lobe may result in deficits in memory, language comprehension and hearing acuity. Secondary damage (such as bleeding) is always evident with open head injuries, and is often one of the primary medical concerns. Swelling is always associated with head injuries; however, because penetration of the skull occurs, there is an opening in the skull which allows the increasing pressure to escape, therefore lessening the damage of the edema (swelling).

CLOSED HEAD INJURIES

A closed head injury is an injury to the brain caused by an outside force without any penetration of the skull. With a closed head injury, when the brain swells, it has no place to expand. This can cause an increase in intracranial pressure, which is the pressure within the skull.

As the brain swells, it may expand through any available opening in the skull, including the eye sockets. When the brain expands through the eye sockets, it can compress and impair the functions of the eye nerves. For instance, if an eye nerve, Cranial Nerve III, is compressed, a person's pupil (the dark center part of the eye) will appear dilated (big). This is one reason why medical personal may monitor a person's pupil size and intracranial pressure (www.biaia.org).

Closed head injuries can result in three types of primary damage, which can occur individually or in combination with one another: Contusions of the frontal and/or temporal lobes(s), coup/contra-coup damage, and diffused axon.
Contusions of the frontal and/or temporal lobe(s)

A concussion can be caused by direct blows to the head, gunshot wounds, violent shaking of the head, or force from a whiplash-type injury. Both closed and open head injuries can produce a concussion. A concussion is the most common type of brain injuries.

- A concussion is caused when the brain receives trauma from an impact or a sudden momentum or movement change. The blood vessels in the brain may stretch and cranial nerves may be damaged.
- A person may or may not experience a brief loss of consciousness (not exceeding 20 minutes). A person may remain conscious, but feel “dazed” or “punch drunk”.
- A concussion may or may not show up on a diagnostic imaging test, such as a CAT scan.
- Skull fracture, brain bleeding, or swelling may or may not be present.
- A concussion can cause injury resulting in permanent or temporary damage.

It may take a few months to a few years for a concussion to heal (www.biusa.org).

Temporal lobe damage may result in learning difficulties. For example, the individual may be unable to learn new information after the injury, or he/she may learn the information but immediately forget it (National Head Injury Foundation, Florida Association; Kay & Lezak, 1990). The individual's hearing acuity may also be affected which may contribute to difficulty understanding and comprehending language.

Damage to the frontal lobe may result in a variety of deficits. The frontal lobe is responsible for higher-level and abstract activities. Frontal lobe damage results in: impaired executive functions, impaired problem-solving functions, and/or uncontrollable emotions and behaviors (Kay & Lezak, 1990; National Head Injury Foundation, Florida Association). Word retrieval may also be affected as well as the overall personality of the individual.

The Cortex:
Most thinking occurs here.

The Cerebellum:
Coordinates movement.

The Brain Stem:
Controls consciousness, alertness, and basic body functions such as breathing and heart rate. It connects the brain to the spinal cord.
**Frontal Lobes Functions** - An injury to the frontal lobes may affect an individual's ability to control emotions, impulses, and behavior or may cause difficulty recalling events or speaking.

- Attention
- Concentration
- Self-Monitoring
- Organization
- Expressive Language (Speaking)
- Motor Planning & Initiation
- Awareness of Abilities
- Awareness of Limitations
- Personality
- Mental Flexibility
- Inhibition of Behavior
- Emotions
- Problem Solving
Brain Stem Functions - The brain stem controls the body's involuntary functions that are essential for survival, such as breathing and heart rate.
- Breathing
- Arousal
- Consciousness
- Heart Rate
- Sleep & Wake Cycles

Temporal Lobes Functions - An injury to the temporal lobes may lead individuals to demonstrate difficulty with communication or memory.
- Memory
- Understanding Language (Receptive Language)
- Sequencing
- Hearing
- Organization

Parietal Lobes Functions - Individuals who have injured their parietal lobes may have trouble with their five primary senses.
- Sense of Touch
- Spatial Perception (Depth Perception)
- Identification of Sizes, Shapes, Colors
- Visual Perception

Cerebellum Functions - An injury to the cerebellum may affect balance, movement, and coordination
- Balance & Coordination
- Skilled Motor Activity
• Visual Perception

Occipital Lobes Functions- An injury to one's occipital lobes may lead to trouble seeing or perceiving the size and shape of objects.

• Vision

The functional sections (lobes) of the brain are also categorized by side - the right side and the left side. If you split the brain down the middle into two equally-sized parts, they are not the same and do not carry the same functions. The right side of the brain controls the left side of the body, while the left side of the brain controls the right side of the body. Each side is responsible for different functions, and general patterns of dysfunction may occur depending on the side of the brain sustaining an injury (www.biaia.org).

Left Side Traits
• Analytical
• Logical
• Precise
• Organized
• Detached
• Literal

Injuries to the left side of the brain can cause:
• Difficulties understanding language (receptive language)
• Difficulties in speaking or verbal output (expressive language)
• Catastrophic reactions (depression, anxiety)
• Impaired logic
• Sequencing difficulties\Decreased control over right-sided body movements

Right Side Traits
• Creative
• Imaginative
Coup/Contra-coup Damage

Coup/contre-coup damage refers to two separate injuries occurring within the brain. If the skull is struck with great intensity it will bend inward and bruise the brain below it; this is considered the initial blow or "coup". The force of the skull bending inward will then push the brain towards the opposite side of the skull causing the brain tissue on that side to also become bruised, this is considered the counterblow or "contra-coup" (Kay & Lezak, 1990).

Damage resulting from this type of injury varies depending on where the coup and contra-coup occurred within the brain. This type of injury tends to result in widespread damage because more than one area of the brain is involved; however, the areas involved depend on the angle and intensity of the initial blow. For example: the "coup" could occur at the occipital lobe thereby causing vision deficits, whereas the "contra-coup" could occur at the parietal lobe, causing deficits in voluntary motion. Examples of damage are:

- impaired motor,
- communicative,
- sensory or perceptual abilities.
Diffuse Axon Injury

Diffuse axon injury is also known as "axon injury" (Kay & Lezak, 1990; Senelick & Ryan, 1991) as well as simply "diffuse" (The National Head Injury Foundation: Florida Association). Axon injury occurs when the head strikes a stationary object, such as the dashboard of a car, with intense force. Upon impact a surge of forces cause the axons throughout the brain to stretch and tear. Disruption of biochemical functioning then occurs, which in turn ceases nerve functioning. Depending on the intensity of the force axons may be stretched so severely that they snap, which results in irreversible damage (Kay & Lezak, 1990). A diffuse axonal injury can be caused by shaking or strong rotation of the head, as with shaken baby syndrome, or by rotational forces, such as with a car accident (www.biaia.org).

This type of damage is considered diffuse because it is widespread throughout the brain rather than centralized in one area of the brain. Axon injury is most likely to occur in the brain stem and/or the corpus callosum, and will result in permanent or severe brain damage (Kay & Lezak, 1990). Axon injury will result in a loss of consciousness; however, if the reticular-activating system (which is located in the brainstem) is injured the individual may experience an extended period of unconsciousness or permanent unconsciousness (Kay & Lezak, 1990). A person with a diffuse axonal injury could present a variety of functional impairments depending on where the shearing (tears) occur in the brain (www.biaia.org). Examples of damage include:

- difficulty maintaining arousal,
- difficulty controlling attention,
- motor disturbances,
- information processing deficits, and
- difficulty with emotional expression (Kay & Lezak, 1990).
Other types of head injuries:

**Penetrating Injury**

- Penetrating injury to the brain occurs from the impact of a bullet, knife, or other sharp object that forces hair, skin, bone, and fragments from the object into the brain.
- Objects traveling at a low rate of speed through the skull and brain can ricochet within the skull, which widens the area of damage.
- A "through-and-through" injury occurs when an object enters the skull, goes through the brain, and exits the skull. Through-and-through brain injuries include the effects of penetration injuries, plus additional shearing, stretching, and rupture of brain tissue.
- Firearms are the single largest cause of death from a brain injury.
The following information was borrowed from the Brain Injury Association of America (www.biaia.org)

<table>
<thead>
<tr>
<th>Abusive Head Trauma (Shaken Baby Syndrome)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abusive head trauma, also known as shaken baby syndrome, is a violent criminal act that causes brain injury. Abusive head trauma occurs when the perpetrator aggressively shakes a baby or young child. The forceful whiplash-like motion causes the brain to be injured.</td>
</tr>
<tr>
<td>• Blood vessels between the brain and skull rupture and bleed.</td>
</tr>
<tr>
<td>• The accumulation of blood causes the brain tissue to compress while the injury causes the brain to swell. This damages the brain cells.</td>
</tr>
<tr>
<td>• Abusive head trauma can cause seizures, lifelong disability, coma, and death.</td>
</tr>
<tr>
<td>• Irritability, changes in eating patterns, tiredness, difficulty breathing, dilated pupils, seizures, and vomiting are signs of abusive head trauma. A baby experiencing such symptoms needs immediate emergency medical attention.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Locked-in Syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locked-in syndrome is a rare neurological condition in which a person cannot physically move any part of their body aside from their eyes.</td>
</tr>
<tr>
<td>• The individual is conscious and able to think.</td>
</tr>
</tbody>
</table>

Vertical eye movements and eye blinking can be used to communicate with others and operate environmental controls.

Immediately following a brain injury, two things occur:

1. Brain tissue reacts to the trauma from the injury with a series of biochemical and other physiological responses. Substances that once were housed safely within these cells now flood the brain, further damaging and destroying brain cells in what is called secondary cell death.
2. Depending on the severity of brain injury, effects may include temporary loss of consciousness or coma, respiratory (breathing) problems, and/or damaged motor functions.

Unlike what is seen in the movies, waking up following loss of consciousness is not immediate and sometimes can be quite difficult for the individual and their loved ones. It is important to be aware of the various neurologically-based symptoms that may occur during this period, such as irritability, aggression, posturing, and other issues. Post-traumatic amnesia (PTA) is also typically experienced as an injured person regains consciousness. PTA refers to the period when the individual feels a sense of confusion and disorientation (i.e., wondering who or where they are and what has happened to them) and an inability to remember recent events.
As time passes, these responses typically subside, and the brain and other body systems approach stability. Unlike bones or muscle tissue, the neurons in the brain do not mend themselves. New nerves do not grow in ways that lead to full recovery. In fact, certain areas of the brain remain damaged, and the functions that were controlled by those areas may be disrupted and lead to challenges in the individual's life.

The severity of damage to the brain after an injury is the primary factor in predicting the injury's impact on the individual. Brain injury is typically categorized as mild, moderate, or severe.

A severe brain injury may cause the individual to experience an unconscious state, where one appears to be in a deep sleep and cannot be aroused or respond purposefully. Assessments will typically reveal that the individual has no sleep and wake cycles. This loss of consciousness (LOC) is referred to as a coma. Depending on varying factors and the severity of injury, the individual may remain in a coma, emerge from a coma, or experience an increased level of consciousness.

A person who is truly in a coma will not be considered for any type of brain injury rehabilitation program. People can, however, experience different states of consciousness after brain injury. Understanding these disorders of consciousness can be important when discussing treatment and possible rehabilitation options.

**Vegetative State**

An individual is unaware, but begins to have sleep and wake cycles; normal digestion, breathing, and heart rates; and may open his or her eyes. The individual may occasionally respond to stimuli.

**Persistent Vegetative State**

Doctors consider a person to be in a persistent vegetative state one year after a brain injury or three to six months after a hypoxic or anoxic brain injury.

However, in certain rare cases, individuals with a brain injury have emerged from a vegetative state after more than one year, and individuals with hypoxic or anoxic brain injury have done the same after more than three months. Research continues to study the recovery process of people who are considered to be in this state.

**Minimally Conscious State**

An individual shows slight but definite self-awareness or awareness of their environment.

They may inconsistently speak short phrases or words, respond to simple commands, may make "yes or no" gestures or verbalizations (sometimes incorrectly), follow people with their eyes, grasp or hold objects, and show appropriate emotional responses, such as smiling or crying. One person may only demonstrate a few of these behaviors, while others exhibit all of them. A minimally responsive state may be a transition level to a higher level of consciousness. An
individual is considered out of a minimally conscious state if he or she can communicate consistently (at least “yes” and “no”) or can use common objects, such as a glass or brush.
Lesson 2: Feedback Exercise

1. Define open head brain injuries.

2. Define closed head brain injuries.

3. Define contusions of the frontal and temporal lobes.

4. Define Coup/Contra-coup damage.

5. Define axon injury.

True or False

6. T  F  Open head injuries are also known as "penetrating injuries."

7. T  F  With closed head injuries the brain itself is penetrating by an external force.

8. T  F  Close head injuries result only in axon injury.

9. T  F  With axon injury nerve functioning ceases.

10. T  F  Contusions of the frontal and temporal lobes are open head injuries.
Lesson 3: Comas

DEFINITION OF A COMA

A loss of consciousness is often experienced following a brain injury. A temporary period of unconsciousness is known as a concussion, and a prolonged period of unconsciousness is known as a coma. Comas can result from any type of brain injury; however, they most often occur as a result of axon injury due to damage to the brainstem, which is responsible for basic life functions including alertness and arousal, as well as other areas of the brain.

A vast majority of individuals who lapse into a coma awaken after a period of time. Unfortunately, it is impossible to determine how long a coma will last. Generally, the longer the coma, the more severe the impairments. However, it is important to understand that even brief periods of unconsciousness can be associated with severe mental impairments.

THE GLASGOW COMA SCALE

The severity of a coma is typically measured by use of the Glasgow Coma Scale. An overall score is given and the severity of the coma is rated accordingly (see tables 3.1 and 3.2). Severity of the brain injury can be classified into 3 categories (www.glasgowcomascale.org)

The first class is mild brain injury. This class is characterized by no loss of consciousness or a loss of consciousness of less than 20 minutes, and a Glasgow Coma Scale (GCS) score of at least 13. Often times the length of the hospital stay is less than 1 week. Neurological impairments are slight and often undetectable immediately following the injury.

The second class is moderate brain injury. This class is characterized by a loss of consciousness of greater than 1 hour but less than 24 hours, and a GCS score between 8 and 12. The length of hospital stay is often several weeks, followed by a prolonged stay in a rehabilitative facility. Significant deficits will be evident following the injury.

The third classification is severe brain injury. This class is characterized by a loss of consciousness of at least 24 hours, and a GCS score of 8 or less. The hospital stay is extremely lengthy and extensive rehabilitation is necessary.

