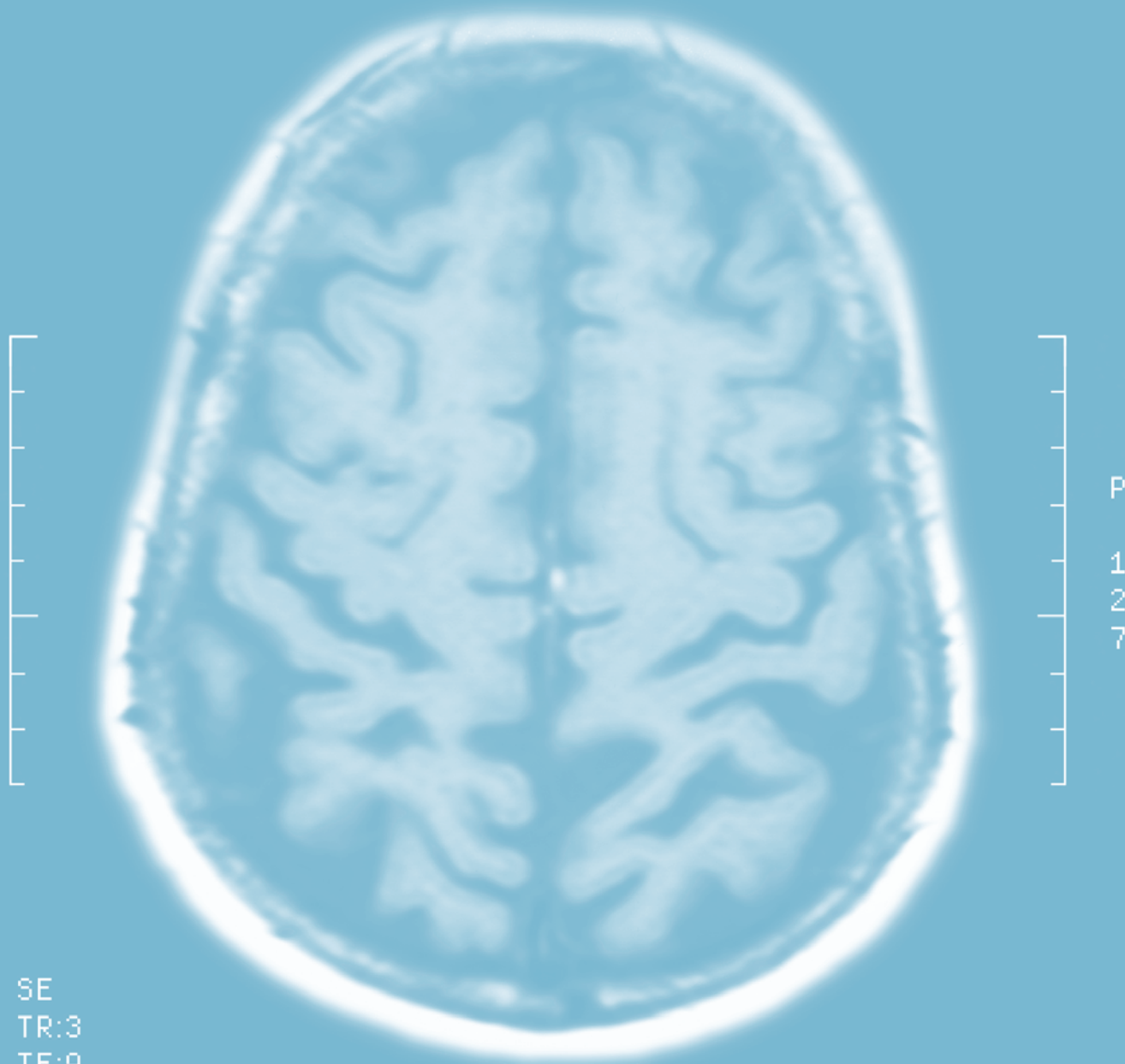


Brain Injury

[PATIENT EDUCATION]



P
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2
7

SE
TR:3
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W = 852 L = 475

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[INTRODUCTION]

If you have received this notebook insert you probably have a family member or loved one who has sustained a traumatic brain injury and who is receiving rehabilitation services through WakeMed. The following information is being provided to help you understand the complex nature of traumatic brain injury and the process of rehabilitation and recovery from traumatic brain injury.

According to the Centers for Disease Control and Prevention (CDC), a traumatic brain injury (TBI) is the result of “a blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain.” In the U.S. it is estimated that there are approximately 336,000 brain injuries per year. Of these, 28,000 die before being admitted to a hospital. 308,000 are admitted to a hospital alive. Of those admitted to a hospital the level of severity is: mild 50%, moderate 30%, and severe 20%. The leading causes of TBI are falls-28%, motor vehicle-traffic crashes-20%, events when a person is struck in the head -19%, and assaults-11%. These injuries may

produce changes in the person’s level of consciousness, cognitive abilities and physical functioning. A TBI may also result in changes of behavioral and emotional functioning. These impairments may be temporary or permanent and cause partial or total functional disability or psychosocial maladjustment.

