



Brain Injury: A Guide for School Nurses



**Brain Injury
— Alliance —**

NEW JERSEY

Brain Injury: A Guide for School Nurses

This publication is a project of the Children and Adolescents Committee, formerly known as the Education System Advisory Group of the Brain Injury Alliance of New Jersey (BIANJ).

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Introduction

Members of the Children and Adolescents Committee (formerly known as the Education System Advisory Group) of the Brain Injury Alliance of New Jersey (BIANJ) wrote this guide to:

- provide school nurses with information about brain injury as it relates to a child's education and health needs, and
- encourage support from school nurses to help raise awareness about brain injury and its prevention.

The writers and members of the Brain Injury Alliance of New Jersey's Children and Adolescents Committee include family members of children with brain injuries, school nurses, and professionals who work in the fields of cognitive rehabilitation, general and special education.

This guide was specially written for school nurses because of their crucial role in the lives of students. It provides an overview of information that may be helpful while working with students affected by brain injury. It will familiarize them with the needs and circumstances of these students. The guide focuses on the needs of students with brain injuries that have been diagnosed as moderate to severe by a medical professional. In addition, the needs of students with mild Traumatic Brain Injuries (mTBI) and concussions are addressed. Students with mTBI or a history of multiple concussions can exhibit some of the same characteristics as those with moderate traumatic brain injuries, even though the diagnosis is not evident immediately or may be noted as a concussion in the student's medical history.

Brain injury affects each student differently. It is impossible to cover all aspects of how a brain injury can affect a student's experiences, abilities and needs in school. There are references and resources at the end of this guide for additional information.

"Weighing less than sixteen hundred grams (three pounds) the human brain in its natural state resembles nothing so much as a soft, wrinkled walnut. Yet despite this inauspicious appearance, the human brain can store more information than all the libraries in the world. It is also responsible for our most primitive urges, our loftiest ideals, the way we think, even the reason why, on some occasions, we sometimes don't think, but act instead."

The Brain by Richard Restak, M.D.

Our mission is to support and advocate for individuals affected by brain injury and to raise public awareness through education and prevention. The Brain Injury Alliance of New Jersey has committed its resources to a set of goals to provide services and programs urgently needed now and in the future. The current programs and services offered by the Alliance are:

- information and resource service
- support groups for persons with brain injuries and their families
- a week-long summer respite and recreation program
- initiatives to help prevent brain injuries

- education about brain injury, including concussion for educators, health care staff, human services personnel, and people affected by brain injury
- advocacy and legislative action
- care coordination services for individuals who sustain brain injuries and their families
- outreach to provide information about brain injury and resources in languages other than English and in alternate formats

BIANJ can provide information about professionals who are available to speak to school personnel about brain injury as well as manuals that have been specially written for educators and families about the impact of a brain injury on the education of children.



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Chapter 1

What is Brain Injury?

The definition of brain injury has changed over the past 10 years. Brain injuries are described as traumatic or acquired based on causes of the injuries. Knowing what causes brain injury is very important for researching effective treatments and developing prevention programs.

According to the definition developed by the Brain Injury Association of America (BIAA), a *“Traumatic Brain Injury (TBI) is an insult to the brain, not of a degenerative or congenital nature, which is caused by an external physical force that may produce a diminished or altered state of consciousness, and which results in an impairment of cognitive abilities or physical functioning. It can also result in the disturbance of behavioral or emotional functioning.”*

Traumatic brain injuries happen during everyday activities. The most common causes in young children are falls, such as a fall from a changing table or falling down the stairs. Car crashes, pedestrian incidents, as well as physical abuse from hitting or shaking a child, are also major causes of brain injury. Skate boarding, roller blading, falling off a bike or scooter, falling from a slide, and sports injuries are common causes in older children. Brain surgery and chemotherapy can also result in an alteration of brain function.

Acquired brain injury (ABI) is an injury to the brain which is not hereditary, congenital or degenerative.

Acquired brain injuries are caused by some medical conditions, such as stroke, encephalitis, aneurysm, anoxia (during surgery, drug overdose, or near drowning), metabolic disorders, meningitis, or brain tumors.

Although the causes of insults to the brain may be quite different from each other, the effects of these injuries on a child’s life are quite similar.

This guide generally refers to students with traumatic and acquired brain injuries as students with a brain injury. The term “traumatic brain injury” is used throughout the text when information provided is specific to traumatic injuries. The terms mild traumatic brain injury and concussion are specific to brain injuries that score 13 or above on the Glasgow Coma Scale.

Some students with traumatic brain injuries are classified as eligible for special education and related services based on the criteria for TBI, and child study team support is encouraged. However, within the special education system in New Jersey, students with brain injuries are often categorized under some other handicapping condition that also qualifies them for special services under IDEA or Section 504. This is because the descriptive category of TBI was only added a few years ago. Prior to this addition, a student with a brain injury was generally classified as NI (neurologically impaired), MH (multiply handicapped), or some other category. Obtaining an accurate census of students with brain injuries is a challenge that is only now being addressed by professionals in the field. Part of the challenge is inherent in the issue of how brain injury is defined. The New Jersey Special Education Code reads:

“Traumatic brain injury” corresponds to “neurologically impaired” and means an acquired injury to the brain caused by an external physical force or insult to the brain, resulting in total or partial functional disability or psychosocial impairment, or both. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem solving; sensory, perceptual and motor abilities; psychosocial behavior; physical functions; information processing; and speech.

The NJ definition replaced *neurologically impaired* with *traumatic brain injury*, but in doing so excludes students with acquired brain injury from this category. The lack of good statistical information about children and brain injury is not unique to the New Jersey Department of Education.

The silent epidemic

Brain injury is called the “silent epidemic” because of the staggering number of people who are injured each year. Over 2.5 million people in the United States sustain a traumatic brain injury each year, but only one sixth of them are admitted to hospitals. This does not even count people with acquired brain injuries.

This epidemic is the leading cause of death and disability in children and young adults. The majority of children who have mild or even moderate brain injuries may not be hospitalized. Symptoms from a mild brain injury may not be apparent immediately after the injury. Academic and/or behavioral problems can emerge later and not be identified as resulting from an earlier brain injury. This means that many children and their families are not aware that special attention is needed. Family members, school personnel, and even medical professionals often have trouble figuring out why a child’s behavior or abilities have changed when symptoms finally appear.

Medical technology has advanced so greatly in the past twenty years that many people with brain injury, who formerly would have died, are now saved. Rehabilitation programs used to be primarily for restoring physical functioning – helping people walk and talk again. The increase in the number of “survivors” of brain injury has led to new and specialized treatment in hospitals and rehabilitation programs, as well as services in the community. They are all part of the road to recovery after brain injury.

Brain injury is also “silent” because most children with brain injuries look “normal”. Difficulties caused by the injury may not become apparent for months or years after the injury. As a child tries to learn new and more complex information in school, or make complicated and important moral decisions, difficulties can appear over time.

Mild brain injury

A child with a mild brain injury, often described as a concussion, may not have lost consciousness. Children are less likely to lose consciousness from a brain injury than an adult. As a result, the injury often goes unnoticed or is not diagnosed. A few days or months later, there are some changes in the child’s behavior. The child gets frustrated easily, has trouble sticking to tasks and gets distracted, or grades drop. More problems result from the child’s inability to understand these difficulties. A child may have trouble getting along with other children and become aggressive or depressed. These behaviors can worsen when family, educators and friends do not understand these changes and do not know what to do.

Common causes of mild brain injury are:

- falls off bikes, swings, or skateboards
- collisions during soccer, football or baseball
- throwing or swinging a young baby
- whiplash injuries in a motor vehicle crash

Chapter 2

Brain Structure and Function

A review of the anatomy and physiology of the brain illustrates the importance of the diagnosis and site of injury. School nurses can use this information to educate others about the consequences of a brain injury and how it may affect the student.

The skull completely encloses and protects the brain. Several layers of tissue cushion the brain and protect it. Cerebrospinal fluid surrounds the brain and fills the ventricles (hollow areas within the brain). The brain has several major divisions: the brain stem, cerebellum, and two cerebral hemispheres.

Brain stem

The brain stem controls:

- respiration
- cardiovascular functions
- gastrointestinal function.

The brain stem also contains cranial nerves, which control the sensation and movement of the tongue, eyes, ears, face, and mouth, as well as swallowing functions.

Cerebellum

The cerebellum:

- controls motor coordination
- monitors muscle tone and equilibrium.