Table 3.1: The Glasgow Coma Scale

The Summed Glasgow Coma Scale = Eye Response score + Motor Response score + Verbal Response score. Maximum score on this scale is 15 and minimum is 3. The most severely injured persons score the lowest.
### GLASGOW COMA SCALE

<table>
<thead>
<tr>
<th>Eye Opening</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td>To sound</td>
<td>3</td>
</tr>
<tr>
<td>To Pressure</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Best Motor Response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Obeys Commands</td>
<td>6</td>
</tr>
<tr>
<td>Localizes Pain</td>
<td>5</td>
</tr>
<tr>
<td>Normal flexion</td>
<td>4</td>
</tr>
<tr>
<td>Abnormal Flexion</td>
<td>3</td>
</tr>
<tr>
<td>Extension Response</td>
<td>2</td>
</tr>
<tr>
<td>No Response to Pain</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verbal Response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriented</td>
<td>5</td>
</tr>
<tr>
<td>Confused Conversation</td>
<td>4</td>
</tr>
<tr>
<td>Inappropriate Words</td>
<td>3</td>
</tr>
<tr>
<td>Incomprehensible Sounds</td>
<td>2</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3.2: Severity Classification According to the Glasgow Coma Scale

<table>
<thead>
<tr>
<th>GCS Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 or more</td>
<td>Mild</td>
</tr>
<tr>
<td>9 - 12</td>
<td>Moderate</td>
</tr>
<tr>
<td>8 or less</td>
<td>Severe</td>
</tr>
</tbody>
</table>

### THE RANCHO LOS AMIGOS SCALE OF COGNITIVE FUNCTIONING

The Rancho Los Amigos Scale of Cognitive Functioning (Table 3.3) is another scale used to diagnose and communicate a patient's level of functioning. The scale is divided into 8 stages which progress from deep coma to appropriate behavior and cognitive functioning.
Table 3.3: Rancho Los Amigos Scale of Cognitive Functioning (www.neuroskills.com)

Levels of Cognitive Functioning

<table>
<thead>
<tr>
<th>LEVEL I - No Response: Total Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Complete absence of observable change in behavior when presented visual, auditory, tactile, proprioceptive, vestibular or painful stimuli</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL II - Generalized Response: Total Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Demonstrates generalized reflex response to painful stimuli</td>
</tr>
<tr>
<td>• Responds to repeated auditory stimuli with increased or decreased activity</td>
</tr>
<tr>
<td>• Responds to external stimuli with physiological changes generalized, gross body movement and/or not purposeful vocalization</td>
</tr>
<tr>
<td>• Responses noted above may be same regardless of type and location of stimulation</td>
</tr>
<tr>
<td>• Responses may be significantly delayed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL III - Localized Response: Total Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Demonstrates withdrawal or vocalization to painful stimuli</td>
</tr>
<tr>
<td>• Turns toward or away from auditory stimuli</td>
</tr>
<tr>
<td>• Blinks when strong light crosses visual field</td>
</tr>
<tr>
<td>• Follows moving object passed within visual field</td>
</tr>
<tr>
<td>• Responds to discomfort by pulling tubes or restraints</td>
</tr>
<tr>
<td>• Responds inconsistently to simple commands</td>
</tr>
<tr>
<td>• Responses directly related to type of stimulus</td>
</tr>
<tr>
<td>• May respond to some persons (especially family and friends) but not to others.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL IV - Confused/Agitated: Maximal Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Alert and in heightened state of activity</td>
</tr>
<tr>
<td>• Purposeful attempts to remove restraints or tubes or crawl out of bed</td>
</tr>
<tr>
<td>• May perform motor activities such as sitting, reaching and walking but without any apparent purpose or upon another’s request</td>
</tr>
<tr>
<td>• Very brief and usually non-purposeful moments of sustained alternatives and divided attention</td>
</tr>
<tr>
<td>• Absent short-term memory</td>
</tr>
<tr>
<td>• May cry out or scream out of proportion to stimulus even after its removal</td>
</tr>
<tr>
<td>• May exhibit aggressive or flight behavior</td>
</tr>
<tr>
<td>• Mood may swing from euphoric to hostile with no apparent relationship to environmental events</td>
</tr>
<tr>
<td>• Unable to cooperate with treatment efforts</td>
</tr>
<tr>
<td>• Verbalizations are frequently incoherent and/or inappropriate to activity or environment</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>LEVEL V - Confused, Inappropriate Non-Agitated: Maximal Assistance</th>
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</thead>
<tbody>
<tr>
<td>• Alert, not agitated but may wander randomly or with a vague intention of going home.</td>
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<tr>
<td>• May become agitated in response to external stimulation, and/or lack of environmental structure.</td>
</tr>
<tr>
<td>• Not oriented to person, place or time.</td>
</tr>
<tr>
<td>• Frequent brief periods, non-purposeful sustained attention</td>
</tr>
</tbody>
</table>
- Severely impaired recent memory, with confusion of past and present in reaction to ongoing activity
- Absent goal directed, problem solving, self-monitoring behavior
- Often demonstrates inappropriate use of objects without external direction
- May be able to perform previously learned tasks when structured and cues provided
- Unable to learn new information
- Able to respond appropriately to simple commands fairly consistently with external structures and cues
- Responses to simple commands without external structure are random and non-purposeful in relation to command
- Able to converse on a social, automatic level for brief periods of time when provided external structure and cues
- Verbalizations about present events become inappropriate and confabulatory when external structure and cues are not provided

**LEVEL VI - Confused, Appropriate: Moderate Assistance**
- Inconsistently oriented to person, time and place
- Able to attend to highly familiar tasks in non-distracting environment for 30 minutes with moderate redirection
- Remote memory has more depth and detail than recent memory
- Vague recognition of some staff
- Able to use assistive memory aide with maximum assistance
- Emerging awareness of appropriate response to self, family and basic needs
- Moderate assist to problem solve barriers to task completion
- Supervised for old learning (e.g. self care)
- Shows carry over for relearned familiar tasks (e.g. self care)
- Maximum assistance for new learning with little or nor carry over
- Unaware of impairments, disabilities and safety risks
- Consistently follows simple directions
- Verbal expressions are appropriate in highly familiar and structured situations

**LEVEL VII - Automatic, Appropriate: Minimal Assistance for Daily Living Skills**
- Consistently oriented to person and place, within highly familiar environments. Moderate assistance for orientation to time
- Able to attend to highly familiar tasks in a non-distraction environment for at least 30 minutes with minimal assist to complete tasks
- Minimal supervision for new learning
- Demonstrates carry over of new learning
- Initiates and carries out steps to complete familiar personal and household routine but has shallow recall of what he/she has been doing
- Able to monitor accuracy and completeness of each step in routine personal and household ADLs and modify plan with minimal assistance
- Superficial awareness of his/her condition but unaware of specific impairments and disabilities and the limits they place on his/her ability to safely, accurately and completely carry out his/her household, community, work and leisure ADLs
- Minimal supervision for safety in routine home and community activities
- Unrealistic planning for the future
- Unable to think about consequences of a decision or action
- Overestimates abilities
- Unaware of others' needs and feelings.
- Oppositional/uncooperative.
- Unable to recognize inappropriate social interaction behavior

**LEVEL VIII - Purposeful, Appropriate: Stand-By Assistance**

- Consistently oriented to person, place and time
- Independently attends to and completes familiar tasks for 1 hour in distracting environments
- Able to recall and integrate past and recent events
- Uses assistive memory devices to recall daily schedule, "to do" lists and record critical information for later use with stand-by assistance
- Initiates and carries out steps to complete familiar personal, household, community, work and leisure routines with stand-by assistance and can modify the plan when needed with minimal assistance
- Requires no assistance once new tasks/activities are learned
- Aware of and acknowledges impairments and disabilities when they interfere with task completion but requires stand-by assistance to take appropriate corrective action
- Thinks about consequences of a decision or action with minimal assistance
- Overestimates or underestimates abilities
- Acknowledges others' needs and feelings and responds appropriately with minimal assistance
- Depressed
- Irritable
- Low frustration tolerance/easily angered
- Argumentative
- Self-centered
- Uncharacteristically dependent/independent
- Able to recognize and acknowledge inappropriate social interaction behavior while it is occurring and takes corrective action with minimal assistance

**LEVEL IX - Purposeful, Appropriate: Stand-By Assistance on Request**

- Independently shifts back and forth between tasks and completes them accurately for at least two consecutive hours
- Uses assistive memory devices to recall daily schedule, "to do" lists and record critical information for later use with assistance when requested
- Initiates and carries out steps to complete familiar personal, household, work and leisure tasks independently and unfamiliar personal, household, work and leisure tasks with assistance when requested
- Aware of and acknowledges impairments and disabilities when they interfere with task completion and takes appropriate corrective action but requires stand-by assist to anticipate a problem before it occurs and take action to avoid it
- Able to think about consequences of decisions or actions with assistance when requested
- Accurately estimates abilities but requires stand-by assistance to adjust to task demands
- Acknowledges others' needs and feelings and responds appropriately with stand-by assistance
- Depression may continue
- May be easily irritable
- May have low frustration tolerance
- Able to self monitor appropriateness of social interaction with stand-by assistance

**LEVEL X - Purposeful, Appropriate: Modified Independent**

- Able to handle multiple tasks simultaneously in all environments but may require periodic breaks
- Able to independently procure, create and maintain own assistive memory devices
- Independently initiates and carries out steps to complete familiar and unfamiliar personal, household, community, work and leisure tasks but may require more than usual amount of time and/or compensatory strategies to complete them
- Anticipates impact of impairments and disabilities on ability to complete daily living tasks and takes action to avoid problems before they occur but may require more than usual amount of time and/or compensatory strategies
- Able to independently think about consequences of decisions or actions but may require more than usual amount of time and/or compensatory strategies to select the appropriate decision or action
- Accurately estimates abilities and independently adjusts to task demands
- Able to recognize the needs and feelings of others and automatically respond in appropriate manner
- Periodic periods of depression may occur
- Irritability and low frustration tolerance when sick, fatigued and/or under emotional stress
- Social interaction behavior is consistently appropriate
Lesson 3: Feedback Exercise

1. Define a coma.

2. List the two most common scales used to assess a coma.

3. What three areas are assessed with the Glasgow Coma Scale.

True or False

4. T  F A coma is a temporary period of unconsciousness.

5. T  F Brief periods of unconsciousness can be associated with severe mental impairments.

6. T  F Comas generally result from Coup/Contra-coup injuries.

7. T  F Generally the longer the individual remains in a coma the more severe the impairments.

8. T  F Level 1 of the Rancho Los Amigos Scale of Cognitive Functioning is purposeful and appropriate behavior.

9. T  F According to the Glasgow Coma Scale, severe brain injury is characterized by a loss of consciousness of at least 24 hours.

10. T  F An individual can experience brain injury without experiencing a loss of consciousness.
Lesson 4: Secondary Damage

A brain injury results in primary (immediate) damage. Secondary damage also occurs which may far exceed primary damage because, if unattended to, complications may result in diffuse, severe, permanent damage. In most cases, secondary damage is controlled by surgical intervention, which itself may also cause further damage (Kay & Lezak), or medications. There are four main secondary conditions which often result from a brain injury:

- edema
- infarction
- hemorrhaging and headaches.

EDEMA

An edema (swelling) of the brain is a major cause of brain damage (Senelick & Ryan). Because the brain is confined within the skull it has very little room to accommodate for increasing pressure which may accompany head trauma (Senelick & Ryan). Intercranial pressure increases causing further damage to nerves. As a result of the pressure fluid may collect in the brain. If Intercranial pressure is not relieved, herniation (the squeezing of the brain downward through the base of the skull) may result. Herniation occurs primarily at the medial portion of the temporal lobe, and results in irreversible damage (Deutsch & Fralish). The most effective way to stop intercranial swelling is to open up the skull and relieve the pressure; however, this can only be done surgically, and may result in other complications. Another way to decrease swelling is through the administration of drugs, particularly steroids.

INFARCTION

The increase in pressure within the skull results in an increase in pressure on the cerebral blood vessels. As a result, the blood vessels compress or tear, causing infarction (tissue death). Infarction may also be caused by thrombosis (blood vessel clotting) or embolism (blood vessel obstruction). The effects of infarction are similar to those of a stroke and therefore, should be treated similarly (Deutsch & Fralish).

HEMORRHAGING

Hemorrhaging results in hematomas (collections of blood) and are a common symptom of a brain injury. Hematomas can occur at three levels: epidurally, between the skull and the brain covering; subdurally, between the brain covering and the brain tissue; and intracerebrally, within the brain itself (Kay & Lezak, 1990). Hematomas can cause further localized damage to the surrounding brain tissue and further diffuse damage by increasing the pressure exerted within the
skull cavity (Deutsch & Fralish, 1988). Such diffuse damage may result in edemas, which leads to increased damage to the nerve fibers of the brain. The best way to control hemorrhaging is through surgical intervention, however this may result in further complications.

**HEADACHE**

A headache is one of the first symptoms of a brain injury, and is usually experienced immediately following the injury. Typically, the more severe the brain injury is the less severe the headache. A injury headache is considered a reaction to the impaired cognitive functions. Medication may be administered to reduce the amount of physical pain experienced by the individual. Unfortunately, the headache can be a persistent, and sometimes permanent condition. To help to control headache the individual should try to reduce the amount of stress in his/her life.
Lesson 4: Feedback Exercise

1. Define secondary brain damage.

2. Define herniation.

3. Define infarction.

4. Define thrombosis.

5. Define embolism.

6. At which locations can hematomas occur?

True or False

7. T  F The more severe the brain injury the more severe the headache.

8. T  F Hematomas are collections of water on the brain.

9. T  F Secondary damage does not result in permanent damage.

10. T  F Surgical intervention is often the best way to control secondary damage.
Lesson 5: Physical Symptoms

Physical deficits are the most obvious symptoms of brain injuries. Unfortunately, because physical deficits are neurological in nature, meaning that damage occurs in the brain rather than to particular anatomical structures, damage is most often permanent (National Head Injury Foundation, Florida Association). It is usually the physical symptoms which the individual and his/her family focus on after the injury has occurred.

MOTOR ABILITIES

Both fine and gross motor abilities are commonly effected by brain injuries, particularly if the motor area in the brain (located in the superior, lateral portion of the frontal lobe) is injured. Such challenges may complicate personal as well as vocational issues, especially if the disability affects the dominant hand.

Hemiparesis/Hemiplegia

Hemiparesis is a weakening of one side or part of the body; and hemiplegia is paralysis of one side or part of the body. Both conditions are due to damage to the motor areas of the brain. Both conditions are irreversible. Both hemiplegia and hemiparesis are devastating, particularly if they occur on the dominant side of the body. For example, if hemiplegia or hemiparesis occurs on the right side of the body to someone who was right-handed before his/her injury, they will need to learn to be left-handed (National Head Injury Foundation, Florida Association).

Muscular Strength and Endurance

Muscular strength of the injured individual may decrease due to muscular inactivity resulting from unconsciousness or a lengthy hospital stay. If the motor areas of the brain are injured, their ability to utilize muscles will decrease or cease altogether. If muscular strength decreases, so too will muscular endurance.

Muscular Spasticity

Muscular spasticity (an increase in muscular tension) is common following a brain injury. A common position is elbows held rigidly at the sides, wrists and fingers bent, and fists clenched. The legs are usually extended at the hips and knees with ankles and toes flexed. As a TBI patient recovers, nerve signals that control motor functions may change. Some signals may not reach the reflex centers of the brain, or the brain may send too many signals, causing the muscles to not respond properly (www.aans.org). Muscular tremors (uncontrollable shaking of the extremities) often accompany spasticity.
Ridigity of the Joints

**Rigidity** (stiffness of the joints) may occur following extreme inactive. This may contribute to a decrease in motor abilities.

