School Re-integration within the Pediatric Traumatic Brain Injury (TBI) Population

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TBI: Basics

- Causes of Head Trauma - Infants, Toddlers, & Young Children
  - Falls
  - Pedestrian-MVA
  - Bicycle-MVA
  - Sports related injuries
  - Child Abuse, Shaken Babies
- Causes of Head Trauma - Older Children & Adolescents
  - Motor vehicle related accidents
  - Sports and recreational activities

Epidemiology: Pediatric

- Pediatric TBI in the USA (facts as of 2009):
  - 435,000 ER visits
  - 37,000 hospital admissions
  - 2,500 deaths
  - 48% impaired by physical, cognitive, psychosocial deficits
  - 160 per 100,000 up to age 5
  - 290 per 100,000 by age 18
- Single leading cause of death in the pediatric population
Recovery Process: Overview

- Partial recovery seen within first few months
- Cognitive recovery seems to plateau after 6 months to one year
- Moderate to Severe: at risk for more adaptive behavior deficits and functional limitations
- Will see some complaints following mild TBI, but symptom complaints persist longer with more severe injuries 12-months after the injury

Factors Influencing Recovery: Inpatient Pediatric Rehabilitation

- After the Intensive Care Unit, when medical stability is relatively achieved...
- Inpatient Rehabilitation sets the stage for maximizing the period of neuronal plasticity and after: to form as many correct neuronal connections as possible
- Brain has the potential to compensate for insult via reorganization
  - Many exceptions and mitigating factors, including focal vs. diffuse lesions, developmental achievement at time of injury, time since injury, available resources to family

Factors Influencing Recovery:

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<tr>
<th>Team Member</th>
<th>Discipline</th>
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<tbody>
<tr>
<td>Physiatrist</td>
<td>School Teacher</td>
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<tr>
<td>Nursing</td>
<td>Social Worker</td>
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<tr>
<td>Physical Therapist</td>
<td>School Reintegration Specialist</td>
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<tr>
<td>Occupational Therapist</td>
<td>Therapeutic Recreation Specialist</td>
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<tr>
<td>Speech Therapist (if warranted)</td>
<td>Neuropsychologist</td>
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<td>Patient</td>
<td>Family members</td>
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<tr>
<td>Respiratory Therapist</td>
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<td>Chaplain</td>
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<td>Pet-a-Pet Program</td>
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<td>Adolescent Medicine</td>
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Factors Influencing Recovery: Inpatient Pediatric Rehabilitation

- Overall goals:
  - To help children to return back to their daily lives in a safe manner
  - Maximize functional independence; perform age appropriate daily living activities
  - Prepare them for life in the community
  - Prevention of secondary disability (e.g., school failure, poor emotional/behavioral adjustment)
  - To determine the extent to which development has been affected and potential long-term consequences
- Research has found that early rehabilitation found to:
  - Facilitate reorganization and functional ability
  - Reduce level of impairment and disability

Factors Influencing Recovery: Location of Injury

- Location/type of injury can influence impairment:
  - focal contusions → most severe and persistent cognitive impairments
  - bifrontal contusions → impaired executive function
  - bilateral entorhinal-hippocampal injury → impaired anterograde memory
  - diffuse axonal injury → cognitive slowing, problems with attention, working memory problems, recall of recently learned info, language/word-finding, executive function

Factors Influencing Recovery: Severity Level

- Injury severity
  - Level of consciousness, duration of impaired consciousness, length of post-traumatic amnesia (PTA), brainstem abnormalities, seizures, increased intracranial pressure
  - Dose-response relationship
Factors Influencing Recovery: Developmental Factors

- Age of child at injury
- The amount of time that has passed since injury
- The child’s age at time of assessment

Factors Influencing Recovery: Predictions of Outcome

- Non-injury related influences
  - Contextual factors: SES, family resources, and pre and post-injury family functioning
  - Developmental factors:
    - Developmental and functional status of the child before injury can strongly impact post-injury adaptive and behavioral functioning
    - Psychiatric functioning post-injury influenced by premorbid intelligence, adaptive skills, and psychiatric condition