Cerebral hemispheres

Although the two cerebral hemispheres look like mirror images of each other, they have different functions. Each hemisphere controls motor and sensory function for the opposite side of the body. In addition, both hemispheres specialize in certain faculties:

- left hemisphere directs language functions.
- right hemisphere manages visual spatial skills.

Lobes

Each hemisphere is divided into four lobes:

- frontal
- temporal

- occipital
- parietal

Corpus callosum

The two hemispheres connect and transfer information back and forth via the corpus callosum. Although certain parts of the brain are primarily responsible for certain functions and behaviors, all parts work together to allow a person to function. The following chart describes regions of the brain and corresponding cognitive, behavioral and motor functioning

Region	Functions
Brain Stem	Autonomic body functions
Cerebellum	Coordination and memory for over learned motor tasks
Mid Brain	Transfer of information between brain regions, movement, basic drives including arousal, motivation, growth, hunger, thirst, emotional reaction, aggression, and sexual response
Posterior	Receptive abilities
Anterior	Expressive abilities
Left hemisphere	Verbal abilities, sequential reasoning, detail problem solving
Right hemisphere	Visual spatial abilities, understanding the big picture
Occipital	Visual disturbances
Parietal	Visual - spatial, sensory perception, awareness of deficits
Temporal	Auditory perception, memory and learning, receptive language and receptive non-verbal auditory input, behavior
Frontal	Expression, attention, organization, planning, cognitive flexibility, the ability to profit from feedback, and regulation of behavior

This diagram reprinted with permission from *Acute Brain Injury: A Guide for Family and Friends*, The University of Iowa 2000

Chapter 3

What Happens to the Brain When It Is Injured?

Permanent tissue damage often results as the soft brain tissue moves against the skull. This can occur either when the head strikes an object directly or when the head is jolted about without direct impact.

Primary effects

When there is a blow to the skull or a sudden acceleration and deceleration movement, several things may happen. The brain can literally move around inside the skull, slam against the sides of the skull and bounce back and forth.

A *coup injury* is caused by the impact where the blow occurs or the head strikes. (For example, when the head hits the windshield during a car crash, the brain moves forward and the frontal lobes may be injured.)

A *contrecoup injury* is the result of further damage as the brain rebounds and collides with the side of the skull that is opposite the initial site of impact (the coup). (For example, after it moves forward, the brain bounces back and hits the back of the skull.)

Acceleration/deceleration are the rapid movements of the brain forward and backward. (For example, this can happen during a car crash, during a bicycle fall when the head hits the ground, or when a baby is shaken.)

Shearing/rotation occurs as the twisting and rotation of the brain damages blood vessels and nerve fibers.

Secondary effects

Secondary effects occur after the initial injury and can complicate the severity of the brain injury. The most common significant effect is increased intracranial pressure (ICP). ICP can be due to a rise in the pressure of cerebral spinal fluid (CSP), the fluid that surrounds the brain and spinal cord. Increased ICP can also be due to a rise in the pressure within the brain, fluid around the brain, or swelling within the brain itself. Signs of ICP may be demonstrated by headache, nausea and vomiting, changes in behavior or level of alertness, or other neurological alterations.

Defining the severity of traumatic brain injury

Traumatic brain injuries are characterized as *mild*, *moderate* and *severe*. Although definitions vary among hospitals and physicians, the following guidelines can help you understand these terms when they are included in medical reports.

Mild (or concussion)

- brief (<1 hour) or no loss of consciousness (LOC)
- signs and symptoms of a concussion

Moderate

- coma > 1 hour but < 24 hours
- neurological evaluation finds evidence of brain trauma
- possible positive findings on CT scan or EEG

Severe

- coma > 24 hours

Rating scales

Two scales are commonly used to assess a patient's responses and functioning levels after a brain injury. They are typically used to assess traumatic brain injury but have been used with acquired brain injuries as well. Both are widely used and referred to in many reports.

Glasgow Coma Scale

The Glasgow Coma Scale assesses the level of consciousness after a brain injury. It rates the patient by eye, motor, and verbal responses to commands. Scores range from 1 to 15. Individuals with scores of 9 or above are not considered to be in a coma state. This scale is also used to determine changes in the patient's status during the acute phase. The complete scale is included in the Appendix. There is one scale for children below age 4 years and another for those over 4 years.

Rancho Los Amigos Scale of Cognitive Functioning

This scale is used during the rehabilitation stage to categorize recovery of cognition and behavior. This scale is valuable in planning treatment programs and measuring progress. The Rancho Los Amigos Scale is included in the Appendix.

Chapter 4

Common Changes Following a Brain Injury

Although each brain injury is unique, there are common changes or complaints that are reported by most students. These changes often are not explained by pathology. A CT or MRI scan only reveals severe damage. Moderate brain injuries may not have any pathological support; concussions do not show on CT or MRI. Neuropsychological testing, clinical observation, and personal complaints provide information about how the brain injury affects a student.

Physical, cognitive and psychosocial changes are most common among students with brain injuries. The degree of change or severity varies depending on the damage to specific nerve cells.

Physical changes

Physical changes can be as obvious as paralysis or as vague as a specific visual field cut.

Physical changes may include:

- difficulty walking, problems with gait
- trouble with balance, falling or bumping into things
- dizziness
- poor muscle coordination, spasticity
- unilateral or bilateral weakness or paralysis
- difficulty grasping objects
- vision disturbances, blurred or double vision, light sensitivity, field cuts
- hearing disturbances, tinnitus (ringing in the ears), noise sensitivity, hearing loss
- problems with speech and motor control, slurred speech
- headaches
- nausea
- increased fatigue
- seizures
- changes in sleep

Cognitive changes

A student with a brain injury typically has a variety of cognitive difficulties that pose special challenges in school. Even a student with a mild brain injury, who did not lose consciousness and had negative findings on an EEG or CT scan, may have cognitive difficulties that affect learning.

Just because a student looks fine, does not mean that the brain injury has not affected the processes of thinking and learning.

Some cognitive changes that commonly occur after a brain injury are *difficulties with*:

- short and/or long term memory loss
- lowered concentration; easily distracted; hard time staying on task
- doing two things at once
- following directions, gets confused
- understanding what is going on
- problem solving and abstract thinking
- organization
- word retrieval
- ability to do things sometimes, but not other times
- social judgement
- sequencing
- decision making
- goal setting
- self monitoring
- initiating tasks
- shifting topics
- forming opinions or beliefs
- processing environmental cues
- planning
- generalizing information
- generalizing ideas
- pace for processing of information, takes longer

Psychosocial changes

Psychosocial changes can result from:

- primary neurophysical damage
- preexisting disposition to emotional difficulties
- cognitive deficits which lead to psychosocial changes

Examples

A student's poor recall results in lowered test performance and this leads to inappropriate behavior.

Psychological trauma over the injury leads to student's loss of family or friends and causes social isolation and depression.

Lowered IQ scores and intellectual abilities lead to student's lowered self esteem and sense of failure.

Organic changes from a brain injury can cause serious changes in behavior. These may present the greatest challenges for a student. Behavior and personality changes are also common in students with mild brain injuries. Behaviors like impulsivity, explosive verbal or physical

outbursts, irritability, inappropriate crying or laughing, and other increased inappropriate responses are typical following a brain injury.

Depression and anxiety over losses and functional changes are frequent effects. They can make the classroom and social environments even more difficult for the student. Any preexisting disposition to emotional difficulties is usually exacerbated by the brain injury. This can be further complicated by decreased understanding about what is an appropriate emotional or behavioral response to a given situation.

Decreased social functioning and subsequent loss of friends can be major contributors to increased anger. A brain injury often affects the student's ability to process social cues. The speed and fluency of speech may be affected, making it harder for the student to maintain conversations using appropriate vocabulary and social judgment.

Some students with brain injuries have difficulty not only with learning and remembering, but also with applying social rules that fit a particular situation. Consequently, they are often rejected or misunderstood by students, teachers, and family members who do not understand their behaviors. It is important that everyone in the student's environment be properly educated about the impact of the brain injury and how best to help.

Typical psychosocial changes may include

- irritability
- mood swings
- impulsivity, acting without thinking
- difficulty accepting someone else's point of view
- sadness, low energy
- low self-esteem
- fidgety behavior or restlessness
- agitation
- hostility
- disinhibition
- sexual disinhibition
- explosive verbal or physical outbursts
- depression
- anxiety

Neuropsychological evaluation

A neuropsychological evaluation provides the best assessment of cognitive changes following a brain injury. A neuropsychologist is a psychologist with postdoctoral training and specific expertise in developmental neuropsychology. This is the study of how behavior and thinking develop and change as the brain matures over time. Although most school systems do not have a neuropsychologist on staff, school systems are required by law to provide all necessary evaluations and services to promote a student's optimal learning.