Ataxia

**Ataxia** (uncoordinated, unbalanced and awkward motor movement caused by lesions of the cerebellum or basal ganglia rather than muscular weakness, rigidity, spasticity or sensory loss) can interfere with the individual's abilities to perform self-care tasks such as talking, eating, or walking. (Senelick & Ryan)

Hand-Eye Coordination

Due to changes in muscular strength and endurance as well as deficits in sensory abilities, the ability to coordinate hand-eye activities (muscular movement with sensory information) may become restricted. (Senelick & Ryan)

Dysphagia

**Dysphagia** (difficulty chewing or swallowing food) is a severe effect of brain injury. Dysphagia can jeopardize the individual's health; therefore, slowing down recuperation and rehabilitation of the individual. (Senelick & Ryan)

SENSORY DEFICITS

Skull fractures, damage to cranial nerves, or damage to the sensory cortex may result in sensory deficits. If the injury occurred to the occipital lobe(s) of the brain, visual deficits may result. Damage to the temporal lobe(s) may result in a decrease in hearing acuity. A loss of smell and taste as well as decreased tactile sensation may be the result of damage to the parietal lobe (Kay & Lezak).
Visual Deficits

If the injury involves the occipital lobe and/or certain cranial nerves in individual's visual capabilities may be diminished. Blurriness may occur, as well as diplopia (double vision). Visual field deficits may also occur, resulting in the individual not perceiving material in particular portions of his/her visual field (National Head Injury Association, Florida Association, Inc.). For example, if the brain no longer perceives where the foot is, the person may try to stand when the foot is still on a wheelchair footrest. This is vital to the person's safety.

Auditory Deficits

Damage to the superior portion of the temporal lobe and/or a specific cranial nerve may result in deficits in the individual's auditory (hearing) abilities and balance mechanism. Deficits in hearing acuity may result in communication difficulty.

Tactile Deficits

The medial portion of the parietal lobe is responsible for tactile information (the sense of touch). Damage to this area and/or a specific cranial nerve may result in tactile defensiveness (oversensitivity to touch). The individual may scream, cry or strike out when touched. In contrast, this can result in the individual being completely unaware of tactile sensation. (National Head Injury Foundation, Florida Association, Inc., 1994)

Deficits in Taste and Smell

Both taste and smell are regulated by the medial portion of the parietal lobe and information on taste and smell are carried via cranial nerves. Damage to this area or a specific cranial nerve commonly results in a complete loss of smell. The loss of taste will also occur if damage to this area and/or other cranial nerves take place. However, a complete loss of taste is not as common as the loss of smell.
SEIZURE DISORDERS

Seizure disorders are a dangerous physical symptom of a brain injury because they can result in further injury. Seizures are characterized by uncontrolled bursts of electrical activity in the brain. There are two categories of seizures: generalized, which involve all areas of the brain, and partial, which involve specific areas of the brain.

Seizure disorders can occur in individuals who experience intra-cerebral hematomas as a result of a brain injury. A seizure in the first week after a brain injury is called an early post-traumatic seizure. About 25% of people who experience an EPTS will have another seizure months or years later (www.msktc.org). Late post-traumatic seizures occur more than seven days after a brain injury. About 80% of people who have a LPTS will have another seizure. Seizure disorders can often be controlled by medication; however, the type of medication must be controlled and monitored very closely.

Proper care must be given to someone experiencing a seizure. First, and most importantly, no one should try to stop the seizure from occurring. Seizures cannot be prevented. Protection, such as a blanket or coat, should be placed underneath the head and neck to prevent further injury. To limit the amount of damage done to the teeth and mouth, do not place items in the mouth. It is important that the person not be restrained during the seizure so as to avoid further injury. As soon as possible turn them on their side to maintain an open airway. When the seizure ends, medical attention should be administered, if necessary. The individual should not be left alone until he/she has fully recovered and is completely alert.

Tonic-Clonic Seizures

Tonic-clonic seizures, also known as "grand mal" seizures, fall into the category of seizures considered "generalized." These type of seizures occur without warning and involve most of the involuntary body functions. Tonic-clonic seizures generally last between one and three minutes and involve a complete loss of consciousness. These seizures are characterized by involuntary muscle contractions, loss of bowel and bladder control, rapid body movements, irregular breathing and loss of consciousness. After the seizure, the individual may appear drowsy and confused. He/she may complain of muscle weakness or a headache; and, he/she may experience speech difficulties. In severe cases, they may not remember having the seizure.

Generalized Absence Seizures

Generalized absence seizures, also known as "petit mal" seizures, are most often seen in children. These types of seizures also fall into the category of generalized seizures. Generalized absence seizures are very subtle and brief (less than one minute). Therefore, this type of seizure often goes unnoticed. Characteristics include lack of confusion following the seizure, eyelid fluttering, facial twitching and repetitive movements.
Partial Seizures

Partial (focal) seizures are more subtle than tonic clonic seizures. This type of seizure often arises from the temporal lobe. The individual will not lose consciousness, rather he/she will experience a lapse in memory. For example, they may forget what they were doing, lose their train of thought in the middle of a sentence, or perform a task repetitively (Senelick & Ryan). Most often, one side of the body is affected, resulting in a stiffness or a jerking motion.

Complex Partial Seizures

Complex partial seizures, also known as "psychomotor" or "temporal lobe" seizures, last between one and three minutes. Individuals who experience this type of seizure often sense an aura, or a "forewarning" prior to the seizure. Complex partial seizures are characterized by repetitive, purposeless speech or activity.

SPEECH AND LANGUAGE ABILITIES

Speech and language allows human beings to communicate. Following a brain injury speech and language abilities may change dramatically, resulting in the individual being unable to express himself/herself or understand others. The left hemisphere of the brain controls the production and comprehension of language. Damage to this hemisphere will severely affect language abilities, which will be noticeable in the verbal, auditory, reading, and writing abilities.

Speech and Language Production

The area which controls the production of spoken and written language (Broca's area) is located in the frontal lobe. If injury occurs to this area, the individual may experience difficulty articulating sounds or words (known as dysarthria). Dysarthria is characterized by indistinct articulation, slow speech rate, abnormal voice quality (generally hypernasal) and decreased voice volume. Drooling is also a side effect of dysarthria. (Medical-Rehabilitation Department of American Re-insurance Company). Difficulties with communication can be caused by many factors including changes in behavior and thinking skills, problem solving, judgement, reasoning, awareness, memory loss and lack of self-awareness (Mayoclinic.org).

Language Comprehension

Wernicke's area is located in the temporal lobe. This area is responsible for the comprehension of written or spoken language. Injury to this area may result in aphasia, which is a loss of ability to express or understand language (Medical-Rehabilitation Department of American Re-insurance Company). They may have difficulty in initiating conversation, following conversation, conversational turn taking, problems with intelligibility, and non-verbal communication (mayoclinic.org).
**Dysnomia** (also known as anomia) is difficulty retrieving or "finding" a word from memory. Most individuals experience dysnomia occasionally, however this may become an everyday factor for people with brain injury.

**DECREASED TOLERANCE FOR DRUGS AND ALCOHOL**

A decrease in tolerance for drugs and alcohol is one of the most serious symptoms of a brain injury. Following a brain injury the depressing effects of drugs and alcohol are more severe and result from smaller doses.
Lesson 5: Feedback Exercise

1. Compare and contrast hemiparesis and hemiplegia.

2. List 3 ways in which motor abilities can be affected by a brain injury.

3. List the 4 types of seizures mentioned in this lesson.

4. What is 1 way in which speech and language can be affected by a brain injuries.

**True or False**

5. T F A brain injuries often result in a decreased tolerance for drugs and alcohol.

6. T F The term "dysnomia" refers to difficulty articulating sounds.

7. T F Partial seizures result in loss of consciousness.

8. T F The term "dysphagia" refers to difficulty breathing.

9. T F Ataxia is caused by muscle weakness.

10. T F Physical symptoms are often temporary.
Lesson 6: Cognitive Symptoms

Cognitive symptoms are often the most detrimental effects of a brain injury. Although cognitive symptoms vary in severity, they are permanent, and without proper intervention, they are progressive in nature. After a brain injury, it is common for people to have problems with attention, concentration, speech and language, learning and memory, reasoning, planning, and problem-solving.

What is Cognition?

“The act of knowing or thinking. It includes the ability to choose, understand, remember and use information. Cognition includes:

- Attention and concentration
- Processing and understanding information
- Memory
- Communication
- Planning, organizing, and assembling
- Reasoning, problem-solving, decision making, and judgment
- Controlling impulses and desires and being patient

(www.msktc.org).

ORIENTATION DEFICITS

An individual who experiences a brain injury may often become disorientated around unfamiliar people or places. He/she may become confused or afraid, resulting in an anxiety attack. Individuals may also lose track of time.

ATTENTION AND CONCENTRATION

A person with a brain injury may be unable to focus, pay attention, or attend to more than one thing at a time. This may result in:

- Restlessness and being easily distracted
- Difficulty finishing a project or working on more than one task at a time.
- Problems carrying on a long conversation or sitting still.
Deficits in Attention Skills

Deficits in attention skills occur when the person is unable to "filter out" or attend to irrelevant information. These deficits are most obvious when tasks are unstructured.

Deficits in Concentration Skills

Concentration difficulties, such as failure in focusing attention on relevant information failure concentrating, and difficulty maintaining intense mental activity for long periods of time, are all common effects of a brain injury. As with attention deficits, deficits in concentration skills affect aspects of the injured individual's life.

Ways to improve attention and concentration:

- Decrease distractions
- Focus on one task at a time
- Practice attention skills
- Take breaks when tired

MEMORY DEFICITS

Memory is stored in the temporal lobe. It is the job of the hippocampus (located directly in the temporal lobe) to register and retrieve information from memory. Damage to either of the temporal lobes or the hippocampus will result in memory deficits.

Deficits in Visual Memory

Damage to the right temporal lobe will result in impairments in visual memory. An individual with right temporal lobe damage may experience difficulty when trying to conjure up visual images with specific words or experiences.

Deficits in Nonvisual Memory

Damage to the left temporal lobe will cause damage in nonvisual memory, resulting in inability to remember how to complete a task.

Incidental Memory

Incidental memory (the ability to recall unattended information, such as misplaced keys) can be caused by damage to the temporal lobe or the hippocampus. Almost all individuals experience incidental memory lapses; however, for people with a brain injury, these lapses become an everyday occurrence.
Amnesia

Severe head injury may result in amnesia, which refers to the loss of memories, such as facts, information, and experiences (www.mayoclinic.org). It can be caused by damage to the areas of the brain that are vital for memory and can be permanent.

The two main features of amnesia are:

- Difficulty learning new information (anterograde)
- Difficulty remembering past events and previously familiar information (retrograde amnesia).

Retrograde amnesia pertains to information that was known before the brain injury occurred. Retrograde amnesia most often occurs with deep temporal lesions. This is what most people think of when referring to amnesia. For example, an individual with retrograde amnesia may not remember who he/she is or recognize family members.

Anterograde amnesia involves the individual being unable to recall information learned or behaviors experienced after the injury occurred. This type of amnesia is perhaps the most detrimental because it involves the individual's ability to learn new information or tasks.

EXTERNAL MEMORY AIDS

By
Rick Parente, Ph.D. and Douglas Herrmann, Ph.D.

People often try to help themselves remember activities or responsibilities by writing them down or setting an alarm. Most of us are not aware of all the additional devices that are available to help us organize our lives and remember things. This article will describe several kinds of memory and organizational aids and how they may be best used.

Very effective memory aids can be made simply from things we find around the house. For example, a rubber band on the wrist makes a simple and effective reminder. Other reminders are available commercially. Inexpensive wrist watches, for example, remind us of the date and time.

Regardless of the type we choose, memory aids all help boost memory in one of three ways. Some aids help a person remember information in order to perform a task better. These are called prosthetic devices. For example, a person who is always late for appointments might set an alarm as a reminder to start early enough to arrive on time. Prosthetic devices are not foolproof. They simply remind the person of something that needs to be done; they do not insure that the person does it.

A second kind of memory aid helps a person remember something after memory alone has failed to do so. This is called a memory corrector. For example, all of us have lost our keys at
one time or another. Now there are devices that we can put on the keychain that beep when we whistle or clap our hands. Then we can find the keychain by following the beeps.

A third type of memory aid is called a memory robot. For example, a thermostat "remembers" to turn up the heat whenever the temperature in the home falls below a certain level. A cruise control in a car "remembers" to adjust the speed without keeping our foot on the gas pedal. Then we don't have to worry about "correcting" for these fluctuations every time.

Many of the devices we use every day have a variety of built-in memory aids. For example, dashboard lights in cars remind the driver to fasten a seat belt; buzzers remind the driver to set the safety brake. Computers have built-in diagnostic programs to help us find problems when the computer won't work.

Memory aids can help us remember many different kinds of things. Telephone directories and address books, for example, help us recall vast amounts of knowledge and facts. Datebooks, diaries, and calendars help us remember events and appointments. Egg timers in the kitchen, wake-up calls in hotels, and electronic devices in the home that automatically turn on lights remind us of our intention to do something. Desk-top organizers and file cabinets help us remember the location of things in the home. Finally, labels such as monograms on our clothes help us remember what belongs to us.

External aids sometimes create problems as well as solve them. Many people, for example, forget to turn off their weekday alarm on the weekend, and are awakened, bright and early, when they would prefer to sleep! Before purchasing a memory aid, it is wise to think about exactly how and when it will be used. It is also necessary to think about whether the aid is too complicated to use conveniently, or if it will continue to be used after the novelty wears off.

Many people are afraid that using memory aids will make their memories worse. They wonder if they will come to rely on them and be helpless without them: "How would I get along if I lost my appointment calendar, or if the battery ran out in my watch?" These things certainly happen. In our experience, though, the advantages of using these aids far outweigh the potential problems.

Memory aids are especially useful to people who have had brain injuries or strokes and to the elderly. Memory problems are common after injury to the brain, and memory aids often solve some nagging memory problems immediately, with little training. A therapist or family member must set up the devices for the person and then teach the person what to do in order to use them. Many elderly people, for example, need a reminder to take medications at certain times each day. A therapist can set a beeping alarm watch to cue the person to do something - but the therapist must also teach the person what to do when the alarm goes off. It is unreasonable to expect that a person with a memory impairment will be able to figure out how to use even simple electronic devices without some help.
INFORMATION PROCESSING DEFICITS

Individuals with a brain injury process information more slowly than others. This is due to difficulty in other areas, such as speech and language or memory. An individual with a brain injury must take more time to process questions or information because he/she must break down the information and consciously search his/her brain for an answer.

IMPAIRMENTS IN EXECUTIVE FUNCTIONING

Executive functions are the thought processes involving the ability to plan, initiate, direct and monitor one's own activities. The degree of the impairment relates to the location of the injury. Damage to either the right or left frontal lobe or both frontal lobes will result in impaired executive functioning regardless of the severity of the injury.