WakeMed’s Brain Injury Rehabilitation System (BIRS) is the most comprehensive brain injury program in the region and the only accredited inpatient and outpatient brain injury program in the Triangle. The brain injury program at WakeMed begins in the emergency room with trauma services and provides a continuum of services from inpatient rehabilitation services to outpatient/day treatment rehabilitation. The WakeMed BIRS continuum is designed to provide appropriate services for the patient’s specific level of functioning.

[THE BRAIN]

The human brain consists of millions of nerve cells (neurons). It weighs about 3 pounds and is jello-like in consistency. It floats in fluid (cerebral spinal fluid), is covered by protective membranes (meninges), and is enclosed in the bony skull (cranial vault). It communicates with the rest of the body through nerves running through the spinal cord and the peripheral nervous system. The brain is a large consumer of oxygen, which is supplied by a complex system of blood vessels.

The brain is sometimes referred to as “the organ of behavior” as it controls almost everything we do. It controls thoughts, memory, speech, emotions, sensory information, body movement, and the function of many other organs in the body. It is also responsible for the patterns of behavior we refer to as personality.

The brain has four main sections, which include: the brainstem, cerebellum, the limbic system, and the cerebral cortex.

- **Brainstem:** The brainstem is the lowest part of the brain and connects the brain to the spinal cord. It is involved in regulating our level of alertness, and also controls basic bodily functions such as heart rate, breathing, body temperature, and digestion.
- **Cerebellum:** The cerebellum is located at the back of the brain. It is involved with movement, coordination, and balance.
- **Limbic System:** The limbic system is located above the brain stem deep inside the brain. It is involved in our emotional functioning and also plays a role in the ability to remember new information.
- **Cerebral cortex:** The cerebral cortex is the outer layer of the brain and is divided into left and right hemispheres, or halves. Each hemisphere controls movement and feeling in the opposite side of the body. The outermost inch of the cerebral cortex is composed of neuron cell bodies and is referred to as “grey matter”, because of its grey color. Below the grey matter is the “white matter”, which consists of incoming and outgoing axons that can be thought of as the arms of the neurons. These axons, or arms, start out at the neuron’s cell body, and reach out to connect with other neurons in different areas of the brain so that these different areas of the brain can communicate with one another. The cerebral cortex controls the highest levels of thinking and behavior. Each hemisphere is further divided into four lobes.
- **Frontal lobes:** The frontal lobes are involved in complex cognitive functions such as planning, organizing, initiating, monitoring and controlling behaviors. These are often referred to as “Executive Functions”. The center for speech is also located in the frontal lobe. In most people this is in the left frontal lobe.

[THE BRAIN]

- **Temporal lobes:** The temporal lobes control hearing and the left temporal lobe is involved in understanding language. Both temporal lobes are also involved with memory, the left temporal lobe for verbal memory and the right temporal lobe for visual memory.
- **Parietal lobes:** The parietal lobes process incoming bodily sensory information from the opposite side of the body. They are also involved in visual spatial information processing, and the left parietal lobe is involved in reading.
- **Occipital lobes:** The occipital lobes process visual information. They allow us to recognize and understand what the eyes are “seeing”.

[BRAIN INJURY]

Injury to the brain may be incurred from many causes. The term “acquired brain injury” (ABI) refers to brain injury that occurs after birth, from any cause, and may include strokes, anoxia, infections, toxins, tumors, or traumatic brain injury (TBI).

Traumatic brain injury is caused by an external physical force or blow to the head. These injuries are most frequently sustained in motor vehicle collisions or falls, but may also be sustained in other ways, such as in assaults, sports, pedestrians being struck by a vehicle, or by gunshot wounds. Every injury to the brain is different in its effects and severity as well as the in mechanisms of injury. Injuries to the brain are often described as Primary Injuries or Secondary Injuries.

Primary injuries occur at the time of the trauma and may include:

- **Contusions:** Bruising of the surface of the brain from impacting the interior of skull. Contusions are most commonly found on the frontal and temporal lobes. They can be found at the point of impact (coup) or directly opposite the point of impact (contrecoup) due to the brain rebounding from the initial impact inside the skull.
- **Lacerations:** Tears or cuts to the surface of the brain. The brain sliding over sharp bony ridges inside the skull often causes lacerations. Blood vessels may also be cut contributing to bleeding inside the skull.

- **Shearing/Diffuse Axonal Injury (DAI):** The generalized stretching and breaking of axons caused by deceleration and rotational forces found in high-speed injuries such as motor vehicle crashes or falls of some distance.

- **Skull Fractures:** Fractures of the skull bone. They may be simple non-displaced linear fractures or more serious compound depressed fractures. The latter may require surgical intervention and may injure the brain by impinging on the brain tissue.