It is important for a student with a brain injury to have a neuropsychological evaluation one or more times during the course of recovery. This evaluation gives a comprehensive assessment of a student's cognition, behavior, and emotional status. The testing takes between six and twelve hours to complete.

This evaluation provides information about how the student learns and identifies strengths and weaknesses. The evaluation yields information that is critical for developing an effective educational program.

The neuropsychological evaluation identifies areas where help is needed. For example, the neuropsychologist may provide family members and teachers with strategies to help a student with very short attention learn how to recognize when he/she is distracted and how to get back on task. A student with poor short-term memory might learn to use a daily checklist or log to help with recall. A cognitive rehabilitation program may be recommended to help the student develop compensatory strategies in order to process and use information more effectively.

Chapter 5

Pharmacological Intervention

Over the past several decades, there has been a better understanding in the acute mechanisms of brain injury as well as the recovery of a brain injury survivor. Recently, interest has grown in the potential positive and negative roles pharmaceuticals can play in the recovery process and in the treatment and rehabilitation of students with brain injuries. Medications used to treat brain injury either facilitate or inhibit specific neurotransmitter activity. Pharmacological intervention can alleviate specific symptoms, improve function, and even enhance the cortical recovery process.

The clinical characteristics of several student groups resemble those of students with brain injuries. For example, principles of pharmacological treatment for hyperactivity and learning disabilities are relevant to treatment for brain injury. To a large extent, the same drugs are prescribed and the same measures are used to evaluate the efficacy of treatment. Even mild brain injuries can lead to impairments requiring pharmacological intervention.

The clinical indication for a specific drug may vary. The possible treatments for a specific disorder may include drugs from more than one drug class. A specific drug may be used to treat a wide variety of disorders.

Antidepressants

Antidepressant medications are frequently used to treat depression, pain, and sleep disturbances. Most of the anti-depressant effects of the medications can be attributed to effects on acetylcholine, noradrenaline or serotonin. Selective serotonin reuptake inhibitors (SSRI) have become widely used in recent years. The most commonly used SSRIs are:

- fluoxetine (Prozac)
- paroxetine (Paxil)
- sertraline (Zoloft)
- fluvoxamine (Luvox)
- citalopram (Celexa)

Tricyclic antidepressants have been used in chronic pain syndromes and post traumatic injuries. Due to their inherent anticholinergic activity, they tend to produce sedation as well as lowering the seizure threshold. The most useful tricyclic antidepressants are:

- amitriptyline (Elavil)
- desipramine (Norpramin)
- imipramine (Tofranil)

Serotonergic agents are utilized in the treatment of various disorders, including anxiety, depression, pain, sleep disorders. The most commonly used serotonergic agent in treatment of BI is:

- trazadone (Desyrel)

Anticonvulsants/mood stabilizers

Anticonvulsants/mood stabilizers are prescribed for affective disorders, neuralgia, aggression, and hyperactivity, as well as seizure disorders. These drugs include:

- carbamazepine (Tegretol)
- valproic acid (Depakote)
- phenobarbital
- phenytoin (Dilantin)
- gabapentin (Neurontin)
- lamotrigine (Lamictal)
- topiramate (Topamax)

Although developed for the control of seizures, carbamazepine and valproic acid are commonly prescribed as mood stabilizers. These medications have clinical benefit in reducing emotional lability, especially angry outbursts and post-traumatic agitation.

These medications are also prescribed following the onset of seizures, or on a prophylactic basis, following a traumatic brain injury. Post-traumatic seizures are categorized as immediate – within the first 24 hours; early – during the first week; or late – occurring after the first week of injury. The incidence of post-traumatic epilepsy is low (2-5%); lower in persons with closed head injuries and higher in persons with penetrating wounds or intracranial hematomas.

A seizure or two immediately following a traumatic injury does not necessarily indicate the need for ongoing anticonvulsant treatment. The longstanding practice of using anticonvulsant medications on a prophylactic basis has been questioned by recent research studies.

Nevertheless, a number of students with brain injuries return to school on maintenance doses of anticonvulsants. These medications may be continued inadvertently for months or even years following brain injury. Such treatment is of questionable benefit and may also contribute to a student's depression, memory problems, and motor coordination difficulties.

The student on anti-epileptic medication should be monitored for side effects and toxicity, as well as potential drug interactions when other new medications are prescribed. The school nurse can help by assessing the potential impact of medications upon a student's performance in school. The school nurse can also talk with parents about the value of further consultation with the student's physician about the medication regime.

Psychostimulants

This class of medication can improve symptoms of inattention, distractibility, disorganization, hyperactivity, impulsiveness, long-term memory difficulties and emotional lability. Positive effects from this class of medication are apparent within days or hours after an optimal dose is achieved. Stimulants have the advantage of being “yes-no” drugs; they either work or they do not. When they do work, positive effects are readily apparent.

Stimulants are currently recommended for students with brain injuries who have prominent symptoms of:

- attention deficit/hyperactivity
- anergia/apathy
- deficits of initiation
- frontal lobe syndrome

Commonly prescribed psychostimulants include:

- methylphenidate (Ritalin, Concerta)
- dexedrine (Dexedrine)
- dextroamphetamine (Adderall)

Although stimulant treatment can be stopped abruptly in students with ADHD with no withdrawal symptoms even after years of treatment, students with brain injuries seem different. Abrupt discontinuation in students with brain injuries may lead to severe withdrawal reactions with symptoms of depression, anergia (loss of energy), or agitation.

The field of neuropharmacology for survivors of brain injuries is relatively young. Many medication trials are ongoing in acute care and rehabilitation settings caring for patients with brain injury. Certainly new medications will be found to be effective with survivors of brain injuries. Since these students exhibit such a wide range of cognitive and behavioral deficits, it is important for the school nurse to keep abreast of changes and new research in this field.

The school nurse should maintain accurate medication records and note changes in dosage and possible side effects and impact on school performance. Dosages may need to be adjusted or the drug discontinued as per physician's orders.

Who may dispense medication?

Medications may be dispensed only by a licensed professional in accordance with the New Jersey Nurse Practice Act (NJSA 45:11).

Resource:

Rehabilitation of the Adult and Child with Traumatic Brain Injury, Third Edition by Rosenthal et al.

Chapter 6

School Re-Entry

It is important that a number of issues be considered prior to a student's return to school. Instructional modifications, scheduling and general "logistical" concerns are critical and often require careful planning. The return to school must be managed carefully to avoid frustration and failure for the student, family and school.

Academic and cognitive considerations

Parents and professionals must decide when and how a child with a brain injury will return to school. Considerations include:

- health stability
- energy level
- attention/concentration
- memory changes
- organizational weaknesses
- ability to handle stimuli of a small group or classroom.

Deficits in any of these areas may affect the student's ability to learn new material and result in academic failure. A period of home instruction and/or cognitive rehabilitation may be recommended prior to school re-entry.

Home instruction

Home instruction for students with brain injury can begin during the hospital stay once medical issues have been stabilized and the student's energy level allows for cognitive work. The student's tolerance needs to be monitored so that the time allowed for instruction (typically five hours per week for students who have not yet been found eligible for special education and related services) can be best utilized. This is a good time to begin the process of eligibility determination. Even if the student is not ready for formal school re-entry, once found eligible, the maximum ten hours per week of home instruction can begin.

A student with a brain injury often returns to school part-time with a gradual increase in time until a full-time schedule can be maintained with appropriate services. Given this part-time schedule, a home instructor may be one of the educators providing cognitive/academic teaching. Including the home instructor in meetings with others on the educational team will enhance understanding of the needs of the student, the impact of the brain injury, strengths and weaknesses, and necessary strategies so that instruction is appropriate. With proper preparation, the home instructor can become the person who communicates with other school personnel about processing issues, learning needs and effective strategies.

Cognitive rehabilitation

Cognitive rehabilitation focuses on retraining the neurological processes that were affected by the injury. These “thinking skills” are required for a person to function and succeed. When some of these skills are affected in a student, it is likely that learning will be different and less efficient than prior to the injury. Cognitive therapists help the student develop strategies to compensate for skills that may be diminished for a period of time during recovery or even long term. An example is a student whose ability to problem solve is affected. This student may have difficulty identifying a problem, determining solutions for the problem, and/or carrying out the solutions. The cognitive therapist helps the student develop strategies necessary for effective problem solving to take place.