A person's difficulty with planning and initiating activities can be the most frustrating components for vocational rehabilitative counselors and individuals to compensate for. They account for the high dropout rate of individuals in vocational rehabilitative counseling. Directing attention toward the plans is also difficult. Often time, the individual will appear "lazy" by family members or co-workers when in fact, the individual simply does not have the ability to direct or maintain his/her attention to the task because of impaired attention abilities. The individual will also be unable to monitor his/her activities. He/she will need a co-worker or family member to assist him/her. Again, the individual may be regarded by family members or co-workers as not "pulling his/her weight"; however, the person simply does not have the ability to look at or analyze his/her behavior or performance.

An individual with impaired executive functioning abilities may be seen as irresponsible, and unconcerned. The individual is neither of the above. Rather he/she is truly unable to plan, initiate, direct or monitor his/her activities without help and will require assistance. Many times, the individual with a brain injury will view this need for help as an increase in dependency. This may decrease the motivation level for rehabilitation. It is important that the individual understands that impairments in executive functioning are due to underlying deficits rather than his/her own unwillingness to perform executive tasks.

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<thead>
<tr>
<th>LEFT HEMISPHERE</th>
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<tr>
<td>Speech</td>
<td>Spatial Orientation</td>
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<tr>
<td>Language</td>
<td>Picture/Pattern Sense</td>
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<tr>
<td>Complex Motor Functions</td>
<td>Performance-like Functions</td>
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<tr>
<td>Vigilance</td>
<td>Spatial Integration</td>
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<td>Paired Associate Learning</td>
<td>Creative Associative Thinking</td>
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<td>Non-verbal Ideation</td>
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<tr>
<td>Conceptual Similarities</td>
<td>Facial Identification</td>
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41
Time Analysis  
Detail Analysis  
Arithmetic  
Writing  
Calculation  
Finger Naming  
Right-left Orientation  

Recognition of Environmental Sounds  
Non-verbal Paired Associate Learning  
Tactile Perception  

Figure 6.1: Responsibilities of the Right and Left Hemispheres  

DAMAGE TO THE LEFT SIDE  
Problems may be seen on the RIGHT side of the body.  

DAMAGE TO THE RIGHT SIDE  
Problems may be seen on the LEFT side of the body.  

Figure 6.2: Brain Damage in Relation to Bodily Function Control
Lesson 6: Feedback Exercise

1. List 3 cognitive symptoms of brain injuries.

2. Define retrograde amnesia.

3. Define executive functions.

4. Define the function of the hippocampus.

True or False

5. T F Incidental memory is the ability to recall attended information.

6. T F Impairments in executive functioning may make the individual appear "lazy."

7. T F Cognitive symptoms of a brain injury are temporary in nature.
Lesson 7: Behavioral and Emotional Symptoms

Aside from physical challenges, changes in behaviors and emotional stability are the most obvious effects of head injury. They are often the most difficult to deal with because the injured individual may be unaware of the changes.

BEHAVIORAL CHANGES

There are many behavioral changes an individual with TBI may experience depending on the area of the brain that was damaged (www.brainline.org). Behaviors can increase or decrease in nature without the individual being aware that he/she is behaving differently than before the injury. Some of the most common behavioral and emotional problems a person with a brain injury may experience include verbal/physical outbursts, poor judgement and impulse control, negativity, intolerance, apathy, egocentric behaviors, and mood swings.

Disinhibition and Impulsivity

The frontal lobe helps govern personality and impulsivity. If damaged, there might be no “braking mechanism” for self-control. A person may not be able to manage aggression or impulse. (www.brainline.org). Since a majority of head injuries do occur to the frontal and/or temporal lobes, this is a common result of TBI. Damage to these neurotransmitters, in conjunction with impaired cognitive skills, results in inappropriate behaviors. The person will no longer have the ability to perceive the outcome of his/her behavior or plan appropriate behavior.

Because the individual cannot assess the outcome of his/her behavior, he/she often becomes capricious, saying or doing things without thinking about the outcome of his/her behavior.

Changes in Drives

A person with TBI is likely to experience changes in his/her basic drives, such as sexual, temperamental and/or hunger. These changes are due to underlying deficits in cognitive and behavioral abilities.

Changes in sexual drive is very common, and often difficult for the individual's intimate partner to accept. An individual with TBI may also become sexually uninhibited, making inappropriate sexual comments or gestures, due to increased disinhibition and impulsivity. They may not realize the behavior was inappropriate or offensive. Sexual arousal may increase or decrease dramatically. This may lead to an increase in aggression or, in contrast, a complete indifference towards intimate partners (Kay & Lezak; Senelick & Ryan).

Changes in temperament are partly due to an increase in frustration resulting from all of the changes that occur with TBI and partly due to underlying behavioral changes. The changes the
individual must become accustomed to are plentiful. It is understandable that the individual would become frustrated when he/she cannot do something he/she could previously do. The individual may not have the ability to know when his/her behavior is being misinterpreted or when he/she is misinterpreting other people or situations. For these reasons alone, it is understandable that the individual may become frustrated or angry.

Changes in appetite are due largely to memory deficits. The person may literally "forget" to eat, resulting in undernourishment, or he/she may "forget" he/she already ate, resulting in overeating.

**Inflexibility**

Often times, a person with TBI will become inflexible in his/her ways of thinking or behaving. This is a result of underlying cognitive changes which prohibits the individual from analyzing the situation or behavior (www.brainline.org). This may lead to egocentricity (a feeling of being the center of everything). Egocentricity is a difficult attribute to have and poses problems in relationships of all sorts, such as in vocational and family situations.

**Changes in Social Skills**

Due to underlying physical abnormalities, cognitive deficits and inappropriate behavior following the TBI, social skills of the individual will be affected. Friends may not know how to deal with the changes, and as a result, stop interacting with the individual. Family members may be unable to attend to the individual's multiple needs or deal with their own emotions regarding the injury and become more involved with their own work or outside activities. The individual may lose interest in leisure activities or social events and prefer to remain at home, or may not have the initiative to do something at home or to go out (www.brainline.org).

**EMOTIONAL CHANGES**

The frontal lobe is responsible for controlling emotions. Damage to the frontal lobe is very common in a brain injury, and the emotional stability of the individual is affected.

**The Effects on Self-Esteem**

Following the injury and during the rehabilitative process, the individual is likely to experience a decrease in his/her self-esteem. This decrease is due to all of the changes experienced and the loss of previous characteristics. Rehabilitation and counseling can help rebuild self-esteem. In severe cases, the person may become apathetic towards life and become suicidal. In such cases, counseling is imperative to the individual's life. In other cases, depression may occur, which may or may not go away over time.
Denial

It is common for someone with TBI to deny changes in his/her abilities. Often, they tend to look to the medical profession to “fix” everything. When they realize that this will not happen, denial may turn into anger. For the rehabilitation process to be effective the individual must overcome his/her denial and anger and accept the changes.

Emotional Instability

Emotional instability is a response to the changes in cognitive and behavioral abilities. Mood swings, temper tantrums and apathy are all characteristics of an individual with injury (National Head Injury Foundation, Florida Association).

<table>
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<tr>
<th>Depression</th>
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<td>by Wayne A. Gordon, Ph.D.</td>
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Depression is our most common mood disorder, affecting people with and without brain injury. Depression is frequently characterized by feelings of sadness. Depressed people often report less satisfaction with their daily activities; social isolation; decreased sexual interest; difficulty sleeping; changes in weight (either loss or gain); loss of appetite; tiredness and lack of energy; feelings of worthlessness; and difficulties concentrating. When individuals are severely depressed, they may have thoughts of suicide.

In people with a TBI brain injury (TBI), depression is difficult to diagnose. Some symptoms, normally associated with depression, may be the direct result of the brain injury—not the person's mood. For example, in people with TBI, changes in weight, difficulty sleeping, poor concentration, and changes in sexual functioning may be the result of the brain injury rather than symptoms of depression. To diagnose depression in a person with brain injury,, the clinician relies greatly on the individual's own description of feelings, and on observations of the person's behavior by a close relative or friend.

It is difficult to predict who is likely to become depressed following TBI. Currently, there is no reason to believe that depression is related to the individual's length of unconsciousness after injury, the part of the brain that was damaged, or the cause of injury. However, some evidence suggests that neurotransmitter systems are disrupted in some people with TBI. Neurotransmitters are the chemicals produced by the brain that help regulate mood.

Evidence also indicates that the more time that passes after the injury, the more likely it is that the person will become depressed. This finding makes sense for a couple of reasons. When people with brain injury are in a hospital or a rehabilitation facility immediately after the trauma, most chores are done for them. It is difficult for them to estimate the extent of their losses—there are few opportunities through which they can evaluate what they can or cannot do.
That situation changes quickly when they return home. There they discover what they can do and what they are no longer able to do by themselves.

Hospitals are sheltered settings in other ways as well. For example, the person confronts a limited number of complex situations in the hospital. At home, many different demands often must be dealt with at the same time. For example, the person might be speaking on the telephone while a young child is asking distracting questions. Thus, being at home presents the individual with TBI with more chances for success and failure. This heightens the person's awareness of the life changes resulting from the brain injury.

Perhaps the most common reason for depression among people with TBI is the recognition that they may no longer be who they were before the injury. Also lost is the dream of who they might have become in the future. A major task that people with TBI face in overcoming depression is to actively mourn the loss of that person and that future.

For people with TBI, the fact that their lives are permanently altered as a result of brain injury is hard to understand. So many aspects of life remain unchanged! They usually look the same, wear the same clothes, sleep in the same bed, and so forth. Yet despite these links to the past, they are no longer who they were before the injury. The awareness of the real differences between who they were, but now are not, who they wanted to be, but now will not be, is often at the root of post-TBI depression. Indeed, the more aware of these differences they are, the more likely it is that persons with TBI will become depressed about it.

Other factors also play a role in determining whether people become depressed following TBI. For example, personality plays a role in determining one's view of the world. If, prior to their brain injury, individuals were prone to viewing the world in a negative fashion--seeing the glass as half-empty rather than as half-full--it is likely that this sensibility will persist following a brain injury.

**Treating Depression**

Depression usually is treated with medication, psychotherapy, or both. The idea behind drug treatment for depression is based on the idea that a chemical deficiency (described above) may be the cause of depression. Anti-depressant medications are specifically designed to alter this chemical imbalance. However, people with brain injury are usually difficult to medicate because their bodies react to medications differently than they did before the injury. As a result, many psychiatrists say to "go low and go slow" with anti-depressant treatment for individuals with TBI. In other words, they recommend starting with a low dose and increasing it slowly over time, if necessary.

While medication often helps, particularly when the individual with TBI is extremely depressed, drugs do not help teach individuals to cope with their losses. Psychotherapy is a useful approach to treating post-TBI depression, since one of its goals is to strengthen people's sense of control over their world. By learning to cope, the individual learns how to better manage stressful day-to-day events that trigger depressive feelings.
People who are depressed have a negative view not only of themselves, but also of their world and their future. A statement such as, "Life's unfair, why did that car have to hit me?" represents a negative view of the world. A statement such as, "I am worthless because I walk with a cane . . . And I don't think I'm going to get any better," reveals a negative view of one's self and future. In psychotherapy, negative thinking like this is identified and dealt with. For example, those who feel worthless because they walk with a cane could learn that their value to themselves and others is based on much more than the way in which they walk. Thus, psychotherapy helps people acknowledge their strengths and learn not to focus on their weaknesses or losses. It also helps individuals plan for a more satisfying future.

Most depressed people tend to exaggerate the negative and minimize their positive qualities. As a result, they often have difficulty acknowledging their progress. Thus, as part of the therapy process, even small gains and positive actions are praised by the therapist. In this way, people with TBI learn to limit their critical view of themselves and the world. They learn they can change and grow. Family members are essential in this therapeutic process. They can help their loved one with TBI identify negative thoughts as they occur on a day-to-day basis. They can praise and encourage the attempts their loved one makes to change and grow.

Figure 7.2

WHY IS IT SO DIFFICULT TO UNDERSTAND BRAIN INJURY?

- VISIBILITY - There may be no visible problems that signal a concern.
- INCONSISTENCIES - Behavioral, support system damage and emotional demands may change over time.
- SPLINTER SKILLS
- EMOTIONALITY OF THE INCIDENT, CHANGES, AND LOSSES.
- GAPS - In verbal performance.
- HETEROGENEOUS, HETEROGENEOUS, HETEROGENEOUS
- PRESERVATION OF KNOWLEDGE AND SKILLS - Ongoing struggles with new learning.
- INSIGHT & SELF-APPRaisal PROBLEMS - "Stranger in a strange land".
- STRESS REACTIONS.
- DEVELOPMENTAL ISSUES - Children, adults, and seniors.
Lesson 7: Feedback Exercise

1. State why behavioral changes are often the most difficult symptoms of a brain injury.

2. State the effect a brain injury can have on self-esteem.


True or False

4. T  F Denial of changes is a common emotion for an individual with a brain injuries.

5. T  F Due to the wide extent of damage a brain injury almost always affect the self-esteem of the individual involved.

6. T  F Inflexibility occurs as a result of underlying cognitive changes which limit the individual's ability to analyze information.

7. T  F People with a brain injury often say or perform things spontaneously, without thinking about the outcome.

8. T  F People with a brain injury will say or perform without thinking about the outcome of the words or actions.

9. T  F Changes in drive includes changes in sexual drive, as well as changes in appetite and temperament.

10. T  F Although some individuals with brain injuries will become apathetic towards life, not every individual with brain injuries will.
Lesson 8: Family Factors

The family is affected by a brain injury. Not only must family members accept the impairments of the individual, they must also accept the physical and cognitive changes of the individual's personality. Family members, as well as the individual, may have to go through a grieving process to accept that the person they knew and loved no longer exists. Alterations in family structure may occur. Members may have to take over responsibilities previously held by the individual. Family routines may have to be redesigned. Coping with a brain injury of a family member tends to be stressful and difficult.

Two distinctions must be made when discussing a family's reaction to head injury. The first reaction is to the head injury itself. The family may experience a loss when they realize the individual is permanently changed by the injury. Initially, this reaction is extreme, but does lessen over time.

The second reaction is to the individual's behaviors and characteristics. The family must learn to respond in new ways. The family must deal with both reactions simultaneously, trying to predict changes in their day-to-day lives while dealing with the loss reaction. The feeling of loss is episodic. It comes and goes, lasting for different lengths of time. Family members may experience a paradox of coping with the traumatic effects of brain injury and at the same time feeling grateful that the individual is alive.

Reactions to a brain injury differ from reactions to typical illnesses. Resolution is achieved with typical illnesses (they end with the result of a cure, of remission, or of death). With brain injuries there is no resolution, the person they knew before no longer exists and they must adapt to a new person.

The family's need to grieve is recognized. This framework is an adaptable one which recognizes the changing nature of the family. This loss reaction is often precipitated by an event such as a pre-injury memory of the individual or an event the individual is not able to reach due to the injury. Each episodic loss reaction triggers the emotions of a grief reaction.