Secondary injuries develop at various lengths of time following the initial impact and may include:

- **Edema:** Swelling of the brain tissue inside the skull, which can cause an increase in pressure inside the skull.
- **Hematoma:** A pooling of blood from a bleeding vessel. Frequently found between the surface of the brain and the surrounding protective membranes. Hematomas may compress brain tissue and often need to be surgically drained.
- **Hemorrhage:** Bleeding within the brain tissue from severed blood vessels.
- **Anoxia / Hypoxia:** A complete loss of, or reduced supply of oxygen to the brain.
- **Hydrocephalus:** An abnormal increase of cerebral spinal fluid (CSF) within the ventricles usually due to a blockage of the CSF pathways, which causes a buildup of pressure on the brain.

[BRAIN INJURY]

- **Seizures:** Abnormal, uncontrolled electrochemical discharges within the brain.

Brain Injuries can also be differentiated as open or closed head injuries. Open head injuries are those in which the skull and meninges have been penetrated and there may have been direct damage to the brain tissue. A gunshot wound to the brain would be an example of an open head injury. Patients with open head injuries are at greater risk for developing seizures and infection. In closed head injuries, the brain is injured by an external force that does not penetrate the skull.

In the rehabilitation process, the initial severity of a brain injury, as well as recovery, is determined by the patient's level of cognitive functioning. It has been observed

that individuals with moderate to severe brain injuries tend to follow a fairly predictable pattern of recovery of cognitive abilities. The Rancho Los Amigos Scale of Cognitive Functioning is a scale that is used to describe this pattern of recovery, and to quickly communicate a person's level of cognitive functioning at a given time. You may hear hospital staff members referring to your family member as being at "Rancho Level ___". A person with a brain injury may enter the scale at any level, and may or may not progress to the highest level. There is no set amount of time a person will spend at any given level. Sometimes a person will seem to fluctuate between 2 levels, or may exhibit characteristics of more than one level at a given time.

[RANCHO LOS AMIGO SCALE OF COGNITIVE FUNCTIONING]

Level I: No Response. Unresponsive to stimuli. Also referred to as “coma”

Level II: Generalized Response. Inconsistent, nonpurposeful, nonspecific responses to stimuli, such as intermittent eye opening, or random movement of limbs. Also referred to as “vegetative state”.

Level III: Localized Response. Inconsistent reaction directly related to type of stimulus present. For example, visually tracking objects or people around the room, or occasionally following a simple, one-step direction. Also referred to a “minimally conscious state”.

Level IV: Confused, Agitated. Disoriented, unaware of present events; frequent bizarre, inappropriate behavior; very short attention span, impaired ability to process information; often very restless and resistant to care.

Level V: Confused, Inappropriate, Nonagitated. Nonpurposeful, random, fragmented responses when task complexity exceeds abilities; appears alert and responds to simple commands; performs previously learned tasks, but is unable to learn new ones. Very little recall of day to day events.

Level VI: Confused, Appropriate. Behavior is goal-directed; responds appropriately to the situation, but has memory difficulties and may not be consistently oriented to time, place, or situation and may respond incorrectly because of memory difficulties

Level VII: Automatic, Appropriate. Correct routine responses are robot-like; appears oriented to setting, but has poor insight, judgment, and problem solving.

Level VIII: Purposeful, Appropriate. Correct responses, carryover of new learning occurs. No supervision required, poor tolerance for stress, and some remaining cognitive difficulties.

[IMPACT ON FUNCTIONAL AREAS]

A brain injury has the potential to affect many areas of a person's functioning. In order to ensure rehabilitation is comprehensive, the rehabilitation treatment team addresses all the major functional areas. These include medical, cognition, communication, behavior, mobility, self-care, and psychosocial. WakeMed's Brain Injury treatment protocols and the patient's Plan of Care are organized in this manner. These functional areas, and how a brain injury impacts them, are described below:

M E D I C A L

Depending on the nature and severity of the brain injury, there may be other medical issues resulting from the injury that can impact recovery and the course of a patient's rehabilitation. Some individuals may have difficulty breathing initially, so that a tracheostomy tube needs to be placed in the neck to help them breathe. Even when they recover the ability to breathe on their own, the tube may remain in place for a while longer to help clear secretions from the trachea. The ability to produce an audible voice is temporarily affected by the presence of this tube.

Many individuals with brain injuries have trouble swallowing safely, so a feeding tube must be inserted through the nose to give liquid nutrition. When the swallowing problems are likely to last a long time, a gastrostomy feeding tube (PEG) can be surgically placed in the stomach. This allows

liquid nutrition to be given in large amounts several times a day instead of continuously dripped in, and is often more comfortable for the patient. Generally, this tube can be removed once swallowing improves.

When a brain is injured, it becomes more sensitive to developing seizures. Seizures are caused by abnormal electrical discharges in the brain. Symptoms may vary depending on the part of the brain that is affected, but seizures often cause unusual sensations, uncontrollable muscle spasms, and even loss of consciousness. Medications can be used to stop seizures and to prevent them from occurring.