A student can receive cognitive rehabilitation in conjunction with home instruction or a school placement. Skills developed during cognitive rehabilitation can be shared with school staff. Likewise, cognitive techniques and strategies developed in school need to be shared with the cognitive therapist. Benefits of cognitive rehabilitation are maximized when the student, school staff and cognitive therapist work together, share information, and implement the same strategies in school, during therapy and at home.

Educational placement

There are many questions to consider for school placement when a student has a brain injury. Often, the school nurse is a key resource if the student has a severe injury with medical complications. Home instruction in the rehabilitation facility or at home is generally a short-term solution until an appropriate educational plan is developed. Even students with severe injuries may eventually return to their former schools.

Safety at school for the student with a severe injury is an important consideration. Questions to consider about placement issues are listed below:

Health-related issues

- Is medical equipment needed?
- Are any safety precautions needed?
- How are seizures controlled?
- Is there spasticity?
- How are headaches treated?
- Are there other forms of pain?
- Are medical procedures needed during the school day?
- Is medication needed and what are possible side effects?
- Does the student have stamina for a full day?
- Are rest periods needed?
- Are there visual or auditory problems?

Self-help skills – does the student need help...

- Eating
- Toileting
- Putting on/removing clothing such as outerwear and gym clothes
- Accessing the locker in a middle or high school setting
- Performing other activities of daily living

Mobility – does the student need...

- Barrier-free environment
- Assistance with transfers
- Equipment

Rehabilitation therapies - does the student need...

- Speech, occupational, and/or physical therapy
- Psychological counseling
- “Educationally-relevant” or “medically necessary” therapies
- Schedule for therapies

Communication - does the student need...

- Augmentative technology
- Note-taker
- Sign language interpreter

Assistive Technology - is technology available to help the student with...

- Time management
- Memory
- Visual limitations
- Executive functioning
- Organization

Behavior - does the student need...

- Behavior modification plan
- Person to oversee/monitor the plan
- Classroom or individual aide
- Structure (defined by type and amount)

Supervision - can the student handle...

- Unstructured times before school, recess, and lunch
- Structure/cueing within the classroom (define amount and type)

There is no one specific placement for all students with brain injuries. The goal is to have the student participate in the least restrictive environment that will enhance the student’s abilities and take into consideration any disabilities or special needs. However, initially it may be beneficial to provide more intense support to minimize fatigue and academic, social or emotional frustration.

Chapter 7

Transitional Planning

Transitional planning for school re-entry can be simple or complex, depending on the student's injury, rehabilitation and recovery. With rehabilitation and the support of family, friends and the community, many students with brain injuries are able to resume some pre-injury activities with a variety of creative supports.

Students who have experienced a mild brain injury generally do not experience a transition like that of a student with a moderate or severe injury. More likely, the student with a mild brain injury will seek help and support from the school nurse, teacher(s), guidance counselor, or child study team to address changes in academic performance. Various strategies and interventions can be developed to accommodate the student's needs.

Students with moderate and severe brain injuries are most likely to have been in a hospital or rehabilitation program where some transitional planning will take place to address the student's needs to return to the school setting. It is important to include members of the rehabilitation team (medical doctor, neuropsychologist, physical, occupational and speech/language therapists) in planning the student's transition back to school. Others to involve include the school principal, school nurse, child study team, guidance counselor, teachers, school-based therapists, parents and student. A rehabilitation nurse (medical case manager), assigned by the insurance company, may also be involved.

Students often return to school in the midst of recovery from brain injury. Recovery from a brain injury may take weeks, months or years. Often recovery is slow and incomplete. Factors that affect recovery are:

- age at the time of injury
- time that has lapsed since the injury
- length of coma and post traumatic amnesia
- personality characteristics prior to the injury
- intellectual and functional levels prior to the injury
- cause, location, and severity of the injury
- support systems
- type of environment and treatment since the injury
- overall medical health

Just as each brain injury is different, so is the course of treatment. Rehabilitation is usually multidisciplinary and includes physical, occupational, speech, cognitive and recreational therapy, in addition to medical management. It can occur in an in- or out-patient rehabilitation center, a therapist's office, or in the home. It is important that the school nurse communicate with the rehabilitation team prior to a student's return to school to help the transition process.

If a student has been classified as eligible for special education and related services, a case manager from the student's home school district should be designated to ensure that clear and ongoing communication occurs between the family and professionals involved. It is essential that the student, family, school staff and peers be prepared for the student's return. The school case manager may be invited to attend any hospital or rehabilitation patient conferences to learn about the student's needs. Frequent meetings are important, even after transition occurs, to continually review, evaluate and change goals as the student's needs change.

If a student has particular health concerns, the school nurse plays a vital role in transitional planning as the initiator and coordinator of the Individual Health Plan (IHP). The school nurse assures that specific health recommendations in the IHP are implemented. The school nurse also can play a pivotal role in this process by communicating with the rehabilitation team, school staff members, the family and the student as appropriate. (See back of guide for a sample IHP)

Preparing school staff

All staff who will be working with the student need to be informed about brain injury and what to expect. Hospital or rehabilitation staff typically welcome the opportunity to visit the school and provide information about brain injury.

The school nurse is knowledgeable about medical terminology and the physiological basis of the changes caused by a brain injury, and consequently is an excellent resource.

It is important for the school staff to understand that deficits or changes are not the result of laziness, lack of discipline or malingering. Any changes in the student's appearance or ability to ambulate need to be described. Behavioral and communication strategies, including how information or directions should be presented to the student, should be reviewed, along with methods for handling any assistive equipment. Staff need opportunities to have any concerns addressed. A school nurse can provide valuable insights to other school staff.

Preparing peers

Peers often think that the student's return to school after a brain injury means full recovery. They may reject the student who is not fully recovered unless they are helped to understand what differences exist.

The student with a brain injury and the family should be consulted to determine what information they want shared with peers.

While attention to privacy must be considered, peer acceptance can be facilitated if peers understand how the brain injury has affected the student. Creating a "circle of friends" may be helpful to promote social transitions for the student with a brain injury.

Someone who is comfortable and knowledgeable about the student with a brain injury is the ideal person to talk to friends and classmates. This can be a parent, older sibling, teacher, or other

professional. Peers are more likely to become comfortable with the student if they are given information and have questions and concerns addressed and answered.

Questions typically asked by peers are:

“How much will he understand?”

“Should I talk slowly or louder?”

“Will she be able to walk, talk, and eat by herself?”

“Just what should we expect and how should we treat him?”

Students of all ages and abilities can be quite flexible if an atmosphere is created that will allow for peer interaction as a normal psychosocial process. The decision about how much to share and what format to use is a personal one. If the student with a brain injury is the person providing the information, make sure that the student is comfortable being the speaker. In this case, having the student meet with small groups may be preferable to a large audience.

Preparing the family

Since many students with brain injuries have no prior experience with special accommodations or special education, families need information on the special education or Section 504 process, special services, and development of an IEP or Section 504 Plan. Having recently learned medical terminology, they may now have to learn new terminology for special education. Given the stresses they have already faced, these families need to be treated with special sensitivity and support.

The family probably knows more about brain injury and the student’s needs than school staff at this point. Many of these families have participated in numerous meetings about their child. They are a vital link connecting rehabilitation and the school system. Thus, the active participation of these families should be encouraged in developing school re-entry plans.

Siblings need special consideration. They may have witnessed the injury. They have lived through the emotional stress with their family. Siblings may feel stressed and even jealous or resentful about all the attention given to the student with a brain injury. Many siblings experience dramatic family turmoil as the reality of brain injury and the recovery process unfolds over time. They may have already made many accommodations for their sibling, like changing bedrooms or accepting more responsibility for household chores. Siblings are often expected to assume responsibility for recreational activities for their sibling with a brain injury.

Teachers, school nurses, and guidance staff can monitor siblings to identify needs for any accommodations due to preoccupation, reduced concentration, and changed moods or behaviors. Formal or informal counseling may be beneficial to provide an outlet for fears and frustrations and to provide emotional support.

Preparing the student with a brain injury

It is often helpful to review assessment findings with the student using developmentally appropriate terms. For example, even young children may be able to understand that they are having difficulty remembering things since they hurt their heads. They also need to know that learning some subjects may be more difficult than it used to be. This may help them better accept necessary modifications. Having some idea of the effects of the injury helps establish a foundation for learning self-advocacy skills.

Even when the student is returning to a familiar school, concrete strategies such as touring the school to review the physical layout and renew acquaintances can be helpful. Spatial organization, memory, and/or mobility may have been affected. If there is a change in school placement after the injury, a tour is even more important.

The student with a brain injury can prepare for interactions with peers and staff by having discussions and using role-plays to anticipate reactions and questions.

