Traumatic Brain Injury: A Disability Often in Disguise

This self-study course for educators is presented by Brain Injury Association of Florida with support from the State of Florida Department of Health.

The purpose of this course is to raise awareness of the incidence and effects of Traumatic Brain Injury (TBI), and to provide information and strategies for teachers facing the unique challenges of educating students with TBI.

The goals of the course are to:
- Increase the ability of Exceptional Student Education (ESE) and general education teachers to identify behavior that may be related to TBI.
- Assist teachers in identifying TBI-related learning difficulties that may look like those associated with Specific Learning Disability (SLD) & Emotional Behavior Disturbance (EBD).
- Provide effective strategies all teachers can use with all struggling students.
- Increase community awareness of TBI, leading to improved reintegration, stakeholder involvement, participation, and teamwork.

Session 1 discusses the definition and prevalence of traumatic brain injury, and why it presents a unique challenge to educators.

Session 2 is a brief tutorial on the brain, how different parts of the brain control different physical and cognitive functions and common causes of TBI.

Session 3 explores the educational impact of a TBI in relationship to instruction and intervention.

Session 4 describes the types of problems likely to be encountered when teaching children with TBI, and the interventions that have proven helpful to educators and students.

Please see the handout section for a transcript of these sessions, plus a glossary, reference materials, resources and additional information.
Florida Definition of Traumatic Brain Injury (TBI)
The State of Florida defines Traumatic Brain Injury as an insult to the skull, brain, or its covering, resulting from external trauma which produces an altered state of consciousness or anatomic, motor, sensory, cognitive, or behavioral deficits. This definition is used by the Florida Department of Health to determine eligibility for services.

The Individuals with Disabilities Act or IDEA definition of Traumatic Brain Injury relates to a child’s ability to learn.

This federal regulation applies to open or closed head injuries resulting in impairments in physical and cognitive functions including memory, attention, reasoning, judgment, problem solving, sensory/perceptual and motor skills, speech and language, and psychosocial behavior.

The Florida State Board of Education’s definition includes anoxia due to near drowning, considered an external occurrence, as part of the criteria for eligibility for Exceptional Student Education (ESE) services.

The term TBI does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma.

[34 Code of Federal Regulations §300.7(c)(12)]

Traumatic Brain Injury in Florida
Over 210,000 people in Florida are currently living with a TBI-related disability. By 2020, this number is expected to increase to nearly 260,000.

Approximately 20,900 TBI’s occur to children from birth to age 15 each year in Florida.
- 16,000 will result in visits to the emergency room
- 4,000 in hospitalizations
- 900 will result in death.
The Challenges: Helping students with TBI succeed in school presents a unique set of challenges to educators.

Challenge 1: Determining Numbers
There’s a seeming contradiction between medical and Exceptional Student Education statistics. Although the numbers from the Centers For Disease Control and Prevention or CDC show that brain injuries are on the rise, this fact is not reflected in ESE data.

Even if the issues are not serious enough to require an Individualized Education Program (IEP), the child with a brain injury still may need special assistance in order to succeed in the academic environment. Strategies for working with these students often differ from those used by educators working with students with other types of disabilities.

Under-reporting can lead to lack of awareness and training, which are essential for identification and delivery of appropriate services. The bottom line is: students with disabilities are being identified, but because learning problems from injury can be easily mistaken for those caused by other conditions, students with TBI are being under-identified.

Challenge 2: Range & Variety of Problems
Every brain injury is different, and outcomes are difficult to predict. In addition to the severity of the injury and which part or parts of the brain are damaged, there are a number of factors that can impact the extent and severity of resulting impairments, including age at the time of the injury, pre-injury profile, support from family and school, environmental factors and medical care.

After a traumatic brain injury, a student’s life may change dramatically. Secondary psychological and social problems often develop as the child learns to cope with a new life.

Challenge 3: A Dynamic & Unpredictable Process
When an injury occurs to a child’s brain, normal development may be delayed or dictated by the course of recovery.

Problems can arise months or years after the initial injury. Performance may fluctuate from week to week, day to day or from morning to afternoon: often one step forward – and two steps back.

Challenge 4: Non-traditional Assessments Needed
In working with children with TBI whose disabilities are serious enough to require an IEP, achievement, intelligence and behavior rating scales alone may not be sufficient in order to plan a successful course of action.

Neuropsychological assessments may be needed to identify underlying cognitive strengths & weaknesses.