Figure 8.1: Working With the Family

<table>
<thead>
<tr>
<th>Family Reactions and Changes</th>
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<tbody>
<tr>
<td>Shock and Disbelief</td>
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<td>Gradual Learning</td>
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<tr>
<td>Onset of Caretaking Challenges and New Worries</td>
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<tr>
<td>Role Changes Within the Family</td>
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<tr>
<td>Economic/Financial Stress</td>
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<tr>
<td>Service Gaps</td>
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<tr>
<td>Severe Resource &amp; Insurance Coverage Limits</td>
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<tr>
<td>Episodic Loss Reaction</td>
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</table>
• Shrinking Social Networks
• Personal Growth Challenges & Opportunities

Figure 8.2: Strategies for Staff Intervention

Intervention Strategies

- Encourage open discussions.
- Incorporate all interested family members into the evaluation and treatment process.
- Provide general education & resources about TBI.
- Discuss the specific problems of the survivor along with the strategies to reduce risks and to make progress.
- Offer counseling to help facilitate positive adaptation and effective coping.
- Support groups are often helpful forms of support to many family members.

THE IMMEDIATE IMPACT OF HEAD INJURY ON THE FAMILY SYSTEM

The immediate situation the family experiences after learning of a brain injury has a profound and lasting effect. In most cases, intense emotions are set into play: disbelief of the injury, shock at the severity, anger that this has happened to a loved one, and fear of the future. These intense feelings set the stage for future situations in which the family must make critical decisions. To help the family deal with the injury, professionals must be open and honest and at the same time, refrain from predicting negative outcomes. After survival is assured, family members may mistakenly assume the next step is cure and full recovery. There is an upset in the family structure. Not only is the individual injured, but family functions, resources and interactions may be adjusted to accommodate for the needs of the person. Each family member must go through the grieving process in order to understand their own feelings and the feelings of the other family members.

THE GRIEVING PROCESS

The grieving process is a natural process encountered by people who experience the death or injury of a beloved person. There are four main stages of the grieving process. The rate through which individuals process each stage varies. Some may go through the entire process in a matter of months, whereas others may take years to go through the process.

The first stage in the grieving process is that of denial. The family, as well as the individual may accept that the accident occurred, however, they may refuse to believe that the injury will result in permanent damage. Often, as the individual recovers from physical impairments he/she, along
with the family, will believe that all functions will return to normal and the person will proceed with his/her life.

The second stage is anger and frustration. The individual and the family may feel victimized and therefore, feel anger towards anyone who can be looked upon as the cause of the accident. Frustration and hostility may be directed towards medical and rehabilitative professions because they cannot “fix” the problems. Often, the individual will not accept the first, or even second, diagnostic evaluation he/she receives; rather, he/she will seek out professional after professional looking for someone who will tell him/her that the problems they encounter can be fixed. The individual may partake in experimental therapies such as the overuse of vitamins, special diets, hyperbaric oxygen, brain implants, electric therapy, acupuncture, chelation therapy and herbal medicine (Senelick & Ryan). Unfortunately, none of the above have been clinically proven to benefit individuals with brain injury.

Depression is the third stage in the grieving process. When the person realizes that his/her life is permanently altered, he/she may become depressed and stop caring for himself/herself. The family may also become depressed with the realization that the individual is forever changed. The individual may question his/her role in the family and withdraw himself/herself from society, family and friends. Others may become less and less supportive and involved as time goes on, which may affect their motivation for rehabilitation.

The final stage in the grieving process is acceptance. When the individual comes to terms with the changes resulting from the injury and accepts the changes, he/she can move forward with his/her life. Family members must eventually accept the differences and may even have to get to know the person all over. Family members who do not accept the loss may experience “chronic sorrow”.

**STRESS MANAGEMENT**

It is impossible to eliminate stress from the life of any individual, much less the life of someone who has experienced TBI. Due to significant changes in many areas, the individual must modify his/her life significantly. The family of a person with TBI will also be affected. It is important that the individual, as well as the family, learns how to manage and minimize stress.

It is important to eliminate unnecessary tasks. The individual should do only those things which are necessary, have meaning, or he/she enjoys doing. Meaningless activities serve only to minimize the time available to enjoy life. Tasks or chores which the individual does not enjoy should be done quickly and efficiently. Procrastination only serves to waste time, and in the end, the task must still be completed.

When faced with a list of chores or things to do, the individual should rate the importance of each task according to: necessity, results of the completed task, and consequences of the uncompleted task. The individual should do those tasks which are most necessary and important first. Tasks at the end of the list should be those which have none or few consequences if they are not completed. Lists can be made daily, weekly, or even monthly.
MINIMIZING STRESS OF THE INJURED INDIVIDUAL AND FAMILY

There are many ways in which an individual can minimize or eliminate unnecessary stress from his/her life. Family members must also help to minimize stress of the injured individual.

The injured individual should express his/her feelings rather than let emotions build up. This communication may be with family members, rehabilitators, a social worker, a support group, a minister or a friend. However, in order for the individual to express his/her feelings open lines of communication must be established. The individual with brain injury must learn to ask for and accept help from others without feeling dependent.

Establishing and maintaining familiar surroundings and daily routines are extremely beneficial in developing structure. Increasing the time allotted to complete difficult tasks may greatly reduce the amount of anxiety experienced before the task is carried out as well as the stress experienced during and after the task is completed.

The family may also help to minimize stress experienced by the individual by becoming aware of the individual's needs and supporting those needs. Open communication with the individual is necessary. Offering assistance for everyday tasks may be very helpful. Family members must respect the person and promote independence. The individual should never be compared to the way he/she was before the accident. Criticism of undesired behaviors or emotional outbursts should be brief and to the point.

Family members may also participate in the rehabilitation process and training programs. It is extremely important that the family members cope with their own emotions and concerns. It is not helpful for them to hold on to feelings of guilt or blame for the individual's injuries. Family members must take care of their mental and physical health also.

Minimizing stress is easier than most people realize. Conscious awareness and efforts are necessary. By minimizing stress, both the family and the individual will experience a greater quality of life. Minimizing the injured individual's amount of stress supports the rehabilitative process and tends to reduce family crisis situations.

CRISIS MANAGEMENT

Crisis situations are a part of everyone's life. Although steps may be taken to minimize stress felt by the injured individual there will be times when they becomes frustrated or angry, which may result in outbursts of anger, hurt feelings, or possibly physical violence. The handling of such a situation is important. Effort should be spent preventing rather than reacting to such situations. Awareness is the foundation of crisis prevention (Foley, 1994).

Awareness of all factors in the individual's life is helpful to help avoid escalation of potential
problems. Clear goals help to prevent anxiety and frustration.

Leisure activities should be addressed. If the person is not participating in outside activities or pursuing hobbies, he/she may become bored and therefore, more likely to become agitated. However, the activities in which the individual participates must be examined. Pre-injury activities may not be activities which can be participated in now due to physical, behavioral and/or cognitive changes. The individual should choose activities in which he/she can actively and successfully participate.

The individual's emotional state is also an important factor. Those who are experiencing anger will have high levels of frustration as compared to those who have come to terms with the injuries. Activities which are calming (such as walking, watching television, reading a book) should be utilized when frustration occurs. The individual should discuss his/her feelings with family members, rehabilitators, counsellors, or any other types of support services.

The best way to work through a crisis is for the individual to talk through the problem with another person at the time of the crisis, unless the individual is, or is close to being, physically violent. In such cases, the individual should be given time to calm down. The individual should be given support to express his/her feelings in ways that do not agitate. The listener should refrain from being sarcastic, rather he/she should be empathetic (Foley).

If the crisis reflects inappropriate behavior by the person, he/she must be taught limits. Setting limits is a difficult task because often the person with TBI is not aware his/her behavior is inappropriate. Limits should be explained and supported by family members. Setting limits involves three important steps (Foley). The first step is stating the unacceptable behaviors. It is important not to be judgmental or demeaning. The second step is indicating what behavior should be performed instead. The final step is setting consequences for the undesirable behavior and responding positively to desirable behavior. The individual must be responded to consistently in order to learn the results of his/her choices.

If the individual does not respond to the set limits then crisis situations may escalate. Intervention for violent outbursts differs from nonviolent crisis situations. Interventions may include: punishment, medications, and as a last resort, physical restrictions (Foley, 1994). Within an agency setting, policies and procedures of the agency and the recommendations of the planning team will guide staff.
### Figure 8.3

**Fundamental Principles for Families and Friends:**

- Encourage rest or break periods either whenever frustration or fatigue appears or often enough to avoid their appearance. This will avoid discouragement or temper control problems.
- Keep activities and surroundings relatively simple. Too much, too fast, too soon leads to confusion and poor emotional control.
- Accept setbacks, both as a normal part of life and as a part of rehabilitation. Abundant encouragement and making light of setbacks assures overall growth. A sense of humor helps!
- Write things down that you want the person to do. Never expect that he/she will remember to carry out a sequence of tasks of more than one or two steps without this assistance. This assures the person of what is expected and that concrete rewards are given abundantly.
- Give honest feedback, with equal attention given to praise for desired behavior and brief, to-the-point, constructive criticism for undesirable behavior. Real sensitivity is required to achieve this balance.
- Surroundings should offer familiarity, predictability, and consistency, with regularly scheduled meals, activities, and rest.
- Do not surprise the person; explain activities fully before initiating them. Write things down, draw charts, use calendars, or whatever to serve as reminders of what is to come.
- Minimize confrontation or the use of logical argument for misbehavior. Redirecting the person's attention to something else is much more effective than either arguing or expecting the person to engage in a logical discussion.
- Being a model of calm, assured, confident behavior provides a sense of sureness and stability that the person wants and needs to build his/her own self-confidence. The person depends on others to relearn how he/she should be acting or thinking.
- Providing specific choices from which to choose is more effective than requesting an open-ended, ambiguous decision. Persons with TBI can select from among things relatively easily, but they have unusual difficulty coming up with a decision spontaneously.
- Use wall charts, reminder notes, labels, calendars, notebooks, journals, and other memory aids abundantly. Praise frequently when these are actually used by the person.
- Do not encourage challenge or competition which places the person with a head injury at a considerable disadvantage with others. There is no need to increase either the change of failure of the fear of failure, which leads to anxiety and defensiveness.

Lesson 8: Feedback Exercise

1. List, in order, the four stages of the grieving process.

2. State the importance of stress management.

3. State an effective way to work through a crisis.

4. State the importance of establishing and maintaining routines.

**True or False**

6. T F Alternations in family structure may occur following a traumatic brain injury.

7. T F The grieving process is a natural process.

8. T F Humiliation is the second stage in the grieving process.

9. T F The individual with TBI should be given many tasks to increase independence.
Lesson 9: The Rehabilitation Process

The process of rehabilitation begins in the hospital and continues at home. Outpatient therapy usually lasts considerably longer than inpatient therapy (mayclinic.org). Rehabilitation is a team process involving the individual, family members, as well as professionals. The rehabilitation physician will treat medical problems, as well as oversee the entire rehabilitation process. The psychiatrist may act somewhat as a "team" manager. The neurologist or neuropsychologist will evaluate and monitor cognitive functioning. The physical therapist will address physical deficits, such as balance. The occupational therapist will address every area of rehabilitation. The speech therapist will evaluate and provide therapy for speech and language concerns.

A good rehabilitation process is the key to helping the individual accept and compensate for a brain injury and achieve an optimal level of functioning. There are many rehabilitation programs and it is vital that the individual, the family and the doctor discuss which program would be most beneficial. The individual and the family should gather information and recommendations on every facility available. By visiting the facilities and talking to people in charge, the individual, the family, and the doctor will be able to decide which facility is right.

Regardless of the facility chosen and the severity of the injury, several aspects must be met in order for the individual to obtain a maximum independence level. Proper assessment, cognitive functioning, behavioral management and counseling are all aspects of good rehabilitation programs. Having realistic goals and expectation is important.

TYPES OF REHABILITATION FACILITIES AND PROGRAMS

There are several types of rehabilitation facilities available, and each differs from the others in many ways. These types of facilities fall into a progressive order, beginning with the most dependent facility to the least dependent facility.

Acute Rehabilitation Facilities

Acute rehabilitation begins when the individual is medically stable. During this time some individuals will remain in a coma, while others will begin the gradual process of rehabilitation. The extent of recovery varies with each person. Some may experience full recovery, while others may not.

Acute facilities are often located within an acute care hospital or as a free standing facility. These types of facilities allow for a high rate of dependency by the individual. The primary goal of acute rehabilitation is to initiate the rehabilitative process. These facilities provide a complete interdisciplinary team of medical and nonmedical professionals to provide for thorough evaluations of the individual's abilities. All areas of functioning are evaluated by appropriate professionals. Rehabilitation begins at the level of functioning, and the individual remains in the facility until he/she has received a significant amount of rehabilitation. Acute rehabilitation programs are best for individuals with less than severe head injuries (www.biaia.org).
Inpatient/Outpatient Rehabilitation Facilities

Inpatient/outpatient facilities are designed to treat individuals with severe to profound head injuries. These type of facilities allow for comprehensive therapy for an extensive time period. Inpatient/outpatient facilities focus rehabilitation on the following: physical therapy, behavioral therapy, speech therapy, memory retraining, and cognitive retraining. (National Head Injury Foundation, Florida Association, Inc.)

Transitional/Sub-acute Living Facilities

Transitional living assists individuals with a brain injury in reaching maximum independence. Transitional facilities focus on the changes the individual must experience in moving from one place (eg. the hospital) to another (eg. the home). The focus in this type of program is on interpersonal skills, community interaction, and vocational training. Transitional living programs may be in a variety of settings, such as group homes. Transitional living programs can be long term rehabilitation facilities or residential living facilities. Long term rehabilitation facilities provide lengthy and intensive rehabilitation for individuals with a brain injury who are making slower progress. This type of program is a non-residential, nonpermanent setting. Residential living programs offer an opportunity to permanently live in a structured, group, residential setting with others with TBI. (www.biaia.org).

Day Treatment Services

Day treatment services are community based services offered through local resources. They are structured in a group setting during the day and allows the person with a brain injury to return home at night (www.biaiaa.org). Services offered include physical, occupational and cognitive therapy, social adjustment, vocational training, and independent living skills.

Respite/Outpatient Programs

Respite programs are short-term programs designed for individuals with a brain injury to leave their current living situation for a couple of days or weeks. These type of programs offer intensive therapy as well as social interaction.

FAMILY-CENTERED REHABILITATION

One of the most important factors for successful rehabilitation is family support. The family must be aware of and learn to accept the physical, cognitive and behavioral changes which come with TBI. Anger, frustration, and grief are natural emotions commonly. Rehabilitation assists family members to learn to accept and accommodate for the changes in the injured individual, as well as adapt to new roles in the family structure.
Family-centered rehabilitation teaches family members to care for themselves first. It is natural to feel the need to put the individual's needs ahead of their own, but for family members to function fully they must satisfy their own needs also. Eating right and taking time out for themselves helps family members deal with the multitude of dilemmas that will arise. The role changes that take place within the family structure can be extremely frustrating for everyone. Support groups can help family members voice their emotions and relieve some of their frustrations.