It is important to monitor how well the transition has occurred by speaking with family members, teachers, peers, and the student on a periodic basis after the student returns to school. The transition back to school is a process of adjustment for the student, family, peers, and school staff.

Special considerations for adolescents and older students

Most adolescents and older students have goals and plans for the future. After a brain injury, these goals may need to change or be achieved differently. By being sensitive to these uncertainties and changes, school nurses and school staff can help the student develop and achieve new or more appropriate goals for life after high school.

College is an option for some students with brain injuries. With the right preparation and guidance, students are choosing colleges appropriate to their needs and having success. Increasingly, colleges are available that offer a spectrum of services to students with special needs, including those with brain injury.

For other students not interested or able to attend college, appropriate postgraduate options need to be explored. Options may include vocational training, employment (with or without support), or community participation.

“Transition services” is defined as a coordinated set of activities for a student, designed within an outcome-oriented process, that promotes movement from school to post-school activities, including post secondary education, vocational training, integrated employment (including supported employment), adult services, independent living, or community participation.

Chapter 8

Role of the School Nurse

The skills, experience and responsibilities of the school nurse provide an excellent opportunity to become an advocate for the student with a brain injury within the school system. The nurse can also play an important role in other areas:

- prevention of brain injury
- coordination of health care issues and services in the educational setting
- assistance to educators by sharing knowledge about brain injury

Advocate

The school nurse has the medical background to advocate for students with brain injury, particularly in cases of mild brain injury and concussion. A school nurse may be the first person to recognize that there is a connection between a recent concussion and a student's sudden onset of academic or health difficulties. This is also the person who may recognize the crucial connection between a documented preschool brain injury and an elementary student's present difficulties in school. Frequent trips to the nurse's office often signify that a student is having difficulties with some part of life. The school nurse can ask questions to determine whether or not a recent unreported mild brain injury or concussion may be the basis for the current problem.

The school nurse understands the medical basis for the changes that a student experiences after a brain injury. The nurse may be a sympathetic listener for a student who is having a bad day. The nurse's office can be a haven of understanding in the midst of difficult and confusing days at school. Often the nurse's office is the place where a student, experiencing the fatigue that accompanies brain injury, can go to rest or nap to get through the rest of the school day.

Prevention

The school nurse is the professional in the school district best suited to advocate for brain injury prevention.

Programs that deal with:

- drug and alcohol abuse
- firearms safety
- driver education
- pedestrian safety
- protective helmets for biking, boarding, skiing and horseback riding
- sports safety
- violence prevention
- conflict resolution

are all appropriate places to include a message about the importance of protecting the brain from injury.

Many of these programs are already in the schools, but do not make the connection between “safety” and preventing a brain injury that can dramatically alter a student’s future. School nurses can coordinate with staff implementing these programs to ensure that a message about brain injury prevention is included. The Brain Injury Alliance of New Jersey has materials and information about programs developed specifically for the prevention of brain injury. These programs provide a comprehensive approach to overall wellness and injury prevention in schools and communities.

Coordinate

When a child with a mild, moderate or severe brain injury returns to school, the school nurse plays a vital role coordinating a successful reentry. Many students with brain injuries return to school with a variety of health related issues. The school nurse, as coordinator for health related issues, can ease the stress for the student, family and staff.

The *Standards of School Nursing Practice* (American Nurses Association) requires using the nursing process in the school setting. Standard III *Nursing Process*, states:

“The nursing process includes Individualized Healthcare Plans (IHP) which are developed by the school nurse.”

The IHP provides the format to record each step in the nursing process. It focuses on the specific health needs and problems of a student at a given time in their development and educational career. Much like the individualized education plan (IEP), the IHP outlines the plan of health-related services and programs required to support the student’s safe and successful functioning in the school setting. Development of an IHP provides for effective and efficient delivery of health-related services that promote school success for the student and reduces the liability of the school district. A sample of an IHP for a student with a traumatic brain injury is included in the Appendix.

Educate

In-Service training

The school nurse can assist by coordinating an in-service training in consultation with the rehabilitation team, and a staff person or volunteer from the Brain Injury Alliance of New Jersey (BIANJ). School staff is likely to have many issues and questions that need to be addressed so that everyone who has contact with the student is comfortable with the plan for reentry. People may react with fears associated with working with a new and unfamiliar situation. Knowledge about the needs of a student with brain injury and how to accommodate those needs will often alleviate fears.

A successful in-service is informative about brain function, brain injury, and the effects on the specific student returning to school. Information about different types of seizures and medications and their side effects is very helpful information for school staff. Most students with brain injury become easily fatigued and frustrated.

It is important for staff to understand that these issues are real, based upon physiological changes in a student's brain. They are not manipulations by the student to "get out of doing work." Staff needs to know exactly what to do when they recognize the symptoms of fatigue and frustration.

Educate staff

Very often it is difficult, particularly for a teacher, to make allowances in the classroom for a student with a brain injury because such allowances are perceived by other students as favoritism. The school nurse is in an excellent position to educate the teacher and students about the medical necessity for periodic rest or breaks for food. It can be comforting for school staff to understand that any changes in the student's behavior can immediately be reported to the nurse. School staff need information about brain injury as situations arise while working with a student with a brain injury.

Intervention

The school nurse may be the one professional on staff with the understanding to associate recent changes in a student's behavior, like frequent visits to the nurse's office because of headaches, with a recent brain injury in the gym. Intervention for mild brain injury will not happen unless someone in school or at home can make that connection. A student with an untreated mild brain injury has often lost friends, fallen behind in schoolwork, and/or been "in trouble" at home or in school because the brain injury remains undiagnosed. The school nurse is in the best position to gather pertinent information that could lead to early identification and intervention.

Chapter 9

Concussions and the School Nurse

The New Jersey Concussion Law and Model Policy on Concussion

The New Jersey Concussion Law applies to all public, charter, and nonpublic schools in New Jersey and to student-athletes in grades K - 12 who play interscholastic sports. The law primarily focuses on interscholastic sports, with the exception that any youth sports team organization operating on school grounds must sign a statement of compliance with that school district's or nonpublic school's policies for the management of concussions and other head injuries. This article in the law grants the youth sports organization immunity from liability when they sign the compliance statement.

Community-based youth sports programs are quite different from interscholastic sports with regard to structure of the organization, accountability, and training of coaches and other staff; very often the only adult in charge of the sports event is a parent volunteer. Interscholastic sports are governed by rules established by the New Jersey Interscholastic Athletic Association and are bound by a school district's Board of Education policy regarding protocol for when an injury may have occurred during a school sports event. Therefore, if a concussion is suspected during a community sports event on school property, the mandates in the Law apply as they would if the suspected concussion occurred during an interscholastic sports event at school.

The New Jersey Concussion Law requires that if a student athlete sustains, or is even suspected of having sustained, a concussion while playing in a game or practice, the athlete must be immediately removed from play and should not return to sports activity for the remainder of the day. Following removal from play, the athlete must be evaluated by a healthcare provider if available at the school or an urgent referral should be arranged. Immediate removal from play is important, even if the athlete feels better on the sideline, because symptoms may often not fully manifest until hours or days after the incident.

The protocol recommended for schools to adopt is as follows:

- **Immediate removal from practice or competition.** 911 should be called if there is a deterioration of symptoms, loss of consciousness, or direct neck pain associated with the injury.
- **Student-athlete should be evaluated by the school's licensed healthcare provider** who is trained in the evaluation and management of concussion.
- **School personnel** (athletic director, building administrator, certified athletic trainer (ATC), school nurse, coach, etc.) **next contacts parent/guardian** and informs that a concussion is suspected.
- **School provides student-athlete with district board of education approved suggestions** for management/medical checklist to give to the parent/guardian, and physician or other licensed healthcare professional trained in the evaluation and management of concussion.

- **The student-athlete must receive written clearance from a physician trained in the evaluation and management of concussions** that states the student-athlete is asymptomatic at rest and may begin the district’s graduated return-to-play protocol. Medical clearance that is inconsistent with district, charter, and non-public school policy may not be accepted and such matters will be referred to the school/team physician.

The law mandated that all school districts in New Jersey develop and implement a policy on concussion by the beginning of the 2011/2012 school year. The New Jersey Department of Education was charged to develop a model policy as a guideline for school districts to follow. The Model Policy on Concussion developed by the New Jersey Department of Education expands the law regarding return-to-play decisions to include grades K-12 with certain distinctions for grade levels K-8. It states that, “Younger students (K-8) should observe the seven day rest/recovery period (after they are symptom free at rest) prior to initiating the Graduated Return-to-Play Protocol”.