Potential Cognitive Deficits

- Attention & concentration
- Memory
- New learning
- Initiation
- Organization & planning
- Cognitive flexibility
- Processing
- Problem-solving, reasoning & generalization
- Personality changes
Disorders of Attention & Concentration:
- Limited ability to focus
- Off-task behavior
- Difficulty sustaining & maintaining attention
- Impaired selective attention
- Poor shifting of attention – gets lost in group conversations
- Easily distracted by internal or external stimuli
- Appears sleepy or fatigues easily
- Daydreams or gets lost in thoughts

Disorders of Memory:
- Short term memory difficulties
- Difficulty organizing information to store
- Can’t recognize what is “important” to store
- Forgets assignments, directions, instructions
- Unable to remember new information
- Forgets locker combination
- Confuses past & present events
- Confabulates (makes up convincing stories to fill memory gaps; this is not intentional lying)

Disorders of Memory:
- Poor following of instructions or class rules; understands only parts of instructions or directions
- Does work incorrectly or incompletely
- Does not know what homework was assigned
- Recalls pre-injury or over-learned information or activity
- Wanders or loses the way in the school, home, community
- Requires multiple repetitions of instruction, information, activity
Disorders of New Learning:
- May see poor performance on assignments & class tests despite relatively intact testing scores
- Verbal IQ is higher than Performance IQ (crystallized versus fluid abilities)
- Role learning may be unaffected
- Incidental skills learned in one setting do not “generalize” to other settings
- Learning is impaired
- May appear to have “memory” difficulties
- Difficulty making inferences or predictions or getting the “big picture”
- Inconsistent: capable of demonstrating skills or mastery one day but not the next

Disorders of Initiation:
- Confused or requires prompts about where, how, or when to begin assignments
- No initiation of interactions with peers
- Apparent lack of motivation
- Passive approach to most or all expected activities
- Gives up easily on challenging tasks
- Homework is not completed

Disorders of Organization & Planning:
- Outbursts or tantrums over a change in activity or during unstructured time
- Difficulty adjusting approach to task on new information
- Begins activities in haphazard fashion
- Haphazard approach to tasks
- Does not use compensatory strategies (outlining or underlining)
TBI Impacts Learning

Disorders of Organization & Planning:
- Difficulty planning for structured & unstructured activities
- Writing assignments “wander”
- Difficulty breaking down complex tasks (term paper, projects)
- Problem organizing materials
- Problems distinguishing between important & unimportant information
- Difficulty making plans & setting goals; sets unrealistic goals
- Difficulty following through with long-range assignments
- Written work appears sloppy, dash-out, & poorly organized on page
- Difficulty taking notes in class – illegible, undecipherable, or unhelpful

Disorders of Cognitive Flexibility:
- Often behind when tasks or class changes
- Perseverates or get stuck on one topic, even when topics change
- Has difficulty keeping up with shifts in conversation
- Does not attend to new information – still thinking of previous topic
- Inability to generate more than one possible solution

Disorders of Cognitive Flexibility:
- Can only do one activity at a time
- Difficulty adjusting to transitions (changes in schedules, school activities, lessons, etc.)
- Seems ...inattentive, self-centered; not interested in the next task
TBI Impacts Learning

Disorders of Processing:
- Exhibits slow reaction time
- Cannot keep up with the rate of information presented in class
- Slowed to complete psychomotor activities (talking, writing, moving, etc.)
- Cannot listen & take notes at the same time
- Hard time processing new information without some prior knowledge of the topic
- Asks questions unrelated to the topic discussed
- Appears to be daydreaming or unprepared