Another problem commonly seen in individuals with brain injury is spasticity. Spasticity is a condition in which muscles are continuously contracted. This abnormal increase in muscle tone results from a faulty signal from the brain to the muscles. The stiffness and tightness of the muscles may interfere with movement, speech, and the quality of walking. The degree of spasticity can vary from mild muscle stiffness to severe, painful, and uncontrollable muscle spasms. Treatment for this will depend on the particular individual's circumstances, but could include such things as medications, and stretching exercises

Finally, a rare occurrence in individuals with brain injury is the development of heterotopic ossification (HO). This refers to the formation of calcium deposits in the soft tissue of the body where it should not be. It

often forms around the joints and produces pain and increasing stiffness. If allowed to grow, the joints may become completely fused. Early identification is key, and physical and medical treatments can be started to slow down this calcium deposition process.

C O G N I T I O N

Cognition is another word for thinking skills and includes such things as attention, memory, language, visual-spatial abilities, and executive skills. Cognition is almost always adversely affected by brain injuries. Cognitive deficits can vary from mild to severe or profound, depending on the severity of the brain injury and the stage of recovery a person is in. Cognition often shows improvement as recovery progresses. Also, some areas of cognition may be more impaired than others. For example a person may have severe memory problems, but relatively intact visual perceptual skills.

Individuals with very severe brain injuries, or in the early stages of recovery from a more moderate brain injury, may have difficulty maintaining staying awake and alert. In fact, in some cases cognitive skills can be so impaired that the patient may not respond at all. This level of cognitive impairment corresponds to Rancho Los Amigos Levels I and II. The patient may eventually gradually begin to respond to simple directions (such as “squeeze my hand”, or “close your eyes”), but responses may be very inconsistent, and

may not always be accurate. While the patient may follow simple directions at times, it would not be unusual for him or her to make no attempts to speak, and to not show much ability to help him or herself. This level of cognitive impairment corresponds to Rancho Level III.

Sometimes, individuals with a brain injury are awake and alert, but are very confused and restless and have a limited ability to understand the world around them. This is often seen in individuals who are functioning at Rancho Los Amigos Level IV and V. If the patient is functioning at this level of cognitive impairment, he or she may have problems with irritability, restlessness, poor attention, poor memory, difficulty solving everyday problems, and insight (difficulty understanding what changes have happened since the brain injury). Because of confusion and memory difficulties, the patient may “confabulate” or talk about things he or she thinks happened but which did not. Patients at this level of functioning often begin to participate more meaningfully in therapies and other activities. For example, the patient may be able to start to participate in dressing, feeding and bathing him or herself again, with assistance and guidance.

Some individuals with brain injuries will have less severe cognitive impairments, or will have more severe impairments in some areas of cognition, and mild or no impairment in others. Many patients who start with more severe cognitive deficits may

[IMPACT ON FUNCTIONAL AREAS]

show significant improvement, and eventually have less severe impairment in some or all areas of cognition. This would typically be associated with Rancho Los Amigos Levels VI-VII. The patient may remember some things from day to day, and may be fully oriented (meaning they know who they are, where they are, and what date and time it is). The patient may be able to dress independently, and eat independently. However, some amount of supervision and assistance might be needed due to things like poor short-term memory, poor perceptual skills, or other cognitive deficits. The patient may not be able to see these cognitive problems and may try to do things the same way he or she did before the brain injury.

In brain injuries of the least severity, or in patients with the highest recovery, cognitive deficits are subtle, and would not be noticed by people who did not know the person before the injury. They may still include mild memory deficits, but also difficulties in planning and organizing their day-to-day functioning, particularly in complex activities like working or going to school. Rehabilitation efforts at this level are focused on teaching the patient strategies to help them in these areas.

C O M M U N I C A T I O N

Speaking, listening, reading, writing and gesturing are all ways we communicate. Patients with brain injuries may have problems doing some or all of these things. Problems communicating can range from profound to mild depending on the nature and severity of the brain injury, and the stage of recovery the person is in. Individuals with the most severe brain injuries are unable to communicate at first. They may sometimes have their eyes open, and appear to be awake, but may not be able to speak or respond to you.

Some individuals can follow simple directions and may be able to talk using simple words or gestures (for example, the patient may point to a cup to tell you he or she wants something to drink), but may have difficulty finding the right words to say. Words said may not always make sense. Generally as the patient improves, communication skills become more and more accurate.

BEHAVIOR

Behavioral disturbance is common among individuals with brain injury. In the most severe injuries, patients will not respond to things around them. Other times, behaviors may be present, but not have a purpose. For example, an individual may be moving his or her arms and legs but not for any particular reason. A patient's behavior will usually become more purposeful as he or she recovers.

As a patient recovers from a severe injury, there may be unwanted behaviors that go along with getting better. It is not unusual for a patient to become agitated, aggressive, or even combative. Cursing, restlessness, and constant motion are common during this time. It is important to not take this behavior personally or try to reason or argue with the patient as he or she has little control of the behavior and will not remember it later. These patients have difficulty with attention and processing of information. They also tend to be easily over-stimulated. Their surroundings should be kept quiet with minimal stimulation. Televisions, radios and lots of visitors are not appropriate at this time.

Sometimes a patient's behavioral difficulties pose a danger to themselves. They are unaware of their injuries or limitations, and have poor safety judgment. For example a patient who is unable to walk may attempt to climb out of bed or stand up from a chair, and be at risk for falling and further injury.