The policy also states that the Graduated Return-to-Play Protocol should be monitored by a physician trained in the evaluation and management of concussion. The parents/guardians of the student-athlete and the school nurse may serve as advocates for communicating signs and symptoms to physicians and parents/guardians.

The Graduated Return-to-Play protocol provides a measure of protection against the risk of second-impact syndrome. The term second-impact syndrome describes an event that results in death or lifelong disability because an athlete sustains a second blow or hit before a concussion is completely resolved; the force of the hit does not seem to be significant to the onset of sudden impact syndrome. Research is ongoing to learn more about second impact syndrome as it seems to be something that only affects adolescents and young adults.

Graduated Return to Play Protocol

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Symptom limited physical and cognitive rest.	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity < 70% MPMR No resistance training.	Increase HR
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities.	Add movement
4. Non-contact training drills	Progression to more complex training drills e.g. passing drills in football and ice hockey. May start progressive resistance training	Exercise, coordination, and cognitive load
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

Baseline Testing

The New Jersey Concussion Law and the Model Policy do not mandate baseline testing. Baseline testing is just one tool that can assist physicians in diagnosing a concussion and making safe return-to-play decisions. Children as young as 12 years can benefit from establishing baselines when they participate in organized sports. Pediatric versions appropriate for children under age 12 are currently being developed.

A student-athlete who has established a baseline can be re-tested at various intervals during recovery; results from the re-tests compared to the baseline provide helpful information for the treating clinician. (It is recommended that the student should not take a re-test immediately after the concussive event.) There are currently three areas of functioning for which baseline tests have been developed.

- **Neurocognitive** – a computerized neuropsychological test that typically measures attention span, working memory, sustained and selective attention time, response variability, non-verbal problem solving, and reaction time
- **Balance** – there are several models of machines that assess balance; however most are too costly for schools to purchase. The Balance Error Scoring System (BESS) is a face-to-face evaluation typically done by the certified athletic trainer
- **Vision** – visual baselines are the most recent development in establishing baselines for student athletes. The King Devick test is often used to evaluate concussions and some clinicians are using it to establish visual baselines

Return to Learn

The New Jersey Model Policy for Concussion contains elementary information about returning to academics following concussion and suggests the following accommodations:

- reduce assignments
- build in rest periods
- give additional time to complete work
- outline and order steps for big tasks
- “To Do” lists
- written directions
- written schedules
- copies of notes/note taker
- meet one-on-one with teachers

A week or two away from schoolwork can have a significant effect on a student’s grades and learning of new material. Models for return to learn have been researched and implemented by hospital based concussion programs and by schools in other states. The following chart outlines a return to learn plan that is based on increasing cognitive endurance and begins prior to return to school.

TABLE 1.

Return-to-Learn Plan

Stage	Activity	Objective
No activity	Complete cognitive rest — no school, no homework, no reading, no texting, no video games, no computer work.	Recovery
Gradual reintroduction of cognitive activity	Relax previous restrictions on activities and add back for short periods of time (5-15 minutes at a time).	Gradual controlled increase in subsymptom threshold cognitive activities.
Homework at home before school work at school	Homework in longer increments (20-30 minutes at a time).	Increase cognitive stamina by repetition of short periods of self-paced cognitive activity.
School re-entry	Part day of school after tolerating 1-2 cumulative hours of homework at home.	Re-entry into school with accommodations to permit controlled subsymptom threshold increase in cognitive load.
Gradual reintegration into school	Increase to full day of school.	Accommodations decrease as cognitive stamina improves.
Resumption of full cognitive workload	Introduce testing, catch up with essential work.	Full return to school; may commence Return-to-Play protocol (see Step 2 in Table 2).

Source: Master CL, Gioia GA, Leddy JJ, Grady MF

CITATION:

Importance of “Return-to-Learn” in Pediatric and Adolescent Concussion, Christina L. Master, MD; Gerard A. Gioia, PhD; John J. Leddy, MD and Matthew F. Grady, MD, PEDIATRIC ANNALS 41:9

Concussions Outside the Parameters of the New Jersey Concussion Law

Concussions happen from car crashes, falls, and schoolyard incidents among many other things. School nurses are key staff members in elementary and middle schools who have the most comprehensive knowledge about the current understanding of concussion and concussion issues. Issues that arise from sports-related concussions are mostly related to decisions that need to be made about whether a student-athlete should continue practice or competition when a concussion is suspected. School districts can choose to provide guidelines for elementary and middle schools to follow in the event that a concussion occurs to a student outside of interscholastic sports.

A school nurse can do many things to facilitate education on preventing, managing, and raising awareness about concussion. Providing education about concussion to teachers, administrators and their community can be as simple as providing fact sheets on concussion at school events or hanging posters in the nurse’s office. A school nurse can provide in-service trainings on concussion for staff, present information about concussion at parent-teacher meetings, or organize a community educational event on concussion. School nurses can take on an advocacy role for individual students by facilitating communication among parents, physicians, students and teachers. School nurses can also become advocates for their school districts by making suggestions for enhancement of the district’s concussion policy that would expand protocols for concussion to include grades K through 8 and for concussions that occur in school but outside of sports. The school nurse can also become knowledgeable about reliable resources and websites on concussion to share with individuals and their community when there is discussion about concussion issues.

Concussion Management Teams

The idea of establishing Concussion Management Teams (CMT) in schools is to support students as they recover, better monitor symptoms, and for those involved to share information about the students' progress during recovery. Essentially a CMT can facilitate communication among all those involved with a student's recovery and reduce the anxiety and frustration students experience from missing schoolwork and their sport if they participate in athletic activities.

Developing a CMT involves four steps:

Step 1. Determine staff

A CMT can include one academic monitor and one symptom monitor or it can have several of each to allow for coverage when a monitor is absent or involved with another project. When deciding on an academic monitor consider a teacher or teachers, guidance counselor, school psychologist, speech therapist and others. A learning consultant could help to determine how to initiate academic activity and help develop a plan. Each school has the flexibility to decide which staff members fit best into the role of academic monitor based on their interest, availability, and the roles they currently play in the system. The symptoms monitor is typically the school nurse or certified athletic trainer, depending on whether or not the student participates in interscholastic sports. Regardless of whether or not the trainer is the symptoms monitor, the school nurse should be part of the team and part of the communication network.

Step 2. Determine communication method

The goal of the communication plan is to make it as easy as possible to share information among the physician, family, and CMT regarding the student's academic progress, cognitive endurance and increase or decrease in symptoms. Monitoring academic progress begins prior to return to school, whether that is a day or two or a week or more. This is a decision the physician makes. The communication method decided upon for the CMT requires compliance with HIPAA (the student's name must be confidential), and needs to include the physician and parents or guardians. A school can customize a communication network already in use by adding an additional function. Alternatively a paper/folder method, an email group, a phone chain, or an online method like Google Docs can be used.

Step 3. Decide on forms

A school may already have forms developed to monitor a student athlete's recovery from concussion. The same form can be used by the CMT. The forms should include tracking of academic/cognitive information. The treating physician may have a symptom tracking chart or other form that can be adapted.

Step 4. Training

CMT members need to be aware of the most current understanding of recommendations for managing concussion, as well as new information as it becomes available. A collaboration between the Alliance and Rutgers University lead to development of the Brain Injury Primer. The course provides information about concussion and return to learn. It also includes information and ideas for addressing the challenges particular to students with more severe brain injury. The

Primer is a free online course on the Rutgers professional development online learning platform and provides ten professional development hours and one Rutgers University CEU.

The student, family members, and the student's physician are also part of the CMT. Each member of the team must understand their role. Regardless of who the student interacts with - physician, school staff, parents- there must be uniformity in understanding what the course of recovery will entail. Working with a cohesive CMT allows the student to take an active role in the recovery process.

Preventing Concussions

Helmets do not prevent concussions; they do minimize force and can prevent more severe brain injury. There is no reliable evidence that mouth guards, headbands or other headgear used in soccer or other contact sports prevent concussions. Research continues to examine the force of hits in contact sports, what determines a diagnosis of concussion and how the frequency of sub-concussive hits might affect risk for concussion.

There have been changes in the rules for professional sports to lower the risk for concussion. Community sports groups are also changing rules, like limiting the number of contact practices.

At this time there are more questions than answers about how to prevent concussion; however, there are basic guidelines.

- play by the rules
- check equipment and the playing field
- practice good sportsmanship
- use proper technique for your sport
- follow the return-to-play and return-to-learn protocols
- **NEVER PLAY WITH SYMPTOMS!**

Chapter 10

Personal Stories

How life changed for Katie, Kevin, Eric and their families

Three personal stories show different options and interventions for children with mild, moderate and severe brain injuries. They show how information in this guide can be used to make a difference.