Disorders of Problem-solving, Reasoning & Judgment:
- Hesitates with making decisions
- Does not ask for help
- Makes inappropriate or potentially harmful decisions
- May be easily talked into things by peers
- Impulsive thinking – makes decisions without considering all of the information
- Ineffective problem solving
- Appears not to learn from experience
- Fails to consider alternatives when first attempts fail

Disorders of Problem-solving, Reasoning & Judgment:
- Confusion with cause-effect relationships
- Difficulty generalizing strategies to a new situation or setting
- Problem understanding abstract concepts
- Difficulty seeing “the big picture”
- Problems making inferences or drawing conclusions
- Can state facts but cannot integrate or synthesize info
- Difficulty applying what is known in different or new situations
TBI Impacts Learning

Disorders of Verbal Communication:
- Fails to respond to another person's conversation, questions or comments
- Does not start, or is slow to start conversations, ask questions, or make comments
- Leaves long pauses, hesitate or use fillers
- Has difficulty with explanations
- Circumlocution – talks around the answer
- Struggles to find the correct word
- Has difficulty paying attention to what is said

TBI Affects Learning

Disorders of Verbal Communication:
- May not have insight into why people cannot understand them
- Talks nonstop, does not give the listener a chance to speak
- Does not appear to adjust communication style or behavior for the situation
- Has a hard time selecting topics for conversation
- Has a hard time keeping up when topics change
- Introduces new topic abruptly
- Does not always stay on topic
- Impaired ability to understand abstraction (puns, sarcasm, innuendo)

TBI Affects Learning

Disorders of Verbal Communication:
- Difficulty understanding main ideas, reading & listening
- Does not draw conclusions
- Understanding may be affected by weak vocabulary, complex syntax, length of utterance
- Misinterprets what is said
- Poorly organized story telling
- Slurred speech
- Speaks too loudly or softly, making the message hard to understand
- Speaks too rapidly
TBI Affects Learning

Disorders of Nonverbal Communication:
- Does not seem to understand common non-verbal cues
- Stands too close or too far from conversational partner(s)
- Uncomfortable number or type of physical contacts
- Body language that does not seem to “match” what is said
- Facial expressions that do not seem to “match” what is said
- Distracting, repetitive or excessive body movements
- Poor eye contact
- Staring at others during conversation

TBI Affects Learning

Disorders of Motor Skills:
- Extreme weakness (paresis) or total paralysis of one or both sides
- Reduced muscle tone (hypotonic) or rigidity
- Muscle contractions or spasticity
- Poor balance or ataxia
- Bumping into walls when ambulating
- Falling with unusual frequency
- Difficulty with writing, cutting, drawing due to reduced motor dexterity or motor planning
- Unable to manage/carry materials (books, folders, locks)
- Difficulty with note-taking & copying
- Difficulty walking far distances

TBI Affects Learning

Disorders of Sensory Skills:
- Difficulty with hearing – partial or total hearing loss in one or both ears
- Unusual sensitivity to sounds, ringing in the ears, etc.
- Difficulty with visual acuity – partial or total vision loss
- Visual field cuts (blind spots or areas)
- Impaired visual tracking affecting reading, writing, etc
- Visual blurring or double vision
- Unusual sensitivity to light
TBI Affects Learning

Disorders of Sensory Skills:
- Difficulty with visual perceptions (misses words on a page)
- Difficulty using maps, graphs, skips problems
- Loss of sensation (numbness, tingling, lack of hot/cold discrimination)
- Shows left/right confusion
- Orient body or materials in unusual positions when reading or writing
- Unusual sensitivity to smells, tastes, & tactile sensations

Medical Factors:
- Physical limitations (restrictions from gym, recess)
- Medical problems – seizures, motor spasticity, headaches, pain, dizziness
- Medication needs
- Requirement for assistive devices
- Appearance of being sleepy
- Deterioration of quality of work throughout the day
- "Shutting down" following cognitively demanding tasks
- Complaints of being tired
- May need support for toileting