**PHYSICAL REHABILITATION**

Physical rehabilitation focuses on the individual's primary physical needs. Physical disabilities may be a direct result of the injury (such as a broken back) or as a result of inactivity (such as muscular atrophy due to the individual being in a coma for an extended period of time). It is important that small, attainable goals be set (rather than larger, unattainable goals) so the person can experience success.

**COGNITIVE REHABILITATION**

Cognitive changes are the primary reason for difficulty in independent living, family life, social re-adaptation, and vocational pursuit for the person with TBI. Cognitive rehabilitation is intervention designed to improve attention, concentration, memory and information processing skills.

Before cognitive rehabilitation can begin, the individual's strengths and needs must be determined by the rehabilitative team. For example, the inability to read after a brain injury may be the result of one of the following or a combination of the following deficits: attention skills deficits, concentration skills deficits, memory deficits, information processing deficits. Realistic goals and objectives for the individual must be stated; and, criterion must be established accordingly. Remediation methods must be fully described and the expected length of rehabilitation must be estimated.

The following, simple yet highly effective, concepts can be used when targeting any area of cognitive concern:

- **Cueing** to focus attention is an effective cognitive strategy. Initially, cues are given by others, however, the goal is for the individual to learn to cue him/herself.
- **Altering the environment** by removing distracting stimuli is helpful. A person cannot learn if he/she is distracted.
- **Overlearning** (learning something over and over) helps the individual recognize information as well as generalize that information to other situations (for example, by
reading a story over and over the person will recognize specific words in other texts as well as well as within the story).

- **Task analysis** (breaking a task down into its component parts) allows the individual to see, perform and understand each step in a task.

**BEHAVIORAL REHABILITATION**

Inappropriate behavior is the biggest challenge facing individuals with a brain injury. Although cognitive deficits and physical impairments will be accommodated for, inappropriate behavior requires careful monitoring and attention. Fortunately, behavior can be prevented and/or relearned.

Correcting problem behavior is the most important step in the rehabilitation process. It is important the individual not be ignored or "talked down to" when he/she is upset. A reward system can be used to teach the individual to distinguish between appropriate and inappropriate behavior, along with setting limits and appropriate consequences. Extrinsic rewards may be extended privileges or treats. By implementing self-monitoring techniques the individual learns to think before he/she acts.

It is important not to get into adversarial relationships, to reward positive behavior, to set realistic expectations, and always to provide emotional support and validation for the individual who is struggling to regain self-control and a positive sense of self. Seeking input from a behavioral counselor, psychologist, psychiatrists, etc..., is highly recommended when addressing behavior problems.

**Figure 9.1**

**EFFECTIVE TEACHING TECHNIQUES FOR INDIVIDUALS WITH TBI**

- Therapeutic Alliance
- Structure and Routine
- Direct Practice of Targeted Skills
- Systematic Feedback:
  - Therapist
  - Peers
  - Family Members
  - Employer/Teacher
  - Video model demonstration
- Positive and Negative Role Playing
- Dignity of Risk (Learning from Mistakes)
<table>
<thead>
<tr>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicting Performance Followed by Self-Charting and/or De-Briefing</td>
</tr>
<tr>
<td>Coaching/Shadowing</td>
</tr>
<tr>
<td>Prevention</td>
</tr>
<tr>
<td>Negotiation/Flexibility</td>
</tr>
</tbody>
</table>
Lesson 9: Feedback Exercise

1. List the 5 types of rehabilitative facilities.

2. List the 2 ways in which physical disabilities can occur.

3. State the first thing which must be done before cognitive rehabilitation can occur.

4. Define task analysis.

5. State the most important step in behavioral rehabilitation.

True or False

6. T  F  Self-monitoring techniques help the individual in learning to think before performing an action.

7. T  F  The goal in cueing is for another person to direct the individual's focus back on task.

8. T  F  Transitional living facilities focus on changes necessary in moving from one type of placement to another (eg. hospital to home).
Lesson 10: Vocational Rehabilitation

Vocational rehabilitation is one of the most difficult areas of rehabilitation. This type of rehabilitation requires an understanding all aspects of a brain injury and is able to address the strengths and needs of individuals. Determination can then be made if the person can function at his/her present vocational setting or if new placement is necessary. In most cases, the underlying effects of head injury (such as concentration deficits) are more vocationally disabling than the obvious disabling conditions (such as epilepsy). The individual may be unrealistic in planning his/her vocational goals, therefore the vocational rehabilitator must work towards increasing the individual's awareness of limited functional abilities resulting from the injury.

Because neurological recovery occurs spontaneously in the first 12 months following the brain injury, it is best to delay the vocational evaluation until the recovery progress has levelled. By doing so, the case manager will obtain a more accurate picture of the individual's abilities as compared to evaluations conducted during a rapid period of recovery.

Once the stage of recovery is determined, the case manager must determine the appropriateness of the services being requested. For example, cognitive rehabilitation may be a necessary service for an individual who has difficulty focusing attention on a task, but cognitive rehabilitation would not be a necessary service for someone who has outbursts of temper. For the individual to receive all the necessary services the case manager must explore all existing sources of funding.

WORK HISTORY INFORMATION

A thorough pre-injury and post-injury work history is important (Figures 10.1 and 10.2). Particular testing should be done to assess vocational abilities and interests.

Figure 10.1: Pertinent Pre-injury Information

<table>
<thead>
<tr>
<th>Questions for the pre-injury history should reveal the following information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Demographics (including age, gender, socio-economic status, etc...)</td>
</tr>
<tr>
<td>• Pre-injury job, job goals and job interests.</td>
</tr>
<tr>
<td>• Work history (level of functioning, salary level, etc...)</td>
</tr>
<tr>
<td>• Educational and vocational training history</td>
</tr>
<tr>
<td>• Physical and mental health background, including use of alcohol and drugs, etc.</td>
</tr>
<tr>
<td>• Social history</td>
</tr>
<tr>
<td>• Behavioral dispositions</td>
</tr>
</tbody>
</table>
Figure 10.2: Pertinent Post-injury Information

Questions for the post-injury history should reveal the following information:

- Level of independence in the home, including daily activities, household chores, etc...
- Level of independence in travel.
- Financial status (including support sources).
- Existence of legal bills (including unsettled lawsuits).
- Leisure activities and hobbies.
- Organizations with which the individual is involved in (including support groups).

Vocational Interest Tests

Vocational interest inventories provide valuable information about work-related, as well as general interests. These can be in written, visual, or audio form.

Achievement Tests

Achievement tests can be administered formally, such as an analysis of reading and writing, or informally, such as having the individual read a newspaper. Skills which should be addressed through achievement tests are: reading, writing, math, reasoning, and direction following. This type of test indicates the present level of functioning, as well as the potential for remediation.

Personality Tests

Personality tests to match personality characteristics and vocational needs with compatible vocational placements.

Aptitude Tests

Aptitude tests examine a variety of skills and produce pertinent information regarding vocational abilities. Of particular use are tests which examine motor speed and motor accuracy. Caution must be used when aptitude tests are administered to individuals with a brain injury. The test administrator must understand that a low score on the test does not necessarily mean a low aptitude in that particular area. Rather, the low score may be a result of an underlying skill which is not being directly tested. For example, an individual may receive a low score on an aptitude test on mathematical reasoning; however, there may be deficits in reading skills which interfere with mathematical reasoning rather than actual deficits in mathematical reasoning. For such reasons, aptitude tests should not be used as the sole determiner of skills and deficits, rather should be used in conjunction with other tests.
The Situational Assessment

A situational assessment is an observation of work skills in a controlled environment which assists in integrating the individual into the most normal and least restrictive work environment. Situational assessments allow for an analysis of the individual in a real work setting and behaviors which are not seen in evaluation centers may be evident in situational sites. The consequences of those behaviors and their effect on work can be determined. Situational assessments should be short term placement on the target job to allow for a supported, yet realistic, environment for vocational assessment. A job trainer may be needed to assist in becoming familiar with the necessary job tasks.

PLANNING THE INITIAL GOAL

Vocational counseling is performed by the vocational rehabilitator; however, counseling involves all rehabilitation professionals involved, and family members.

When the test and situational assessment results are available, initial goals can be made. It is important to understand that initial goals do not have to be end goals, rather it can be a small, initial step towards the end vocational goal. The individual's abilities and deficits, the availability of community resources, and local job market opportunities must be viewed in depth when planning the initial goal. Ongoing assessment also assists in reviewing and modifying the goal.

A common issue in vocational rehabilitation is unrealistic goal setting by the individual, most often due to the overestimation of vocational abilities and the underestimation of the effort necessary to achieve the goal. Unrealistic expectations are part of the adjustment process; and relate directly to the level of awareness and acceptance of the disabling conditions. The vocational rehabilitator, along with other team members, must work together to help the individual gain awareness of his/her deficits which may hinder or interfere with vocational success in the area chosen by the individual. The individual should not be discouraged to set goals, rather he/she should be aided in setting achievable goals. It is important for the vocational rehabilitation counsellor to understand that unobtainable goals can be a source of hope to the individual and therefore result in compliancy in other aspects of rehabilitation, such as social skills training.

The setting of realistic goals is often a difficult process. However, there are several ways this process can be facilitated. By listening to the individual describe his/her goals, the counselor can build rapport. The individual will be more likely to negotiate if he/she feels like the counselor is helping him/her. Setting up a hierarchy of goals aimed at a long-term outcome (even if a long-term goal has not been established) allows the person to focus on small, progressive steps rather than one large step.

If the individual wishes to return to a previous vocational setting, a situational assessment should be performed. Before the assessment occurs the individual and the counselor must agree
on criteria for success. The information gained from the assessment will provide valuable feedback on the ability to perform pre-injury job duties. This type of assessment may also assist the individual in realizing if his/her goals may be unrealistic. Volunteer positions may also aid in awareness of strengths and weaknesses.

**VOCATIONAL ANALYSIS**

The final step before job placement can occur is job analysis. The employer must clearly define the requirements of the job. The vocational rehabilitator must look at every requirement of the job and be assured that the individual either holds the skills or has the ability to learn the skills necessary for job satisfaction and success.

According to the American Disabilities Act (ADA), employers must make reasonable accommodations to a job, employment practice, or the work environment that make it possible for a qualified person with a disability to be employed, unless the accommodations would cause undue hardship on the business. These accommodations must be made from the first point of contact with a person with a disability including: the application process, the interview process, job training, promotional consideration, and layoff consideration. If job duties change, new accommodations may need to be made. Figures 10.3 and 10.4 offer suggestions for employer modifications of the job application and the interview process.

**Figure 10.3**

**Employer Modifications of the Job Application:**

- Allow the individual to fill out the application at home rather than at the workplace. This allows for assistance in filling out the application.
- Provide assistance at the workplace in filling out the application.
- Mail or fax applications to an individual rather than have the individual pick up the application at the workplace.

**Figure 10.4**

**Employer Modifications of the Interview Process:**

- Ask the individual if he/she has any specific needs that must be addressed to make the interview process easier.
- Make sure the interview site is accessible to the individual.
- Decrease distractions in the room.
- Decrease the number of introductions made.
- Break down tasks or jobs into steps which may be easier for the individual to remember.
Modifications can also be made in job training. It is best to ask the individual how he/she learns and to modify job training to utilize the individual's learning style. For example, if an individual is a hands-on learner it would be more beneficial to pair him/her up with a coworker to learn job duties rather than verbally stating the duties. Flexibility in allowing the person to set up his/her own work station may eliminate or reduce the need for future work station modifications.

Selecting accommodations should be determined by the employer and the employee. Accommodations could involve a variety of support strategies such as wheelchair-accessible facilities; raised desks or tables; modified work schedules; memory log books; voice-activated computers; job checklists; sequenced job steps; etc.

OUTCOME PERSPECTIVES

The outcome of employment for someone with TBI depends on several factors: initial placement, the individual's abilities or potential to meet the requirements; the employer's flexibility in regard to job modifications; and, the individual's willingness to participate in ongoing rehabilitation and training.

When defining outcome criteria five critical aspects must be taken into account. They are:

- level
- regularity
- productivity
- structure
- length

Employment level refers to the position the individual will hold. An individual who held a high authority pre-injury position (such as a business executive) may dislike holding a low authority post-injury position. As previously stated, it is extremely important that the individual partake in the choosing of a vocational position. It is also important to remember that they can be placed in a different, perhaps more suitable, employment situation at any time.

Employment regularity refers to the necessary work hours. Can the individual work full-time, or is part-time work necessary? Also, shift work must be at the time of day when the individual works best.

Productivity refers to the quality and quantity of work required of the individual. The amount and caliber of the work and attention required are particularly important when considering placement of an individual, because they will affect the amount of work performed by the individual.

Structure refers to the level of independence required of the individual on the job site. Many employment situations incorporate ongoing structure, allowing ongoing support while simultaneously increasing independence.
**Length of employment** refers to the length of time the individual can hold the employment position. It can be more difficult to hold a job than it is to get a job, due to inappropriate behaviors and attention deficits not yet overcome.

Variables which may impact employment outcome include physical, cognitive, and behavioral challenges due to TBI. The individual's self-esteem and willingness to learn compensatory strategies play an important role in successful employment outcome. Other variables include personal characteristics (such as disorganization) as well as styles (such as procrastination) present in the individual before the injury.

Environmental variables in the workplace and psychosocial factors (such as family support) are extremely powerful in influencing outcome. The availability and funding of vocational rehabilitation services, as well as the individual's willingness to participate in such services are major factors in long-term employment success.
Lesson 10: Feedback Exercise

1. Describe one type of test which can aid in vocational rehabilitation.

2. Discuss unrealistic goal setting.


4. Discuss how the setting of realistic goals can be made easier.

5. State what must be completed before goal setting can begin.

True or False

6. T F Pre- and post-injury work history information can provide valuable insight to the abilities and interests of the individual regarding vocational placement.

7. T F Vocational rehabilitation cannot occur without the active participation of the individual in the vocational placement process.

8. T F The physical effects of brain injuries are the most important aspect in vocational rehabilitation.
Lesson 11: Staff Development

Providing rehabilitation services is a highly demanding job and a great deal of pressure is placed on the staff. Many staff members enter the field with minimal or no formal training in addressing the needs of individuals with a brain injury. The result can be an ineffective rehabilitative program from which the clients receive limited benefit.

The importance of staff training and development is stressed to result in improvement in performance and to foster motivation and creativity. Effective training programs incorporate direct input from service recipients. Consumers generally view the service value as unique to their needs and also define it more broadly than the perspective held by professionals. Utilizing consumer input can help identify areas of strengths and weaknesses, which would otherwise go unnoticed, within a program.

BASIC CONCEPTS

Typically, three related areas of human performance factor into the areas of staff development: attitudes, knowledge, and skills. In the past staff training and development focused on increasing staff knowledge through lectures and presentations. Presently, successful training and development programs focus on how staff attitudes affect motivation and effort, and also provide situational training which allows for immediate feedback.