Or, a patient who can walk, but is confused, could wander away and place themselves in danger. In these instances, safety devices such as lap belts, enclosure beds, and alarms are used to protect the patient.

As the patient improves these behaviors usually become less frequent. Patients may continue to have behavioral issues such as doing things quickly without thinking, which puts them at risk for injury. In addition, patients at this level may have trouble interacting with others in social situations. They may not recognize their behavioral problems even though they may be obvious to you. Sometimes patients become more irritable, or anger more easily. Other patients may laugh at inappropriate times, or make inappropriate comments.

MOBILITY

Mobility is about movement, whether it is from laying down to sitting up, walking to the bathroom, or wheeling a wheelchair down the hall. In order to move the body, the brain must coordinate balance, strength and motor control.

Areas of function that can affect mobility include in a person with a brain injury are:

- **Balance** – allows upright posture without falling over.
- **Strength** – the amount of power that your muscles have.
- **Coordination** – the smooth movement of

[IMPACT ON FUNCTIONAL AREAS]

- multiple body parts in harmony.
- **Sensation** – the body has several types of sensation, all of which are interpreted by the brain:
 - Hot/cold and sharp/dull
 - Deep pressure
 - Proprioception – tells the body where it is in space
 - **Tone** – an increased resistance to movement, a common problem in brain injury, particularly troublesome if it overpowers available active movement. Tone can increase with laughing, coughing, sneezing, infection, fever or impaction. Tone is easily mistaken for active movement, but it is not under the patient's control.
 - **Orthopedic Restrictions** – The patient may have orthopedic injuries in addition to the brain injury, such as fractures or sprains. This may limit the activities allowed or the weight put on a limb.
 - **Range of Motion** – Orthopedic injuries, increased muscle tone, or changes in motor control can reduce the patient's ability to maintain joint flexibility.
 - **Posture** – An individual's ability to sit up or stand including head position is controlled by the brain. The brain injury may also affect vision, perception, and motor control, all of which play a part in posture.
 - **Motor Control** – a combination of strength, balance, coordination and sensation to produce purposeful, controlled movement.
 - **Motor planning** – the selection of the correct motor plan, including starting, continuing, and stopping a desired movement appropriately.

[ACTIVITIES OF DAILY LIVING]

Activities of Daily Living (ADL's) are all the activities people engage in on a daily basis including work, school, leisure, and self-care activities. Self-care activities include: grooming, bathing, dressing, toileting, and performing toilet and shower transfers. Initially, in moderate to severe brain injury, it's obvious a patient can't work or go to school, but he or she also may not be capable of basic self-care due to a combination of cognitive and physical factors. Patients may be totally dependent upon others to care for them. In less severe brain injuries, or as patients with more severe injuries begin to recover, they are often able to resume aspects of self-care starting with the simplest (such as assisting a therapist with wiping one's face) and moving to the more complex (such as dressing one's self with little or no assistance). Patients with less severe injuries, or who are more advanced in their recovery may continue to require assistance, but to a lesser degree.

Some patients may regain complete independence in self-care (this would typically be associated with Rancho Levels VII - VIII). Individuals at this level of functioning often transition to a Day Treatment Program, where work begins on higher order activities of daily living including issues of community re-entry such as returning to work or school.

PSYCHOSOCIAL

A brain injury patient's psychological functioning and psychosocial situation may be severely disrupted by the injury. The degree of disturbance is usually determined by the severity of the injury and degree of cognitive deficits. Early in the injury patients often cannot understand what has happened to them and are highly confused. They may be very fearful or angry and have no control over their emotions leading to inappropriate behavior. To families, they may not seem as if they are the same person. Because of their continued cognitive problems explanations or even attempts to "counsel" them are ineffective. They do, however, sometimes respond well to family support. As patients recover they may begin to be able to understand their situation and what's happened to them. At this point they are at risk for depression or other adjustment difficulties and need to be closely monitored.

Every family is different but for most the idea of long-term recovery from a brain injury can be overwhelming. However, the injured brain can often heal and the changes can be inspiring. Along with the hope that recovery brings is the balance of acceptance of more permanent changes. This sets the foundation for effective coping and can often be the most challenging aspect of rehabilitation for patients and families.

Patients are affected by their brain injury in many ways, beyond their cognitive and physical functioning. Family members and

[ACTIVITIES OF DAILY LIVING]

caregivers are also affected by the patient's brain injury. Patients and families may experience a range of emotions that will change from time to time. Some examples of these emotions can be:

- Disbelief
- Anger
- Guilt
- Depression
- Isolation
- Panic
- Hope

It is important to recognize that these emotions are normal, and an expected part of the process of trying to understand and cope with a patient's severe injury. A brain injury affects not only the patient, but everyone else who knows and cares about that person. It is also important to recognize that the young children or siblings of patients can be very distressed and upset by the injury. It can be a very confusing time for children, and their daily routine is often very disrupted. We recommend that families try to "normalize" children's routines. If possible, children or young siblings of patients with brain injuries should return to their normal school and activity routine as soon as possible. If you are not sure how to explain the patient's brain injury to a child, or if you have questions about how to prepare the child to visit the patient for the first time, a consultation with one of

WakeMed's Child Life Specialists can be arranged.