Evaluations, including functional analysis obtained from natural settings, family reactions to the injury, and pre-existing conditions should be also be considered.
Challenge 5: Medical to School Coordination
Traditionally, there’s been little communication between the medical and educational communities on the subject of TBI. Doctors often assume that teachers know how to work with children who have brain injury. Making a successful transition from the hospital back to school after a TBI truly requires a team effort by physicians, rehabilitation therapists, educators, social workers or case managers, and parents. The medical community and educators need to understand each other’s language.

Summary: Session I
Identification of students with traumatic brain injury and teacher/educator training are key to providing appropriate services and interventions for the child. The good news is: Many resources and educational materials are available in Florida.

Session 2 – A Brief Tutorial: Brain Functions & Causes of TBI

The human brain is the most complex and mysterious organ in the body. It controls all body functions, 24 hours, 7 days a week - from heart rate and movement to emotions and learning. The brain determines abilities and personality, and creates a capacity for thinking, feeling, imagining, and planning that exists in no other species.

Interest in brain injury has grown recently as many veterans return from combat missions with TBI, but much is still unknown about the brain or its ability to heal itself.

Understanding how the brain controls all aspects of human life helps to illuminate how devastating a traumatic brain injury can be. Even a so-called mild brain injury can result in major consequences.

Causes of TBI
The brain is not attached to anything except the spinal cord. Under normal conditions, it floats within the skull in cerebral spinal fluid, and therefore is sensitive to sudden movements of the head. Damage or bruising may occur when the soft, floating brain is slammed against the skull’s rough, bony ridges.

A typical type of brain injury is called coup/contrecoup. This happens when the head is slammed against a hard surface, like the windshield of a car or when the head of an infant is shaken. The brain is jolted first one way, and then snaps back to hit the opposite side of the skull, resulting in bruising in at least two places.

The brain can also rotate during an injury. Even when the brain does not strike a hard surface, the rapid snapping back and forth of whiplash causes the brain to move in two or more different directions at once, stretching and tearing nerve cells throughout the brain, rather than causing injury to any specific area.
Shaken baby syndrome is an example of whiplash injury that can cause serious, long-term problems for a child. Consequences of shaken baby syndrome may include blindness, paralysis and cognitive disabilities.

Most TBI’s result from closed head injuries, where the skull may be fractured but is still intact.

Open head injuries, like those from a gunshot wound or stabbing, affect a smaller part of the brain.

Secondary effects of brain injury include swelling, bleeding, and infection. Because the skull does not stretch like skin, as the brain swells, it’s pressed against the skull’s hard ridges, causing more damage.

Sometimes, in the absence of bleeding and swelling, CAT scans may not show any evidence of brain injury; however, there is often tearing and shearing of the threadlike nerve connections called axons, which carry messages between the brain and the rest of the body.

Consequences of the injury may show up in a child’s performance or behavior in school for a period of weeks, months or longer. Even after a mild brain injury, the child may still need some accommodations or special assistance in school.

Cerebral Hemispheres
The brain (also called the cerebrum) is divided into two almost identical looking halves known as the cerebral hemispheres.

Certain areas of the brain influence our performance academically. As a result, knowing where the injury occurred helps in planning for optimal intervention.
Lobes
Each hemisphere is subdivided into parts called lobes; each lobe controls specific physical and cognitive functions.

The frontal lobe governs much of what we do, and helps us make decisions about our actions. This is the area of “executive function,” affecting motor skills, emotional expression, awareness, reasoning, judgment, organization and focusing attention.

Broca’s area, situated at the base of the frontal lobe, helps to govern expression of speech and language. A large percentage of brain injuries are the result of damage to the frontal lobe.

The parietal lobes sit behind the frontal lobe. Perception and sensation of touch may be affected by damage to this area of the brain. A person may not perceive when something touches them, or when they touch something or someone. They may not be able to identify the items in a bag by touch. Thus, abilities such as typing or playing a musical instrument would be impacted. The left parietal lobe is where visual messages are processed.

The temporal lobes are on the sides of the head above the ears. Damage to this lobe may occur in a motor vehicle crash when the side of a person’s head hits the side window—a good reason to place children in the middle of the back seat whenever possible.

Memory loss is often a result of temporal lobe injury, especially short term memory. The Hippocampus, located in the temporal lobe, is crucial in the transition of short-term to long-term memory. Students with temporal lobe damage who are given oral instructions for an assignment may not remember what they’re supposed to do. These students may also experience hearing loss, problems with organizational skills and difficulty in completing activities and assignments.

The occipital lobe is in the back of the head and is often part of the coup/contrecoup injury of a frontal lobe impact. The optic nerve is in this area of the brain. Damage to the optic nerve can cause blindness or partial blindness, which includes a limited field of vision, limited peripheral vision, or a split field of vision.