Attitudes affect the staff’s willingness and motivation to properly perform job duties. Positive attitudes are reflected in the staff’s ability to choose and perform effective rehabilitative strategies. Negative attitudes result directly from a lack of knowledge of the effects of brain injuries. For rehab strategies to be effective they must be performed properly, and to be performed properly they must be well understood by staff. In addition, confidence, assertiveness, patience, and motivation are all necessary skills for staff working with individuals with a brain injury.

ETHICAL ISSUES

Ethical issues are discussed in health care settings generally when doing what is right in a given situation has become unclear. Moral dilemmas are commonly conflicts of rights or duties. Staff will benefit from training in the following ethical issues:

**Autonomy** refers to the right of an individual to be self-ascertaining and participate in decisions regarding his/her well-being. The autonomy of individuals and the preservation of their ability to decision-make generally involve informed consent (individuals are informed of the conditions, possible treatment strategies, and risks associated with those strategies). The goal is to allow the individual to follow or refuse treatment. Unfortunately, TBI often robs individuals of this autonomy. An effective rehabilitative outcome is one which fosters decision making and functional capacity and restores autonomy. Staff training and development should be driven by a
consumer-centered perspective which accounts for appreciation of the person's uniqueness and dignity, such as engaging individuals in decisions regarding their care.

**Nonmaleficence** refers to the right of the individual not to be harmed and the duty of the health provider not to do harm. TBI professionals should be aware of subtle forms of disrespect to the consumer's dignity. Talking to individuals in the third person or behind their backs, and using language they do not understand are common examples of factors which will constitute disrespect. Staff may unconsciously have negative thoughts and feelings, or blame the individuals for noncompliance, which may influence their ability to cope successfully with critical situations.

**Beneficence** refers to individual’s rights to assume the health care providers will seek measures to secure their well-being. Staff must recognize that individuals with TBI are people with disabilities rather than disabled people. Staff must acknowledge dignity and self-worth to be effective in therapeutic efforts and foster consumer relationships.

A difficult aspect of a brain injury is determining the autonomy of the individual. This is a team responsibility. Is the patient competent enough to participate in rational decision making? If not, who should the surrogate decision maker be, and what should his/her authority include?

**Justice** refers to the rights of the individuals to expect fair and appropriate treatment. Staff must limit care to that within their own skills and competencies. Providing unqualified care is not only unethical, but illegal. A common problem faced is that of basing treatment of a patient on the willingness of the insurance company to pay for treatment. This must be avoided if it is detrimental to the well-being of the individual. The possibility of funding from other sources must be investigated.

**STAFF TRAINING FOR FAMILY-CENTERED REHABILITATION**

The biggest challenge in family-centered rehabilitation is creating a system in which the family and the health providers are equals. There are several important strategies that can foster family-staff relations:

- Promote positive attitudes about family decisions in all family-staff interactions.
- Use common language and speak of realistic predictions.
- Promote family-staff interaction.
- Discuss the balance between hope and reality.
- Give the individual as much control as possible.
- Evaluate the quality of family-staff relationships as reported by family and incorporate recommendations to increase that quality.
- Incorporate education about service delivery models.
- Offer on-going assistance and support to the family.
DEVELOPING POSITIVE COMMUNICATION

Staff must be knowledgeable of the effects of a brain injury, particularly the communicative deficits. Common problems observed are:

- Failure to communicate with the person.
- Failure to respond to communication or communicative attempts from the patient.
- Talking about the patient as if he/she was not present.
- Allowing a distracting environment.
- Taking someone's aggressive language personally.
- Ridiculing bizarre or inappropriate behavior.
- Labelling individuals by their behavior.
- Speaking too fast or too slowly.
- Failing to encourage new strategies.
- Addressing the individual in a disrespectful manner.

STAFF TRAINING ANALYSIS AND INSTRUCTIONAL DELIVERY

Effective programs must include establishing training objectives, methodologies, and evaluation processes that can be easily incorporated into ongoing staff activities; and, encouraging staff to use them throughout the day. Instruction is best provided in the natural work environment to improve staff's skill acquisition, maintenance, and generalization.

Effective instructional approaches maximize participation, engage learners in the practice of targeted skills, allow for training and feedback in typical work situations, and create an effective learning environment. Programs which incorporate self-evaluation, self-direction and self-learning, aid the learner in focusing on skill development and allow the instructor to view how the learner rates his/her skills.

Modeling is an effective approach to staff training, however it can have significant drawbacks. A decrease in staff confidence can occur if an experienced staff member steps in, takes control, and manages a situational crisis. Other staff members may feel intimidated and inadequate; and, the opportunity to define successful strategies or techniques may be lost. The most valuable experience that results from modeling is when the chosen strategy is ineffective, requiring staff collaboration and intervention to concentrate on the problem. This collaboration builds a sense of team and increases staff's ability to problem solve when faced with a crisis.

Role playing is an effective learning strategy which offers staff the opportunity to practice applied skills and identify skills they must master. Several considerations must be made:

- Identify real-life situations (crisis situation, team conflicts, etc...)
- Use incorrect responses and scenarios to generate identification of problem areas and breakdowns by staff.
- Ask participants to debrief the situation.
- Repeat the role playing situation with the participants managing the situation in the most effective manner.
Commonly used tests to measure staff training effectiveness are knowledge-based and performance-based tests. Information regarding attitudes can be measured through questionnaires, rating scales, and interviews. Knowledge-based tests compare pre-test and post-test performances. Knowledge can be measured through objective tests. Performance is evaluated through staff assessment in simulated situations or situational analysis by observation.

**Figure 11.1: Instruction Delivery Methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Example of Instructional Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case studies</td>
<td>Promotes self-awareness</td>
</tr>
<tr>
<td>Debriefing incidents</td>
<td>Crisis intervention</td>
</tr>
<tr>
<td>Demonstration</td>
<td>Use of adaptive equipment</td>
</tr>
<tr>
<td>Focused discussion</td>
<td>Ethical dilemmas</td>
</tr>
<tr>
<td>Lectures</td>
<td>Cognitive deficits of TBI</td>
</tr>
<tr>
<td>Peer reviews</td>
<td>Sharing approaches</td>
</tr>
<tr>
<td>Role playing</td>
<td>Resolving staff conflicts</td>
</tr>
<tr>
<td>Videotaping</td>
<td>Teaching compensatory skills</td>
</tr>
</tbody>
</table>
Lesson 11: Feedback Exercise

1. Discuss the importance of staff training.

2. Discuss how attitudes effect staff.

3. Discuss the drawback of modeling a training approach.

4. Define nonmaleficence.

5. List 4 strategies for family-centered rehabilitation.

True or False
6. T F Many staff enter the field of TBI with adequate training and knowledge.

7. T F Performance is measured through staff assessment.

8. T F Instruction is best provided through lecture
LESSON 1: FEEDBACK EXERCISE KEY

1. A brain injury is any insult to the brain caused by
   - external force that may result in a loss of consciousness and
   - impaired cognitive abilities or physical functioning.

2. The following are causes of a brain injury:
   a. Automobile accidents
   b. Falls
   c. Assaults (non-firearm)
   d. Child abuse
   e. Sports activities
   f. Bicycle accidents

3. The term “brain damage” refers to any damage to the brain, including degenerative and congenital damage. The term “traumatic brain injury” refers to damage to the brain caused by an external force.


5. According to the Brain Injury Association of Connecticut (1996) brain injuries are the leading cause of death in children as well as young adults.

6. Males are twice as likely to experience a brain injury as females according to the Brain Injury Association, Inc., (1996).

7. Although automobile accidents are a major cause of brain injuries, accounting for 50% of all brain injuries, they do not account for 75% of all injuries.

8. Alcohol is involved in half of brain injuries.

LESSON 2: FEEDBACK EXERCISE KEY

1. Open head brain injuries occur when an outside force such as a gunshot penetrates the brain.

2. Closed head brain injuries occur when an external force is applied to the brain; however, the external force does not penetrate the brain.

3. Contusions of the frontal and temporal lobes are bruises on the brain resulting when the brain contacts the rough edges of the inside of the skull due to an external force applied to the skull.

4. Coup/Contra-coup damage occurs when an external force is applied to the skull, which causes the skull to bend inward and bruise the portion of the brain trapped below it (Coup). The force exerted on the brain will then push the brain against the other side of the skull, resulting in a bruise on that side of the brain (Contra-coup).

5. Axon injury occurs when the head strikes a stationary object. Upon impact the axons in the brain stretch and tear, disrupting biochemical functioning.
6. T Open head injuries are also known as penetrating injuries because penetration of the brain by an outside force occurs.

7. F The brain itself is not penetrated in closed head injuries.

8. Closed head injuries may result in 3 types of damage:
   1. Contusions of the frontal and temporal lobes
   2. Coup/Contra-coup damage
   3. Axon injury.

9. T Ceasement of nerve functioning is axon injury.

10. F Contusions of the frontal and temporal lobes are types of damage caused by closed head injuries.

LESSON 3: FEEDBACK EXERCISE KEY

1. A coma is a prolonged period of unconsciousness.

2. The two most common scales used to assess a coma are the Glasgow Coma Scale, and the Rancho Los Amigos Scale of Cognitive Functioning.

3. The areas assessed by the Glasgow Coma Scale are:
   a. eye opening
   b. motor response
   c. verbal response.

4. F A coma is a prolonged period of unconsciousness.

5. T Brief periods of unconsciousness can be associated with severe mental impairments.

6. F Comas most often result from axon injury.

7. T Although the length of the coma does not necessarily indicate the severity of the impairments, the longer the individual is in a coma the more severe the impairments tend to be.

8. F Level I of the Rancho Los Amigos Scale of Cognitive Functioning is no response to stimulation.

9. T According to the Glasgow Coma Scale, severe brain injury is characterized by a loss of consciousness of 24 hours or more.

10. T An individual can experience brain injuries losing consciousness.
LESSON 4: FEEDBACK EXERCISE KEY

1. Secondary brain damage is the damage which occurs as a result of the primary damage.

2. Herniation is the squeezing of the brain downward through the base of the skull, which results from inter-cranial pressure.

3. Infarction is tissue death.

4. Thrombosis is blood vessel clotting.

5. Embolism is blood vessel obstruction.

6. Hematoma’s can occur at any of 3 locations:
   1. Epidurally - between the skull and brain covering
   2. Subdurally - between the brain covering and the brain tissue
   3. Intracerebrally - within the brain itself.

7. F The more severe the brain injury the less severe the headache.

8. F Hematoma’s are collections of blood. Collections of water are edemas.

9. F Secondary damage can often be more severe than primary damage, and may result in permanent damage.

10. T Surgical intervention is generally the most effective way to control or prevent secondary damage

LESSON 5: FEEDBACK EXERCISE KEY

1. Both hemiparesis and hemiplegia affect one side of the body however, they differ in that hemiparesis is the weakening of one side of the body, whereas hemiplegia is the paralysis of one side of the body.

2. Motor abilities can be affect in 7 ways (accept any 3):
   a. hemiparesis/hemiplegia
   b. muscular strength and endurance
   c. muscular spasticity
   d. rigidity of the joints
   e. ataxia
   f. hand-eye coordination
   g. dysphagia

3. The 4 types of seizures are:
   a. tonic-clonic seizures
   b. generalized absence seizures
   c. partial seizures
   d. complex partial seizures

4. Speech and language can be affected in several ways (accept any 1):
   a. speech and language production
b. language comprehension
c. dysnomia

5. T A decrease in tolerance for drugs and alcohol is one of the most common and dangerous effects of a brain injury.

6. F Dysnomia refers to difficulty retrieving a word from memory.

7. T Partial seizures are also known as "focal" seizures.

8. F Dysphagia refers to difficulty chewing or swallowing food.
9. F Ataxia is not due to muscle weakness, rather it is due to lesions of the cerebellum or basal ganglia.

10. F The underlying causes of physical symptoms lie in the brain rather than at the anatomical structures involved; therefore, damage is most often permanent.

LESSON 6: FEEDBACK EXERCISE KEY

1. There are 5 cognitive symptoms of brain injuries (accept any 3):
   a. orientation deficits
   b. attention and concentration deficits
c. memory deficits
d. information processing deficits
e. impairments in executive functioning

2. Retrograde amnesia occurs with deep temporal lesions. This refers to the inability to recall information (such as recognizing family members) learned before the injury.

3. According to Senelick and Ryan executive functions are those functions involved in planning, initiating, directing and monitoring the individual’s own activities.

4. The hippocampus is responsible for incidental memory.

5. F Incidental memory is the ability to recall unattended information.

6. T Due to impairments in executive functioning the individual may appear “lazy”.

7. F Because the damage causing cognitive symptoms occurs in the brain, symptoms are most often irreversible.
LESSON 7: FEEDBACK EXERCISE KEY

1. Behavioral changes are often the most difficult symptoms to deal with because in most cases, the individual will not realize changes in behavior and emotions have occurred.

2. In most cases, brain injuries result in a severe decrease in self-esteem due to the magnitude and severity of changes resulting from the injury.

3. Ego-centricity is the feeling of being the center of the universe, that everyone and everything centers around oneself.

4. T Denial is part of the grieving process, and as such is a common emotion for individual’s with brain injuries, as well as their families.

5. F Due to the wide extent of damage brain injuries almost always affect the self-esteem of the individual involved.

6. T Inflexibility occurs as a result of underlying cognitive changes which limit the individual’s ability to analyze information.

7. T Disinhibition results in the performance of inappropriate behaviors.

8. T People with TBI often say or perform things spontaneously, without thinking about the outcome.

9. T Changes in drive include changes in sexual drive, as well as changes in appetite and temperament.

10. F Although some individuals with brain injuries will become apathetic towards life, not every individual with brain injuries will.

LESSON 8: FEEDBACK EXERCISE KEY

1. The 4 family coping styles are:
   a. The unsupportive family is characterized by denial of the impairments.

   b. The overly supportive family is characterized by guilt. Family members may become overly protective of the individual.

   c. The dysfunctional family often has difficulty communicating thoughts and feelings with one another.

   d. The supportive family accepts the injuries and aids in the rehabilitative process.

2. Denial
   Anger and frustration
Depression
Acceptance

3. Stress management is extremely important in eliminating unnecessary stress from the individual’s life. A high level of stress can restrict the rehabilitative process.

4. The most effective way to work through a crisis is to discuss the problem at hand. If the individual exhibits violent behaviors, the individual should be given time to calm down before discussing the problem.

5. Establishing and maintaining routines allows for structure in the individual’s life. Structure is important when recovering from a brain injury because it reduces stress, which can interfere with the rehabilitative process.

6. T Alterations in family structure almost always occur with brain injuries.

7. F The overly supportive family is characterized by guilt or the sense of power over the injured individual.

8. T The grieving process is a natural process. Through this process individual’s and families can come to terms with the injuries and accept the changes in the injured individual as well as the family.

9. F The second stage in the grieving process is anger and frustration. Humiliation is not a step in the grieving process.

10. F The injured individual should be given only necessary tasks. The responsibility of too many tasks will increase the individual’s stress level which can interfere with rehabilitation.