Disorders of Psychosocial Functioning:
- Agitated, depressed anxious, or labile behaviors
- Immature, insensitive, or inappropriate behaviors, statements or responses
- Poor or unrealistic perceptions of self or abilities
- Limited task persistence
- Blurs out in class; disturbs other pupils
- Acts without thinking – leaves class, throws things, sets off alarms
- Displays dangerous/unsafe behavior
TBI Affects Learning

Disorders of Psychosocial Skills:
- Too dependent on adults
- Too bossy or submissive with peers
- Peculiar manners & mannerisms
- Difficulty understanding feelings & perspectives of others
- Limited insight into own strengths and weaknesses or how to get assistance
- Does not know when help is required or how to get assistance
- Denies problems or changes resulting from injury

TBI Affects Learning

Disorders of Psychosocial Skills:
- Easily frustrated by tasks or if demands are not easily met
- Becomes argumentative, aggressive, or destructive with little provocation
- Cries or laughs too easily
- Feels worthless or inferior
- Withdrawn, does not get involved with others
- Becomes angry or defensive when confronted with changes resulting from injury
- Apathetic or disinterested in friends or activities
- Limited safety awareness

Manifestations of TBI by Age

Preschool...
- Irritability and crying
- Temper tantrums
- Frustration
- Fearfulness
- Disabilities become evident over time as higher level skills are expected to develop
Manifestations of TBI by Age

**Elementary school...**
- Difficulty with new learning
- Short attention span and impulsivity
- Frustration
- Inappropriate social interactions
- Disabilities become evident over time as higher level skills are expected to develop

**Middle school and high school...**
- Difficulty with new learning
- Short attention span and impulsivity
- Executive deficits noticed
- Frustration over skill losses
- Decreased social judgment
- Risk-taking
- Depression and anxiety
- Sexuality concerns
- Effects of earlier injury become evident

What happens as a result of these deficits and behaviors?
- Friends leave
- Families mourn
- Teachers are frustrated
- The student is at risk for isolation from peers, academic failure, depression, substance abuse, sexual behavior, delinquency, further TBI
Successful School Reintegration

Prior to discharge from hospital:
• School representative will:
  • Visit with student & rehabilitation staff
  • Obtain copies of hospital evaluations
  • Conduct or arrange for in-service in school
  • Identify appropriate educational plan with school
  • Facilitate Circle of Friends if appropriate

Immediately after hospital discharge:
• Contact parents
• Follow-up with hospital liaison
• Establish an educational team

Successful School Reintegration

Arrival at school:
• Assign personnel to conduct initial evaluation & give feedback to teachers & parents
• Further modify classroom environment to meet student’s needs

After first weeks of school:
• Reassess student’s needs & modify educational plan accordingly
• Maintain contact with parents & teachers
• Ensure frequent and ongoing monitoring of physical, cognitive, behavioral and health symptoms
• Advocate for flexibility with programming particularly early on

Successful School Reintegration

- 70% of children with severe TBI and 40% with moderate TBI will require special education services
- Services may range from half-day placement with increasing time with more recovery, homebound services, residential placement
- Be cognizant of the possible impact of cognitive limitations when designing behavioral interventions
- Investigate the underlying etiology of the behavior
- One of best predictors of long-term outcome: acknowledging potential obstacles in the system
- Multi-dimensional approaches are best
- Frequent communication of the effectiveness of the plan is needed
Successful Community Reintegration

- For adolescents
  - Contact the Office of Disabilities if able to attend college
  - Vocational Rehabilitation Services
    - Many adolescents do not succeed at first job
    - Support of job coach and additional training for success

TBI as an Educational Disability

Students with TBI differ from students in other special education disability groups:

- Developmental history includes a period of normal development
- Cause of disability is known and happens suddenly
- Pre-existing behavioral or cognitive needs are likely to be intensified after TBI
- Problems with reasoning, organization of thoughts, cause-effect relationships, and problem solving are pronounced
- Mild to severe problems with memory and new learning are very common