Similarly, spouses and other family members may want to consider trying to return to as normal routine as possible. You should try to get adequate rest and good nutrition, and not feel guilty that you are not at the hospital continuously, particularly after the patient transfers to the Rehab Hospital or NeuroCare Unit. The patient will be busy during the day with therapies and other activities, and will need rest breaks between therapies.

RECOVERY

One of the first questions families ask when told a family member has had a brain injury is "how long will it take my family member to get better?" Unfortunately, we usually don't know the exact answer to that question. While most people with a mild brain injury will have a complete, or nearly complete recovery within a few months, people who suffer moderate or severe brain injuries may continue to progress for many months, or even years after their injuries.

One thing we do know is that recovery from brain injury is a gradual process. Sometimes television shows or movies portray brain injuries incorrectly. They may show someone being in a coma, then suddenly "waking up", and immediately being completely back to normal. This is not an accurate portrayal of what really happens with a moderate or

severe brain injury. Usually, a person will come back to full consciousness gradually, and for some time may be confused and disoriented. The patient will likely have no memory of how or when the injury occurred. You should refer to the Rancho Los Amigos Scale of Cognitive Functioning to get an idea of the typical natural progression of cognitive recovery from a moderate or severe brain injury, which can take from days to months or even years to occur. Unfortunately, some individuals are never able to return to their former level of functioning.

Part of the reason it is so difficult to predict recovery after brain injury is that every brain injury is different – and it really is true. There are many factors that contribute to a person's ability to recover. Of course, the severity of the injury itself is very important. However, there are many other factors that can affect how long it takes a person to recover from a brain injury. For example, the

elderly may have slower and less complete recoveries from brain injuries. Having abused drugs or alcohol in the past can impact recovery. And sometimes a person with a brain injury has suffered other serious injuries at the same time, which can affect recovery. A few of the things that can have a positive affect on recovery are good family support, good health before the injury, good psychosocial adjustment before the injury, and young age.

It is everyone's goal to maximize the patient's recovery and ability to live independently or with very little help. Some individuals will eventually reach the goal of being able to live independently, and return to activities such as work and driving; however, others may continue to need more help from family and friends. There is no promise how much or how quickly each person may recover. Each person recovers at his or her own pace.

[REHABILITATION SETTINGS]

Brain injury rehabilitation occurs in many settings throughout the WakeMed system. The patient may pass through several different rehabilitation settings as he or she recovers from the brain injury, and different people spend different amounts of time in each setting. When a person progresses from one setting to the next, therapists communicate with one another to maintain a good continuity of care.

TRAUMA CENTER / ACUTE HOSPITAL

If a patient sustains a brain injury and is admitted to WakeMed for emergency medical management of his or her injury, he or she will typically begin to receive rehabilitation services as soon as medical stabilization occurs, often within the first 24 hours following an injury.

NEURO CARE UNIT

This acute hospital unit at WakeMed is specially designed for individuals with more severe injuries, who are medically stable, and can benefit from coordinated rehabilitative services, but may need more time to recover before being ready to move to the next step.

While on the NeuroCare Unit, each patient's schedule will be individualized to accommodate the patient's current level of functioning. Therapies available include occupational therapy, physical therapy, and

speech therapy. In addition, patients typically receive neuropsychological services, and therapeutic recreational services are available on an as-needed basis. Therapies are available Monday through Friday, with a typical schedule being occupational, physical, and speech therapy one to two times per day. However, this may vary depending on the individual needs of the patient. Patients may be scheduled for therapies any time between 9:00 am and 4:00 pm, usually with a break over lunch from 12 to 1:00.

WAKEMED REHABILITATION HOSPITAL

If your family member needs intense, inpatient rehabilitation, he or she may be admitted to WakeMed Rehabilitation Hospital, where a coordinated, comprehensive rehabilitation program will be developed. While in the Rehab hospital, each patient will get a minimum of three hours of therapy per day. Available therapies include occupational therapy, physical therapy, and speech therapy. In addition, patients will receive neuropsychological services, and recreational therapy on an as needed basis. Pet therapy dogs visit on occasion as well. Typically, between 7:00 am and 8:30am, the occupational therapist will be assisting patients with ADL's (grooming, bathing, dressing, toileting, feeding). Patients may be scheduled for therapies any time between 8:30 am and 5:00 pm, with a

break over lunch from 12 to 1:00. The therapists assigned to the patient will set up the patient's Monday through Friday therapy schedule on the day of admission. A schedule card is placed in a plastic sleeve on the patient's wheelchair, with a copy posted in the patient's room. Saturday and Sunday therapy schedules will be posted in the same place, each Friday evening.

DAY TREATMENT PROGRAMS

WakeMed Rehab offers "day treatment" services. Individuals live at home, but come in several days a week for continued coordinated, multi-disciplinary care with oversight by a case manager. When attending day treatment program, each patient's schedule is individualized. The number of hours per day, and days per week of therapy to be given will be determined by the treatment team upon admission to the program, after the initial evaluation is completed. Therapies offered include occupational therapy, physical therapy, and speech therapy. In addition, neuropsychological services, nursing services, and case management services are available.