Summary: Session II
Traumatic brain injuries are like “snowflakes.” None are exactly alike. Each differs in severity and in the area of the brain most affected. The outcome of the injury is also likely to be affected by the continuum of medical care received (Pre-hospital, trauma, acute care, inpatient and outpatient rehabilitation). Other factors that influence recovery include the child’s pre-injury profile, health status, family and academic support.
Session 3 – Effects of TBI on Academic Performance

In this session we will explore the educational impact of a TBI in relationship to instruction and intervention.

It’s not the purpose of this training to identify more students for Exceptional Student Education services. Rather, the goal is to make educators aware that there may be students who have an unidentified or unreported TBI, and how they could benefit from strategic instructional interventions, regardless of whether or not the student has an IEP or 504 Plan.

Causes of TBI in Children
Brain injuries to infants are most commonly caused by abuse and shaking. After infancy, twice as many boys sustain TBI’s as girls.

Motor vehicle crashes and falls cause most brain injuries to toddlers and preschoolers. Parents and guardians should have their child’s car seats and boosters checked for proper installation by a certified technician.

Young school age children are most often hurt in car crashes, as pedestrians, and on their bikes (often without helmets).

Adolescents are most likely to be hurt in motor vehicle crashes, sports activities, and assaults.

Effects of TBI on Academic Performance

We’re all familiar with the activities depicted here, and think little of the mild injuries students experience when participating in sports and other physical activities.

But consider the possibility... how many times has a child fallen off their bike, with or without a helmet - and hit their head? How often have students been stunned while playing football only to get back up and continue to play. Some refer to it as “having their bell rung.”

What about the children who’ve been hit in the head by a baseball or softball in Little League. Consider the boys and girls who climb trees or playground equipment and fall hitting their head. Sometimes these injuries are serious, and do affect a child’s school performance.

Is it JUST a Bump on the Head?
In school, the long term effects of brain injury become apparent over time, creating challenges for students, families and educators. Even a mild brain injury can impact a child’s success in school. The majority of brain injuries, about 85%, are considered mild.
TBI – Often in Disguise
According to the CDC, traumatic brain injury is a leading cause of death and disability among children, but the Florida Department of Education considers students with TBI a low incidence population. Why?

- Not all students with TBI need ESE services. Some children will only have short term effects or changes after a TBI. Others, unfortunately, will live with long-term effects or changes after their injury.

- The full extent of a TBI is not always evident immediately after a child is hurt. Difficulties may appear weeks, months or years later. Young children may do well in pre-K and 1st grade, but as the work becomes increasingly difficult, deficits may emerge.

- Students with an undocumented TBI may already be receiving Exceptional Student Education under another diagnosis, such as emotional behavior disturbance (EBD), learning disability (LD), and attention deficit/hyperactivity disorder (ADD/ADHD).

- Two students may be impulsive and disorganized in the classroom. One has a TBI. The other has a learning disability. Since the strategies for working with these two students successfully may differ, it’s helpful to know about the TBI.

Let’s review the IDEA Act Definition of Traumatic Brain Injury. It applies to open or closed head injuries resulting in impairments in physical and cognitive functions including memory, attention, reasoning, judgment, problem solving, sensory, perceptual and motor skills, speech and language, and psychosocial behavior. The Florida State Board of Education includes anoxia due to near drowning, considered an external occurrence, as part of the criteria for eligibility for ESE services.

The term TBI does not apply to brain injuries that are congenital (genetically based) degenerative (caused by a disease that produces progressive damage to the brain and nervous system) or brain injuries induced by birth trauma. However, the interventions and strategies provided in this course can be effective for all students suffering from cognitive and intellectual disabilities regardless of cause.

Brain Development/Recovery
Young children who sustain a TBI are at greater risk for difficulties in the future because the development of the brain has been interrupted. The younger the child, the more immature and vulnerable the brain is to an injury.

While previously learned skills are often left largely intact after a brain injury, acquiring new skills is a common problem. Youngsters cannot draw on previously mastered skills to compensate for the results of a brain injury.
Consider the children who, in the early years do not appear to have difficulties, but begin to struggle in school in the 2nd and 3rd grade. These are the milestone grades where students begin to use higher thinking skills and make connections. It may take a long time to see the effects of a brain injury in a young child, when basic skills like language, math, reading, and writing are still being learned. As the child is expected to become more independent, difficulties with problem solving, planning, and organizing become more apparent. Children who have a brain injury at a young age may have trouble keeping up with their peers academically and socially.

Few children go to comprehensive inpatient rehabilitation programs following a TBI. Children tend to recover faster physically than cognitively, which may make them appear ineligible for services.