LESSON 9: FEEDBACK EXERCISE KEY

1. The types of rehabilitative facilities are:
   a. acute rehabilitation facilities
   b. inpatient/outpatient facilities
   c. transitional living facilities
   d. day treatment services
   e. respite facilities.

2. Physical disabilities can occur in 2 ways:
   a. as a direct result of the injury
   b. as a result of inactivity (muscular atrophy).

3. Before cognitive rehabilitation can occur the individual’s strengths and needs must be assessed.
4. Task analysis is breaking a task down into its component parts.

5. The most important step in behavioral rehabilitation is correcting the problem behavior.

6. T Self monitoring techniques help the individual learn to think before performing an action.

7. F The goal in cueing is for the individual to direct his/her focus back on task.

8. T Transitional facilities focus on the necessary changes in moving from one placement situation to another.

LESSON 10: FEEDBACK EXERCISE KEY

1. Tests which can provide valuable information are (accept any 1):
   a. Vocational interest inventories provide valuable information work-related and personal needs.
   
   b. Achievement tests provide information on basic skills such as reading, writing, math, reasoning and direction following
   
   c. Personality tests provide a characteristic portrait of the individual which can be used to place the individual in a work setting which will match his/her personality characteristics

2. Unrealistic goal setting by the individual occurs because the individual does not understand the full extent of the damage caused by the injuries.

3. Situational assessment is an observation of work skills in a controlled environment which allows the individual to integrate into the least restrictive work environment.

4. The vocational rehabilitator can make the setting of realistic goals easier by establishing an open line of communication with the individual. The individual should be allowed to voice his/her wants and needs in terms of vocational placement.

5. Before goal setting can begin the individual’s strengths and needs must be determined. A pre- and post-injury work history must also be completed, as well as vocational tests (such as interest tests, achievement tests, and personality tests).

6. T Pre-injury and post-injury work histories provide valuable insight into the individual’s wants and needs regarding vocational placement.

7. T The individual must actively participate in the vocational rehabilitation process.
LESSON 11: EXERCISE FEEDBACK KEY

1. The importance of staff training is to improve performance and foster motivation and creativity.

2. Attitudes effect staffs willingness and motivation to perform job duties.

3. The main drawback to the modeling concept is a result of feelings of intimidation, inadequacy and less confidence if a staff member steps in and manages a crisis without defining strategies or techniques.

4. Nonmaleficence is the right of the consumer not to be harmed and the duty of the health provider not to do harm.

5. The family-centered rehabilitative strategies are:
   a. Promote positive attitudes about family decisions.
   b. Use common language.
   c. Promote family-staff interaction.
   d. Discuss the balance between hope and reality.
   e. Give the individual as much control as possible.
   f. Evaluate and improve upon the quality of family-staff relationships.
   g. Incorporate education about service delivery models.
   h. Offer continuous assistance and support.

6. Many staff who enter the field of TBI lack the necessary training and knowledge of TBI.

7. Performance is measured through staff assessment and situational assessment.

8. Instruction is best provided in natural work environments (such as on the job training).
### Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract Thinking</td>
<td>The ability to reason and to solve problems.</td>
</tr>
<tr>
<td>Agitation</td>
<td>Behavior pattern of restlessness and increased activity intermingles with anxiety, fear, and/or tension.</td>
</tr>
<tr>
<td>Amnesia</td>
<td>The inability to retrieve any information from memory. There are 3 types: (1) Retrograde amnesia is the inability to recall information that was known before the injury; (2) Antegrade amnesia is the inability to recall information that was learned after the injury; and (3) Post-traumatic amnesia is the inability to recall the injury or information/events which occurred immediately following the injury.</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>A bubble-like deformity in a blood vessel wall which is prone to bleeding.</td>
</tr>
<tr>
<td>Antegrade Amnesia</td>
<td>The inability to recall information learned or behaviors experienced after the injury occurred.</td>
</tr>
<tr>
<td>Anoxia</td>
<td>Generalized lack of oxygen supply - may be due to poor blood flow in the brain or low oxygen in the blood.</td>
</tr>
<tr>
<td>Anticonvulsant</td>
<td>Medication used to control or decrease the possibility of a seizure.</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Drugs which help treat depressions.</td>
</tr>
<tr>
<td>Aphasia</td>
<td>An impairment of communication, caused by damage to an area of the brain, which can involve not only speaking, but understanding of spoken language, writing, reading, and use and understanding of gestures.</td>
</tr>
<tr>
<td>Apraxia</td>
<td>Disorder of the voluntary control and organization of movements.</td>
</tr>
<tr>
<td>Aspiration</td>
<td>When food or liquid goes into the windpipe (trachea) and lungs instead of the esophagus and then the stomach. This can cause a lung infection or pneumonia.</td>
</tr>
<tr>
<td>Ataxia</td>
<td>Uncoordinated, unbalanced, and awkward motor movement caused by lesions of the cerebellum or basal ganglia.</td>
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</tbody>
</table>
**Attention Span:** The amount of time a person can concentrate on a particular task.

**Automatic Speech:** Items said without much thinking on the part of the speaker. These include songs, numbers, social communication, or can be items previously learned through memorization. Spontaneous swearing in individuals who did not do so pre-injury is another example.

**Autonomy:** The right of an individual to be self-ascertaining and participate in decisions regarding his/her well-being.

**Axon Injury:** Occurs when the head strikes a stationary object with intense force, causing the axons to stretch and tear.

**Balance:** The ability to use appropriate righting and equilibrium reactions to maintain an upright position. It is usually tested in sitting and standing positions.

**Behavior Modification:** Interactions with a person in a way which either decreases, increases or maintains specific behavior. The techniques of behavior are generally intended to facilitate improved self-control by expanding the individual's skills, abilities, and independence.

**Beneficence:** The right of the individual to assume the health care will seek measures to secure his/her well-being.

**Bilateral:** Both sides.

**Brain Stem:** The lower extension of the brain connected 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.
Capricious: Speaking or performing behaviors without thinking about the outcome.

Cerebellum: The portion of the brain located at the back which helps coordinate movement. Damage may result in ataxia.

Closed Head Injury: An injury in which the brain itself is not externally penetrated, rather, an outside force is applied to the skull and brain causing the brain to shift and move about inside the skull, such as with whiplash.

Cognition: "Thinking" skills such as being able to organize, solve problems, follow directions, etc...

Cognitive Deficit: A reduction in one or more "thinking" skills which include: attention, concentration, memory, sequential thought organization, judgment, reasoning, and problem-solving.

Cognitive Rehabilitation: Therapy programs which aid people in the management of specific problems in thinking and perception. New strategies and skills are taught to help people improve function and/or compensate for remaining deficits.

Coma: A prolonged period of consciousness. Often a result of axon injury.

Compensation: Utilizing strengths to make up for weaknesses (e.g. A person with a visual field cut can learn to compensate by turning his/her head to take in his/her surroundings).

Concussion: A brief period of unconsciousness.

Concussive Damage: Contusions of the frontal and/or temporal lobes.

Confusion: A state in which a person is bewildered, perplexed or unable to orient him/herself.
**Contralateral:** Opposite side.

**Contusion:** Bruise.

**Coping Pattern:** Behaviors, attitudes, and/or emotions used to deal with or overcome problems or difficulties.

**Counseling:** Communication between a therapist and an individual with goals that may include adjusting to changes in one's life and attaining a higher level of understanding of oneself, dealing with emotions, improving relationships and life situations.

**Coup/Contra-coup Damage:** Damage by two separate injuries. The first is the initial injury, the coup, and the second is the counterblow, the contra-coup.

**Cue:** A signal or direction used to assist a person in performing an activity (e.g., you give a person a cue when you tell him the initial of your first name when he cannot remember your name).

**Deficit:** A problem area in a person's functioning.

**Depression:** A feeling of sadness brought about by loss. Usually a natural process in brain injury recovery. On occasion, professional treatment may be necessary.

**Diffuse:** Brain damage which involves many areas of the brain rather than one specific location.

**Diplopia:** Double vision.

**Discrimination:** The ability to detect differences between similar objects or events.

**Dysarthria:** "Slurred" speech due to paralysis or weakness of tongue, lips, soft palate, and/or other facial muscles involved in the production of speech.
**Dysphagia:** Problem with or absence of the ability to chew and/or swallow food.

**Dysnomia:** Difficulty retrieving words from memory.

**Edema:** Swelling.

**Embolism:** Blood vessel obstruction.

**Epilepsy:** Seizure disorder.

**Equilibrium:** Normal balance reactions and postures.

**Executive Functions:** Functions involving the ability to plan, initiate, direct and monitor an individual's own activities.

**Figure-ground:** The differentiation between the foreground and the background; this refers to all sensory systems, including vision, hearing, touch, etc. (e.g., auditory figure-ground is at work when you are able to listen to a conversation in a noisy room).

**Focal Seizures:** A seizure involving a loss of consciousness. Also known as partial.

**Frontal Lobe:** Front part of the brain; involved in planning, organizing, problem-solving, selective attention, personality and a variety of "higher cognitive functions."
**Glasgow Coma Scale (GCS):** A scale which rates the severity of a coma.

**Hematoma:** Collections of blood on the brain which can occur at three levels: (1) epidurally, (2) subdurally, and (3) intracerebrally.

**Hemiparesis:** A weakening of one side or part of the body.

**Hemiplegia:** A paralysis of one side or part of the body.

**Hemisphere:** One of the two halves of the brain.

**Hemorrhage:** Bleeding.

**Herniation:** Squeezing of the brain downward through the base of the skull. Results in irreversible damage.

**Impulsive:** Acting too fast without thinking whether it is safe or appropriate.

**Incidental Memory:** The ability to recall unattended information, such as misplaced keys.
**Independent:** The ability to perform a task without assistance or supervision.

**Infarction:** Tissue death.

**Ipsilateral:** Same side.

**Ischemia:** A reduction in the blood supply.

**Judgment:** The ability to make appropriate decisions. This is closely related to abstract thinking because one must be able to reason to arrive at good judgment. It is listed separately because faulty judgment is easy to identify and is an indication that the thinking processes are impaired (e.g., a patient with poor judgment might try to go up and down stairs despite the fact that his/her balance is not steady).

**Justice:** The right of the individual to expect fair and appropriate treatment.

**Learning:** The process which produces changes in a person's knowledge and/or behavior and allows him/her to perform activities.
Memory: The process of storing and retrieving information, sometimes categorized according to the mode in which it is received (e.g., visual vs. auditory).

Motor: Regarding movement.

Muscular Spasticity: An increase in muscular tension.

Muscular Tremors: Uncontrollable shaking of the extremities.

Nonmaleficence: The right of the individual not to be harmed and the duty of the health provider not to do harm.

Nystagmus: Involuntary rapid movements of the eyeball(s).

Occipital lobe: Area in the back of the brain whose primary function is processing visual information. Damage to this area can cause visual deficits.

Open Head (Penetrating) Injury: An injury in which penetration of the brain occurs from the outside, such as with a gunshot wound.

Orientation: Accurate awareness of self, time and place.
Parietal Lobe: One of the two parietal lobes of the brain.

Perception: The 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 may be unaware of them.

"Petit Mal" Seizures: Subtle, brief seizures involving eyelid fluttering, facial twitching and lack of confusion. Also known as generalized absence seizures.

Post-Traumatic Amnesia: The inability to recall information or events which occurred immediately after the injury.

Proprioception: The sensation that allows a person to know the position of his/her body parts.

Psychiatry: The medical specialty which deals with psychological and biological treatments of emotional problems.

Psychomotor Seizure: A seizure characterized by repetitive purposeless speech or activity. Also known as complex partial, or temporal.

Rancho Los Amigos Scale of Cognitive Functioning: A scale of functioning.

Remediation: The process of decreasing a handicap by challenging the individual to use and improve deficient skills.
Retrograde Amnesia: The inability to retrieve information learned before the injury from memory. Most often occurs with deep temporal lesions.

Rigidity: Stiffness of the joints.

Scanning: The active search of the environment for information; usually refers to "visual scanning," which is a skill used in reading, driving, and many daily activities.

Seizure: An uncontrolled discharge of nerve cells which may spread to other cells nearby or throughout the entire brain. Usually lasts only a few minutes at most. May be associated with loss of consciousness, loss of bowel and bladder control and tremors. May also cause aggressive or other behavioral change.

Sensation: Feeling pain, movement of body parts, touch, temperature, etc. Also seeing, hearing, smelling and tasting.

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

Spasticity: Hyperactivity of stretch reflexes (such as a response to tapping the knee with a hammer); may or may not get in the way of functional activities, may be associated with increased tone or tension in muscles, usually in a pattern such as flexion or extension.

Task Analysis: Breaking a task down into component parts.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Tactile Defensiveness</td>
<td>Over-sensitivity to touch.</td>
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<tr>
<td>Temporal Lobes</td>
<td>There are two temporal lobes, one on each side of the brain. The right is</td>
</tr>
<tr>
<td></td>
<td>mainly involved in visual memory. The left is mainly involved in verbal</td>
</tr>
<tr>
<td></td>
<td>memory.</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>The clotting of blood vessels.</td>
</tr>
<tr>
<td>Tonic-Clonic Seizure</td>
<td>Generalized type of seizures which generally involved most involuntary</td>
</tr>
<tr>
<td></td>
<td>body functions. Also known as &quot;Grand-Mal&quot; seizures.</td>
</tr>
<tr>
<td>Traumatic Brain Injury</td>
<td>An insult to the brain, not of degenerative or congenital nature, but</td>
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<tr>
<td></td>
<td>caused by an external physical force that may produce a diminished or</td>
</tr>
<tr>
<td></td>
<td>altered state of consciousness, which results in an impairment of</td>
</tr>
<tr>
<td></td>
<td>cognitive abilities or physical functioning.</td>
</tr>
<tr>
<td>Unilateral</td>
<td>One side.</td>
</tr>
<tr>
<td>Wernicke's Area</td>
<td>The area of the brain responsible for comprehension of written or spoken</td>
</tr>
<tr>
<td></td>
<td>language. Located in the medial, superior portion of the temporal lobe.</td>
</tr>
<tr>
<td>Word Retrieval Deficit</td>
<td>Difficulty recalling a specific word or words.</td>
</tr>
</tbody>
</table>
Brain Injury Resources

ADA Regional Disability and Business Technical Assistance Center Hotline.
1-800-949-4232.

Equal Employment Opportunity Commission,
1801 L Street NW, Washington, DC 20507
1-800-669-4000 (voice), 1-800-800-3302 (TTY), or 1-800-666-EEOC (Publications).

Ability Magazine/Jobs Information Business Office,
1168 Langley, Irvine, CA 92714.
1-800-453-JOBS.

Association for Persons in Supported Employment (APSE)
5001 West Broad Street, Suite 34,
Richmond, Virginia 23230
1-800-282-3655.

Job Accommodation Network (JAN),
West Virginia University, Allen Hall,
Morgantown, West Virginia 26506-6123
1-800-526-7234.

National Head Injury Foundation, Inc.,
1776 Massachusetts Avenue, NW Suite 100
Washington, DC 20036-1904
1-202-296-6443.
References