OUTPATIENT THERAPY SERVICES

If less intensive services are needed, or if just a single service is needed, an individual may receive outpatient treatment at one of

WakeMed's many outpatient rehabilitation sites. WakeMed currently offers outpatient rehabilitative services at several sites in Raleigh, as well as in Cary, Apex, Fuquay, Zebulon, and Clayton. When receiving outpatient therapy services, each patient's schedule is individualized. The number of hours per day, and days per week of therapy to be given will be determined by each individual therapist upon admission to the program, after the initial evaluation is completed. Therapies offered include occupational therapy, physical therapy, and speech therapy.

HOME HEALTH THERAPY SERVICES

If after discharge from the hospital the patient is home-bound, and meets certain criteria, WakeMed may send rehabilitation therapists to your home to provide rehabilitative services. The number of hours per day, and days per week of therapy to be given will be determined by each individual therapist upon after the initial evaluation is completed. Therapies offered include occupational therapy, physical therapy, and speech therapy. In certain cases, a nurse may also visit the home.

The BIRS program includes treatment protocols for use in guiding treatment throughout the continuum. There are 4 different protocols. The particular protocol a patient is placed on is determined by his or her Rancho Los Amigos Level of Cognitive

[BIRS TREATMENT PROTOCOLS]

Functioning. Each patient will be assigned to a particular protocol upon admission, based on his or her Rancho Level of cognitive functioning at the time of admission to the program. If a patient shows improvement in cognition, he or she will be advanced to the next protocol. The treatment protocols include specific areas of treatment across all functional areas, including time frames in which those areas are to be addressed, and which treatment team members will be addressing them. Protocols are reviewed at each treatment team meeting to be sure all treatment areas are being addressed. This insures timely and comprehensive treatment appropriate to each individual patient's level of functioning. Color-coded signs corresponding to the patient's Treatment Protocol and Rancho

Level will be posted at the room door or inside the room. These signs specify the patient's Rancho Level, and provide information to both families and staff as how best to maintain the environment and interact with the patient. The different protocols are as follows:

- **Sensory Regulation (yellow signs)** – for patients functioning at Rancho Levels II & III
- **Neurobehavioral (blue signs)** – for patients functioning at Rancho Levels V & VI
- **Cognitive Rehabilitation (green signs)** – for patients functioning at Rancho Levels VI & VII
- **Executive (grey signs)** – for patients functioning at Rancho Level V & VI (used only at our day treatment facilities)

[FAMILY INVOLVEMENT]

Family involvement in a patient's care is both encouraged and appreciated. Family members are considered important members of the treatment team, and good family support and involvement can be very important to a patient's overall recovery. There are a number of ways in which we involve families.

CASE MANAGEMENT

The clinical case manager serves as the team leader and as a point of contact for patients and their families with the medical/therapy staff. The case manager can help the patient and his or her family with personal, financial, emotional, and social issues that may arise during the hospital stay. The case manager will meet with the patient and/or family upon admission to rehab to provide an overview of the rehab process. At this meeting, the case manager will gather information about the patient in order to assess needs and allow the team to know the patient better. The case manager can also arrange individual and group counseling to help patients and families learn to cope with problems resulting from the brain injury. The case manager also provides information to insurance companies for their review of the patient's hospital stay.

The case manager can assist patients and families in coping with the emotions that occur throughout the recovery process. Depending on comfort level, patients and families can participate in individual

counseling or participate in a support group meeting. The case manager can also refer patients and families to ongoing counseling in the community.

There are also a number of legal and financial issues that may need to be addressed, if the patient is going to be hospitalized and/or incapacitated for a period of time. Examples of these issues can be:

- Guardianship
- Advanced Directives
- Short Term/Long Term Disability
- Supplemental Security Income (SSI)
- Social Security Disability Income (SSDI)

The case manager will also be the patient and family's point-person for discharge planning. Throughout a patient's hospital stay, the case manager will be discussing options that are available for discharge, and will work with the patient and family to plan for a safe discharge. Patients are typically discharged from the rehab program when they have achieved their discharge goals or progressed to a level that allows them to receive rehab services in a home care setting, outpatient center or alternative care setting. Occasionally, patients are discharged if they fail to demonstrate significant progress in therapies over a period of time, or cannot tolerate the level of therapy required by the program. Preparing for discharge from the rehab unit can be very overwhelming for many patients and

[FAMILY INVOLVEMENT]

families. The case manager will be available throughout a patient's stay to discuss discharge needs and options, and to ensure a safe, smooth discharge from the rehab unit.

Whether a patient is going back home or to another location, the case manager will work with the patient and family help to determine the best way to make this transition. If going home at discharge is not an option, the case manager will help to find a nursing home or assisted living facility that can continue to meet the patient's needs. If the patient is to return home at discharge, and will continue to need therapy, outpatient rehab, day treatment, or home health services can be set up, depending on individual need. The case manager will arrange follow up therapy and order any equipment needed before the patient leaves the hospital. The case manager can make referrals to community resources that can continue to help the patient and family after discharge.