Katie's mild brain injury

Katie was in second grade when she brushed up against a moving school bus. She bounced back from the bus, bumping her head on the curb. Katie bruised her ribs and shoulders and lost consciousness for about one minute. Afterwards, she was dazed, held her head, and kept saying that her head ached.

She was taken to the local hospital's emergency department and had skull and chest x-rays. The results were normal and she was sent home. Katie continued to complain of neck and head pain, nausea, and a ringing or buzzing noise in her head. Her family took her to their chiropractor who performed some spinal adjustments.

Katie was out of school for one week. Upon returning to school, she still complained of head pain and ringing in her ears. She reported that the pain and noise distracted her and made her a little tired. These symptoms lessened over the first three months following the accident.

In first grade before her injury, Katie scored between the 75th and 98th percentile ranks on her achievement testing and had been a good student. Three weeks following the accident, she took her second grade achievement tests and scored much lower, between the 30th and 50th percentile. Reading and arithmetic scores had the most dramatic decline. The teacher noticed that Katie found it hard to retain new information and that she read more slowly. She often had to reread material, sometimes several times, to understand the information. Katie also had some difficulty with writing.

Her family had noticed changes, too. They noticed that Katie was unhappy, irritable and more withdrawn. Her family had consulted an attorney about the accident. As the attorney gathered information about Katie's injuries, she recognized the symptoms of post-concussive syndrome. She referred Katie to a neuropsychologist, who confirmed the presence of cognitive slowing and attention difficulties due to a traumatic brain injury.

The neuropsychologist recommended to Katie's family that they write a letter to the Child Study Team (CST) at her school to request an evaluation for special services to help her with schoolwork. The neuropsychologist also recommended that Katie receive outpatient cognitive rehabilitation services. Specifically, rehabilitation was suggested to help Katie understand and deal with the changes she was going through from the concussion. She also needed help to develop compensatory strategies to cope with these changes in order to be successful at school again.

The Child Study Team evaluation was completed and determined that Katie did not require services under IDEA. They suggested that the rehabilitation center and school work together to develop a 504 plan. The CST gave information about 504 to Katie's family. They discussed how the strategies that Katie needed could be spelled out in a 504 plan and carried out by the classroom teacher.

Katie's parents were confused and sought help to understand what was the best thing to do for their daughter. They contacted the Brain Injury Alliance of New Jersey and were put in touch with an advocacy group. An advocate attended the school meeting with Katie's parents and helped them to work out a 504 plan that was clear, but flexible. This seemed important because Katie's needs were not completely understood she appeared to be continually improving.

Many aspects of the first month were rocky. Katie did not follow through with homework for school and was tired by the time she got to her twice-weekly rehabilitation appointments in the afternoon. A meeting was called; the rehabilitation therapist attended and brainstormed with Katie, her parents and the school staff. A modified plan was developed that increased Katie's rehabilitation hours. Even though this sounded like a step backwards to Katie's parents, they agreed to try it because the rationale made sense. The rehabilitation therapist's plan was to use Katie's homework as part of the therapy content and to develop routines, organizational study skills and attention and learning strategies within the sessions. Recognizing that Katie experienced periods of mild fatigue at school, she was scheduled to rest in the nurse's office twice a day. Communication between the rehabilitation therapist and school staff was set up on a regular basis to address problems immediately.

The 504 plan was updated and revised, initially every six weeks and then once each marking period after Katie's performance improved and held steady. The same was true with the rehabilitation services. After one month, Katie's time in rehabilitation was cut back to two hours a week. Then it was weaned to once a week, every other week, and finally down to telephone check-ins over a period of three months. What felt like a lifetime was a school year. Katie and her parents still notice some minor cognitive changes, but Katie is active and successful in school after a year. The 504 plans were discontinued in mid-third grade, with the knowledge that reevaluation and rewriting of a 504 plan would be done if any problems occurred.

Comments

This case shows the importance of not being afraid to seek out and use community resources to help a student's reentry to school after an injury. Parents often hesitate to disagree with a school's recommendation or are afraid to bring others into the school's territory. Here, the combination of an informed lawyer, a neuropsychologist's recommendations, help from an advocate, and the rehabilitation staff's involvement were all important pieces in the success of Katie's return. Even though information is available about brain injury, not all school systems have expertise in this area. Most school staff will work cooperatively with community resource people because it is in the best interest of a student.

Kevin's moderate brain injury

At the time of his injury, Kevin was 16 years old. He was a junior in high school and was considered by his family and teachers as a “good kid” who took a lot of risks. Kevin was a C student and had run-ins with other kids now and then, as well as detention for minor offenses. Kevin was a passenger in a car driven by his best friend when they were involved in a motor vehicle crash. Kevin was thrown several feet after the crash. His friend died.

Kevin was in the hospital's Intensive Care Unit for one week, spent two weeks in a Brain Trauma Unit and then had outpatient rehabilitation for 8 weeks. He was unconscious for 20 hours and had seven days of post-traumatic amnesia. The CT scans showed bruising and swelling of frontal, temporal, and parietal lobes in his brain.

After he was discharged from the hospital, Kevin found it hard to remember things, follow directions, organize his thoughts, express himself, and plan his time. It took him longer to process information and respond to people than before his brain injury.

In addition, his parents worried about how he was reacting to the death of his friend. Because expressing himself was harder for Kevin after his injury, it was difficult to know how he felt about both the loss of his friend and his own loss of memories and abilities.

Kevin's parents contacted the school right after the accident. They gave permission to the staff at the Brain Trauma Unit and cognitive rehabilitation program to have ongoing contact with the school to provide updates on his progress and plan for his return to school. Rehabilitation staff went to the school and provided brain injury education for Kevin's peers.

It was suggested to Kevin's parents that he be classified to receive special education services to better meet his needs. Kevin's parents sought other professional opinions and were put in touch with the Brain Injury Alliance of New Jersey and with a parent advocacy group, SPAN, to help them. They made the decision to take advantage of special education services, and they felt that that turned out to be a positive move. As part of the Individual Education Plan (IEP) process, an initial transitional plan was also proposed.

Kevin's school reentry began with home tutoring in combination with outpatient rehabilitation. He began tutoring the second week he was in the rehabilitation program. The rehabilitation team and the tutor met weekly to exchange information. It was during this stage of recovery that Kevin also began individual counseling with a psychotherapist to help him cope with loss and grief issues and to adapt to internal changes. He was also receiving medication for depression.

Kevin progressed to a half day at school followed by outpatient rehabilitation therapies (occupational, physical and speech) in the afternoon. After two months, Kevin was ready to increase his time at school. He began to stay for lunch and gym class.

Staff at school began to see that Kevin was having more difficulty with social interactions. He was experiencing altercations with peers and sometimes with teachers and other school staff. Especially when fatigued, he became verbally abusive. School staff met with Kevin and his parents to explore strategies to help him with the extended school day and how to handle the less structured activities that had been added to his schedule.

Kevin's psychotherapist was also consulted. Together with the CST, Kevin, and his parents, a plan was developed to address his behaviors. Kevin's behavior began to improve with his increased awareness of what he was doing and consistent feedback about his behavior. At the close of Kevin's junior year, he was in school two-thirds time. He attended an extended school year program to increase his skill level and complete credits for his junior year. Kevin's goal for his senior year was to develop his vocational direction and be a full-time student with a half-day of academics and a half-day of workstudy. These goals were added to his IEP and transition plan as part of the ongoing revision process. Kevin's CST also contacted the Division of Vocational Rehabilitation Services (DVRS) to consult with them about post high school services available to Kevin.

Although Kevin was making good progress in the vocational program, it was evident that he was not ready, vocationally or academically, to enter the work world. After reviewing his skills and needs, Kevin, his parents, and the CST decided to hold off graduation for one year. Special arrangements were made for Kevin to attend the graduation ceremony and related activities without receiving a diploma. This meant he could be part of this big event but not lose his educational benefits.

Kevin, currently 19 years old, attends two academic classes and a vocational training program each day. His social skills and ability to self-monitor his behavior have continued to improve, as well as his reading and math skills. While continuing to feel sadness at times over the effects of his own injury and the loss of his friend, Kevin has been able to express that he is not overwhelmed by this and has "graduated" from seeing a counselor once a week for support. He has referrals to brain injury support groups, as well as a "clubhouse" type social group if he wishes to explore these resources.