TBI as an Educational Disability

- Student may deny or have difficulty recognizing and accepting post-injury deficits
- Discrepancies in ability levels are pronounced
- Mild to severe speech/language problems often exist
- The student’s emotional expressions are unpredictable and exaggerated
- High levels of fatigue are often observed even when no medication is being used
- Headaches may last up to two years following the injury
Effective Teaching Techniques

- Positive cognitive changes occur over time – More rapid for the 1st year post-TBI, then slows down
- Avoid using condescending communication
- Respect student’s dignity and look for child’s strengths
- Continually look to ways to foster child’s independence while accommodating for their needs
- Provide structure and a consistent routine
- Help connect new learning to previously learned concepts
- Encourage, support, reinforce efforts
- Ongoing communication among student’s teachers and family
  - Avoid work overload
  - Adjust expectations over time
  - Use consistent strategies
  - Structure, model, repeat, consistency

- Do not overstimulate; be aware of environmental stimuli in classroom (e.g. placement of desks, noises in hallway, stimuli on the wall) and how they may affect student
- Gradually increase rate and complexity of information
- Use repetition and consistency
- Provide structure throughout the day
- Give feedback immediately following task
- Prepare child for changes in routine and schedule in advance
- Allow extra time for all tasks, quizzes, tests, answering questions

- Guide one to see alternatives to a problem without giving the answer
- Always model new learning tasks
- Student may need to leave class early to avoid crowds in the halls
- Performance will be variable—to be expected
- Give work appropriate to student’s abilities to avoid frustration, being aware that this may change over the course of their recovery
- Repeat, rephrase, summarize
- Check student’s understanding by having student paraphrase ideas
Task Analysis for Teachers: Was I Right or Wrong?

Issues for Teacher Consideration:

- Is the page too busy?
- Are the directions easy to find?
- Does this put a demand on word retrieval?
- Do the materials require recall of information?
- Was the amount of time appropriate?
- Are there too many choices?
- Does the task require shifting too much from task to task?

Potential Modifications & Accommodations by Domain

- Reduced course load upon return to school
- Consider rest periods during the day
- Use of computer for organizing, writing
- Schedule heavier content classes when student is most alert
- Provide study guides at start of new units
- Plan for recess time, fire drills
- Extra set of books kept home
- Adjust homework demands
- Consider logistical placement of classes near each other to reduce fatigue

Potential Modifications & Accommodations by Domain

Slow Processing Speed/Fine Motor Impairments:
- Reduce distractions in environment
- Extra time on tests and assignments.
- Reduced assignments.
- Allowance to take tests in a quiet location.
- Receiving a copy of annotated notes.
- Shortened assignments
Potential Modifications & Accommodations by Domain

Attentional Difficulties:
- Minimize distractions in the environment.
- Have child focus on one task at a time.
- Make sure they maintain eye-contact with the instructor while learning new verbal information.
- Have child repeat what was said to ensure understanding. Encourage child to ask questions to ensure understanding of the material.
- Have child repeat information and tasks (“practice makes perfect”).
- Provide child with frequent verbal/visual cues and reminders.

Potential Modifications & Accommodations by Domain

Executive Dysfunction:
- Teach child various strategies:
  - To take time to prepare a task, especially a complex task, prior to executing the task.
  - Pre-task strategies (e.g., obtaining necessary materials before starting assignments). It might be helpful to map out/plan the steps before attempting the task; she is then able to check each step off as she completes each step. This will give her time to contemplate the process of completing such tasks.
- Help child break tasks into manageable components, and organizing these into a coherent whole.
- Steps to completing a task or activity should be clearly and concretely spelled out and placed in a logical sequence.
- Help child create an organizational system (i.e., homework folder).
Potential Modifications & Accommodations by Domain

Speech and Language Deficits:
- Allow student time to think about what they want to say; try not to pressure them to hurry up.
- Provide the word for them in the event that it is difficult to understand what she said.
- Provide a list of relevant vocabulary words for assignments, tests, and classroom discussions.
- Ask them more direct questions rather than open-ended questions. For example, ask “do you want to use a pen or pencil?” rather than “what type of writing utensil do you want to use?”
- Utilize student’s nonverbal strength in the classroom (e.g., show them how to execute tasks rather than tell them).