MEDICAL ROUNDS

During the stay in the Neuro Care Unit or Rehab hospital, the Psychiatrist (a physician who specializes in physical rehabilitation) and a Physician Assistant (PA) will visit with patients every morning. They will address any active medical issues and make any necessary changes in care. This may include changing medication, ordering tests to diagnose new problems or monitor existing ones, and referring to other

healthcare specialists to address specific issues. The doctor and the PA will work closely with the nursing staff, case manager and the therapy staff, and will meet with them formally every week to coordinate care. If necessary, they will also bring in other physician specialists to assist with a patient's care.

If there are medical questions or concerns, please bring them to the attention of the nurse or case manager.

NURSING CARE

Upon admission to the Neuro Care Unit or Rehab hospital, the admitting nurse will do a complete physical assessment including heart and lung sounds and examination of skin for wounds, rashes or reddened areas. The patient and family will be given a copy of My Important Papers which will have helpful information including patients' rights, advance directives, pain management, and unit-specific information. The patient and family will be asked to answer questions as part of a nursing admission assessment. They will also be asked to sign a consent form granting permission for use of the "whiteboard" in the patient's room. The white board is used to record important information needed to coordinate the physical care of the patient. For example, it will indicate how much, and what type of assistance a patient needs with transfers to and from the wheelchair. Caregivers can look at this board and have a snapshot of

what is needed to care for the patient.

We always encourage family participation in a patient's day-to-day care. We will try to include families during personal care, if family is present and willing to participate. We ask that families do not try to transfer patients to or from the bed, wheel chair, or commode, or provide personal care, until they have had training by the nursing or therapy staff (formal family education sessions will be set up by the case manager). Because brain injured patients may become over stimulated or agitated easily, we reserve the right to ask visitors to step out, and to limit visitors to 2 at a time. Nursing staff will provide education to patients and families regarding care, medications, and medical conditions to patients and families and do much informal education. Our goal is to enable the families to care for patients in the safest possible way as they reach their fullest potential.

Upon admission to one of our day treatment programs, the patient and family will meet with a Rehabilitation Nurse who will do a complete physical assessment. During the initial session with the nurse the patient and family will be asked to provide information regarding any current medical issues, a list of current medications, and a list of follow up physician's appointments. The nurse will provide written and verbal education to patients and families regarding brain injury and recovery and will continue to be available as needed throughout the day treatment stay.

FAMILY TRAINING SESSIONS

At some point in a patient's rehabilitation, often shortly before discharge from the hospital, or prior to a planned day pass, family members who will be responsible for caring for the patient will be invited to accompany the patient to his or her therapies, so that instruction can be provided on such things as assisting with walking, assisting with bathing and dressing, assisting with transferring the patient to and from the wheelchair, bed, commode, car, etc. Teaching on special dietary or swallowing precautions, or administration of medications might be provided as well. This training is designed to prepare families to be able to care for the patient when he or she is discharged from the hospital. Depending on the needs of each individual patient, sometimes families will only need to attend one session. Other times, multiple sessions will be needed. The case manager will be responsible for arranging these sessions at a time that is as convenient as possible for the patient's family.

Patients who are receiving inpatient rehabilitation on the NeuroCare Unit, or in the Rehab hospital will typically be dressed in street clothes each morning, so they will need several changes of clothing. Loose fitting clothing like T-shirts and elastic waist pants are the best choice. The patient will also need a good pair of shoes such as sneakers. Dirty linen will be gathered in a bag in the patient's bathroom, to be

[WHAT THE PATIENT WILL NEED WHILE IN THE HOSPITAL]

laundered by the family. Families are asked to bring in personal toiletries, such as deodorant, shampoo, body wash that the patient prefers to use. Electric razors may also be brought in. Other personal items such as radios or CD players can be brought in, but the hospital cannot be responsible for lost or stolen items.

This notebook insert was meant to provide you with introductory information about brain injury and the rehabilitation process. As you become more familiar with brain injury, you will probably have many more questions. WakeMed's staff has a great deal of expertise and experience in this area and will provide you further information or answer your questions throughout the rehabilitation process. In addition, you may find the resources listed below helpful:

[RESOURCES]

Brain Injury Association of North Carolina
2113 Cameron Street, Ste. 242, or Post
Office Box 10912
Raleigh, NC 27605
Phone: 919-833-9634
Fax: 919-833-5415
Toll Free: 1-800-377-1464
www.bianc.net

Brain Injury Association of America
105 North Alfred Street
Alexandria, VA 22314
Phone: 703-236-6000
National Family Help Line:
1-800-444-6443
www.biausa.org

BRAIN INJURY SUPPORT GROUPS :

Raleigh

Meets the third Tuesday of each month at 7
pm in WakeMed Conference Dining. For
more information, call Susan Fewell
(919) 618-3003

Cary

Meets the first Monday of each month from
6-7:30 pm at WakeMed Cary Hospital.