Comments

Kevin's experience illustrates the steps involved in going through the rehabilitation stage, school reentry, and transition processes with sensitivity to the effects that cognitive impairments, grief, and personal adjustment can present for an adolescent with a brain injury. This example demonstrates good communication among the family, rehabilitation staff, school personnel, and DVRS. Delaying graduation allowed Kevin time to develop his academic and vocational skills in order for him to be better equipped to enter the work world. It also demonstrates how a coordinated effort to address behavioral issues in a positive way can have a beneficial outcome for the student.

Eric's severe brain injury

As a result of an auto crash, 14-year-old Eric was propelled from a car and had a traumatic brain injury and severe chest trauma. He was hospitalized for several months and spent six months in a low-level coma. After his transfer to a rehabilitation hospital, Eric received physical, occupational and speech therapies, and later cognitive rehabilitation.

He regained his speech eight months post injury and started academic tutoring shortly thereafter. A CST from his local school district became involved in his case once tutoring was requested. At that time, Eric was deemed eligible for special education services under the category of traumatic brain injury. One year after his accident, Eric had progressed to reading, writing, and simple mathematics. He was walking with a walker and was able to eat enough on his own to have his feeding tube removed.

Progress continued, and as discharge from the rehabilitation hospital neared, Eric's CST case manager began to attend the monthly case conferences to plan for the transition to school. Eric's parents obtained the services of a private consultant specializing in brain injury. This consultant instructed his teachers about Eric's unique needs and helped develop an appropriate program at school. She helped school personnel understand the effects of Eric's brain injury and introduced strategies to maximize his classroom instruction.

Once discharged from the hospital, Eric attended an outpatient cognitive rehabilitation program four days a week, followed by cognitive/academic tutoring and therapies (occupational, physical and speech). On Fridays he attended a full day at his home high school where he received all academic instruction in the resource room, plus speech therapy. He had an instructional aide to help him navigate the halls and provide extra help in class.

Eric's IEP included assistive technology. His primary assistive device was a laptop computer with word prediction software, a screen reader and scheduling/ date book software. Eric was mainstreamed into a computer class where he typed any notes or assignments necessary for his other courses into his laptop.

At that point, Eric was considered a ninth grader operating on a 4th – 6th grade level. Before the crash, Eric had functioned well above grade level. Much time was taken to modify his curriculum, develop appropriate goals and strategies and put together a transition plan. Frequent meetings among his parents, CST members, and the TBI consultant were held to review progress and update the IEP as needed.

The following September, almost two years after his accident, Eric attended a resource program science class daily in addition to his other classes. He continued to receive his related therapies, including cognitive rehabilitation therapy sessions and attended school all day on Friday. After the second semester that year, Eric's in-school program was increased to three periods with two periods of resource program science and history and one period of computers. Transition planning was continually updated with special attention to services Eric might need after graduation.

After a year and a half of services in a rehabilitation center, Eric was discharged. He returned to school the following September as a full-time junior. He was mainstreamed for art and computers, and continued his resource program for academics. He also had three periods of one-on-one speech therapy in school per week. He received physical therapy and additional academic support along with speech therapy at home. He became involved in community reentry activities with a recreational therapist. Again due to his progress, Eric's transition plan in his IEP was updated to include new possibilities after high school.

By mid-junior year, testing revealed that Eric's academic achievement scores were between the 7th and 12th grade level. His functional cognitive performance remained impaired, especially in memory, the ability to organize his thoughts, and problem solving. The school nurse identified absence seizure activity and Eric was subsequently placed on anti-seizure medication by the neurologist.

Programming in school had become a bit more problematic because his resource program curriculum generally tapped into Eric's prior knowledge and did not challenge him with new material. One regular academic class had been added to his schedule with the additional support of an aide and a supplemental class to reinforce and modify the regular class materials. Programming for his senior year included three mainstream classes with extra support built into his program. His IEP clearly stated what modifications would be made to the regular class curriculum, what accommodations would be required and who would be responsible for its day-to-day implementation. Accommodations written into the IEP included alternative test materials, modified assignments, tape-recorded classes for later review, study guides, and note takers.

As Eric's developing abilities changed his future educational needs, options were investigated at the post-high school level focusing on colleges and other post secondary schools with Section 504 accommodations and support programs. Eric, his parents and the rest of his child study team obtained information on possible programs and Eric and his parents visited various schools. They ended up choosing a county college with 504 accommodations.

Comments

This case illustrates the slow, steady and creative school reintegration process. It also demonstrates the flexibility a school offered and the positive results for the student. By looking at Eric's unique needs, planning and following through, programming went relatively smoothly.

Individualized Healthcare Plan

Traumatic Brain Injury

Assessment Data	Nursing Diagnosis	Goals	Nursing Interventions	Expected Outcomes
ND1 and ND8 Previous cognitive function. Current cognitive function. Ability to participate in activities as prior to TBI.	Self-esteem alteration related to changes in physical/mental abilities, grieving over loss of physical and/or psychosocial well-being and feelings of powerlessness (NANDA 7.1.2)	Student will participate in social activities with modifications as necessary. Student will develop and maintain meaningful social relationships with similar age peers.	Encourage student to ask questions & share feelings about his condition, its management requirements, limitations, the stigma it imposes and the prognosis with family, school staff, peers & healthcare providers.	Student will verbalize feelings about his concerns, grief, anger, anxiety, fears and limitations and others' reactions to his disability to appropriate adults.
Understanding/acceptance of disability limitations, etc.	Risk for social isolation related to inability to participate in activities at same level as prior to TBI, and discomfort of peers in relating to student because of changes in abilities.	Student will develop a realistic self-image and demonstrate adaptation to and comfort with changes related to TBI	Encourage student to identify his strengths and weaknesses and signs that he is coping effectively/ineffectively.	Student will verbalize positive feelings about himself and identify individual strengths. Students will develop answers about his disability and will use them to explain to others about his disability and limitations
Available support systems within family, school and community		Student will be successful in activities that foster self-esteem. Student will be encouraged to express feelings to others.	Reinforce student's positive abilities interactions, etc. Refer student and family to support groups, counseling, family therapy, and/or clergy as indicated.	Student and family will participate in counseling and increase understanding and acceptance of the disability and to assist student to develop and maintain appropriate social skills
Behavioral issues		Student will use positive, effective coping measures to decrease stress and anxiety.	Identify student's developmental stage and assure that expectations are real for that stage. In collaboration with others, encourage student to develop appropriate social skills.	Student will participate with peers in activities that he enjoys and that give him positive feelings and enhanced self-esteem.
		Student and family will communicate feelings to one another. Barriers to social contact with peers will be minimized.	Encourage continued and age-appropriate peer relationships and activities. Provide educational opportunities for student and his peers to increase knowledge about TBI, its prevention and implications	Student will demonstrate improved social skills with peers. Student will demonstrate increase in appropriate behavior in the school/classroom setting.
		Peers will be comfortable interacting with and helping student.		Student will identify activities in which he is not able to participate as well as prior to TBI. Student will identify activities in which he can fully participate.

Assessment Data	Nursing Diagnosis	Goals	Nursing Interventions	Expected Outcomes
				Student will interact positively and successfully in classroom, small groups, lunchroom, hallways, etc.
				Student will demonstrate positive coping strategies to decrease stress and anxiety.
ND2 History of loss of consciousness. Duration of post traumatic amnesia	Risk for alteration in student role related to cognitive and or memory deficits resulting in disorganization, poor retention of information and instructions	Student will achieve academic success appropriate to chronological age and cognitive abilities	Refer to CSE or 504 Committee for evaluation of academic needs. Participate as member of interdisciplinary team to develop IEP.	IEP will be developed to address academic program needs.
Previous level of cognitive function or requirements for special education services.	Risk for school failure. Problems with fine motor coordination (NANDA 3.2.1)	School activities will be based on students level of tolerance and ability	Develop IHP that addresses physical and academic needs. Assist family and school staff to identify barriers and implement modification in academic program, home and school environment, and scheduling.	IHP that addresses physical and health-related academic needs will be in place.
Results of psychological testing. Current level of cognitive functioning.		A system and emotional support will be available to the student.	Arrange for assistance/modification for daily activities: full-time aide; computer; extended time for test taking; note-taker; someone to carry materials when moving within building or to school bus.	Student will actively and successfully participate in his academic program.
Documented memory problems. Identified need for adaptations or modifications to optimize academic performance.			Collaborate with OT/PT to monitor self-care, improve ability, and maximize potential and independence.	Student will increase academic achievement with modification in curriculum, assignments, and grading as needed.
Behavioral issues			Instruct and encourage school staff to optimize independence in self-care, academics and decision making.	Student will utilize assistive devices at home and school to achieve optimal success.

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