Potential Modifications & Accommodations by Domain

Speech and Language Deficits:
- If student struggles to retrieve words, employ a phonetic cuing strategy to assist her. For example, if she is trying to think of the word “kangaroo,” cue her with “starts with the same sound as “can” or “cat.” Continue to provide such clues until she retrieves the word. The student may also respond better when they are given two-choices as opposed to open-ended questions.
- People who have word retrieval difficulties sometimes “fill in the gaps” with other words and pretend that they are correct. Be cautious to not be judgmental when this occurs and simply correct her or use one of the cuing techniques described above.
- Include a list of possible answers on tests (e.g., multiple choice, true/false, or matching).

Potential Modifications & Accommodations by Domain

Learning and Memory Difficulties:
- Multi-modal presentation
- Active participation with the material
  - rewriting class notes,
  - making up songs/rhymes to remember information
  - developing mnemonic devices
  - making games with the material
- Technology supports
- Shortened directions (e.g., one-step at a time) and repetition of instructions.
- Provide periodic review of previously learned information
**Potential Modifications & Accommodations by Domain**

**Nonverbal Learning Deficits:**
- Assist student in organizing their desk, book bag, etc.
- Grade assignments on the content, not the appearance.
- Be aware that the student may not understand language pragmatics and may need support to maintain appropriate conversational skills.
- To assist with generalizing information, student should be shown explicitly how to use skills in different contexts rather than being expected to generalize information independently.
- Multi-modal presentation of all learning material (e.g., visual, auditory, sensory).
- Teach keyboarding.

**Potential Modifications & Accommodations by Domain**

**Nonverbal Learning Deficits:**
- Student may benefit from the modification of all worksheets so that they can work on accuracy and mastery (e.g., the number of problems on a worksheet should be limited to prevent visual overload).
- Student should receive handouts of all information presented on the blackboard. Handouts should be provided to student discreetly so that they do not feel singled out.
- Verbally explain all diagrams on the blackboard such as graphs, maps, etc.
- Beware that the student may miscode their answers on scantrons. Have them indicate their answers on the test booklet instead.

**Potential Modifications & Accommodations by Domain**

**Emotional/Behavioral Dysregulation:**
- Constant supervision outside of school ensure her safety.
- Use and enforce clear rules and consequences for inappropriate verbal behavior or substance abuse.
- Referral for a Functional Behavior Assessment if needed.
- Emphasize/model the positive behaviors you want to see (e.g., working on classwork, following directions) rather than simply point out mistakes.
- Consequences for appropriate and inappropriate behavior should be reinforced on a regular basis through positive reinforcement and response cost.
- Model positive statements that the student can say to themselves to help them calm during challenging/overwhelming times. Make a list of these statements and behaviors (e.g., breathe deeply, blow bubbles).
TBI RESOURCES


TBI RESOURCES

- Brain Injury Partners: Navigating the School System: http://free.braininjurypartners.com/
- LEARNet: http://www.projectlearnet.org
- TBI Educator: http://www.tbied.org/
TBI RESOURCES

- Brainline: www.brainline.org
- Brain Injury Association of America: http://www.biausa.org
- Brain Injury Association of Indiana: http://www.biausa.org/Indiana
- The Perspective’s Network: http://www.tbi.org

Traumatic Brain Injury: A Training Program for School Personnel in Indiana

by Kathleen A. Munroe, MS, CCC-SLP, CBIS (2009)

Available on the Brain Injury Association of Indiana website
http://www.biausa.org/Indiana/education.htm#Modules

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