Currently, there are only three comprehensive pediatric inpatient rehabilitation programs in Florida—they are in Tampa, Miami and Jacksonville. Even if the child is eligible, the logistics make it difficult for many parents to obtain these services.

**Summary: Session III**
Without the appropriate documentation of a TBI, a student cannot receive services through Exceptional Student Education, although some students may manifest difficulties that make them eligible under other disability categories. Most commonly, these students could be served under the Emotional Behavior Disorder (EBD), Specific Learning Disability (SLD) and the Other Health Impaired (OHI) categories.

If the child’s symptoms are not recognized or addressed, they may lead to a complicated downward spiral resulting in low self-esteem, school failure, behavioral acting out, depression, and more.

In exceptional student education we say that regardless of the disability category, the student will receive the services they need to be successful in school. While this is true, it should be noted that, if at all possible, it’s better to know if there has been a brain injury and, if so, what part of the brain is affected. Knowing this helps to provide more specific information about how the injury may affect the student’s ability to learn, and what strategies would be most effective to help the student become more successful academically.
Session 4 – Interventions and Strategies

This session describes the types of problems likely to be encountered while teaching children with TBI, and interventions that have proven helpful to educators and students.

Areas for Intervention/Strategies:

- Curriculum
- Instruction
- Classroom Organization
- Behavior Management
- Accommodations: Classroom and Test

Providing variations in the areas listed here can greatly increase a student’s success in the academic environment. However, modifications made to a student’s curriculum may keep that student from receiving curriculum content necessary for success in the Florida Comprehensive Assessment Test (FCAT), and therefore should be undertaken thoughtfully.

TBI Impacts and Interventions:

- Physical/Somatic
- Cognitive/Attention
- Cognitive/Executive Functions
- Cognitive/Memory
- Cognitive/Language
- Visual/Spatial/Perceptual/Motor
- Psychological

These are the categories of brain function commonly impacted by a TBI. For each category, we will discuss how it manifests in the educational environment, and offer potential strategies that can be used by educators.

This is not meant to be an exhaustive list, but rather a springboard for thinking about what more can be done to facilitate the success of students with TBI in the academic environment.

Physical/Somatic

Difficulties:

- Dizziness/positional vertigo
- Ringing in the ears
- Low-frequency hearing
- Decreased tolerance for stress
- Fatigue
- Headaches
- Sensory intolerance or sensitivities
  - light and/or sound;
  - sensory-perceptual disturbances/distortion tactile sensitivity

- Varied visual field preferences
- Blurred or double vision
- Changes in vision
- Paralysis/weakness
- Nausea; changes in appetite
- Decreased taste and/or smell
- Changes in sleep patterns
- Balance and/or impaired gait
- Feeling “shaken”
- Tremors
A brain injury may produce a wide variety of physical difficulties that need to be addressed in school, including dizziness, fatigue, headaches, sensory, hearing and vision problems. Following a brain injury, there’s an increased chance of a second or third brain injury due to diminished judgment, balance and strength resulting from the original trauma. Since the results are cumulative, care must be taken to protect the child from additional brain injuries.

Parents should be contacted if a child’s vision has changed following a brain injury. If safety is a concern for a student with weakness, balance or coordination difficulties, make arrangements for the student to change classes before the rest of the class is dismissed. Perhaps a buddy system can be arranged to guide the student who may get lost around the school.

Teachers should also be aware of changes of appetite in children with TBI. Weight gain is common because the child may forget when they last ate or the part of the brain that tells us when we’re full may have been injured.

**Physical/Somatic: Interventions and Strategies**
Here are some interventions that can be used in the classroom:

- **Experiment with different lighting:** Some people place fabric over lights to soften them. The use of dimmers is another way to adjust lighting. This is an accommodation that can be provided without an IEP.

- **Give short breaks:** Breaks provided to students can be especially effective if coupled with kinesthetic activities such as stretching and changing positions. Brain research shows that there is a connection between movement and enhancing learning. We tend to think that students get a break when they change classes if they’re in the higher grades. However, preparing for the next class, getting the right materials, showing up on time, etc. can hardly be thought of as a break.

- **Have a sensory evaluation and use multiple sensory deficit interventions.**

- **Modify physical activity requirements.**

- **Be aware of changes in balance.**

- **Seek feedback from an Occupational Therapist:** Although students who do not have an IEP would not be eligible for Occupational Therapy services, most occupational therapists would be willing to provide a teacher with feedback on how they can assist a student in this area. An OT would rather provide an intervention that does not necessitate therapy, than have a student identified and placed on an IEP unnecessarily.

- **Give cues for appropriate movement:** Cueing is something that helps many kids stay on track. Teachers can provide cues for students, and show them how to cue themselves.
Cognitive/Attention

Difficulties:
- Heightened arousal
- Divided attention
- Heightened distractibility
- Problems focusing
- Unable to attend to simultaneous input from varied modalities
- Scanning and discrimination problems

There are many types of cognitive impairments resulting from a brain injury that can affect a child’s ability to succeed in school.

We will briefly review the cognitive areas of Attention, Executive Function, Memory, Language, and Spatial/Perceptual Motor Skills, and offer appropriate interventions.

Clearly, an inability to focus attention in school would be a liability for any student.

Cognitive/Attention Interventions and Strategies

- Limit the number of modalities used at one time during a presentation: If a student is unable to attend to simultaneous input from varied modalities, limit the number of modalities used at one time during a presentation. For example, don’t place notes on the board while using an overhead. Don’t have a movie going and expect the student to follow notes on the board at the same time.

- Teach tracking strategies: For working with scanning and discrimination problems, teach tracking strategies such as underlining, using your finger, and blocking off extraneous information with a straight edge ruler or piece of paper. When writing on a white board or flip chart, vary the color of the text on every other line.

- Monitor lists and activity level in the room: To address heightened distractibility, you can review the number of items posted on the wall and monitor the level of activity in the room.

- Create a “quiet place.” Consider sectioning off a “quiet place,” something akin to a cubicle, yet not as obvious.
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<td><strong>Macro-environment</strong> Designate a specific location to return homework • Display classroom activities schedule&lt;br&gt;<strong>Micro-environment</strong> Use tape recorders to review critical information • Use an organizer as an external memory aid • Test using multiple-choice format • Use fact cards and cue sheets • Use highlighters&lt;br&gt;<strong>Structure and Pacing</strong> Utilize the student’s best learning modality (visual vs. auditory input) • Encourage taping new class content • Encourage writing down class assignments in daily organizer&lt;br&gt;<strong>Teach Style</strong> Provide adequate repetition for mastery • Encourage student to repeat information to ensure comprehension</td>
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<td><strong>Macro-environment</strong> Develop a system to indicate that homework has been handed in • Use a binder with subject sections and pockets for homework • Color code binder sections by subject • Create maps to aid between-class travel; Do in-school travel training&lt;br&gt;<strong>Micro-environment</strong> Review daily routine to re-orient students • Cue students to record homework assignments, check for accuracy • Encourage outlining oral and written assignments&lt;br&gt;<strong>Structure and Pacing</strong> Encourage student to use organizer daily • Break large projects or tasks into component parts or steps • Prepare student before the topic shifts</td>
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This chart is from a publication by the Mt. Sinai School of Medicine titled Students with Traumatic Brain Injury: Identification, Assessment and Classroom Accommodations. We will refer to charts from this document frequently during this session, and a copy of the entire publication is available in the handout section.

In the area titled Attention/Concentration, there are more ideas for changing the classroom environment.

**Cognitive/Executive Functions**

Difficulties:
- Confusion and/or orientation
- Unclear thinking
- Inflexibility
- Rigid in problem-solving
- Poor decision-making
- Diminished organizational skills
- Comprehension
- Analyzing part-to-whole relations
- Categorization
- Self-regulation
- Learning new skills
- Prioritizing steps
- Identifying goals
- Following directions
- Initiation
- Following through

Children with frontal lobe injuries affecting their executive functions may lack the ability to make good decisions. Limiting their choices may help. It’s also important to watch for peer pressure that may influence their behavior. Teachers may need to provide planning notebooks for assignments, and to arrange for frequent meetings with school guidance counselors to help these students with organization.

Unclear thinking can cause problems with mathematical computation. Students with rigid problem solving skills do not adjust well to changes in the way they approach a task. Diminished organizational skills can result in students who can’t seem to find their homework, remember to do their homework, bring the right books, or arrive on time. These students may need advanced organizers or structured schedules to help them.

Confusion can cause a student to give you a look that is interpreted as “I don’t care” when in actuality they’re thinking “What happened?”

Problems with prioritizing can make it very difficult for the child with a brain injury to follow directions, unless the steps are broken down and practiced ahead of time. Students experiencing difficulty with functions such as categorization, identifying goals, initiation and following through will not do well with long term projects that don’t have frequent benchmarks. They may need their directions written down and cues to help in following through the task at hand.

The teacher’s effectiveness depends upon being well organized, and presenting well thought-out lessons that flow from one activity to the next. If the teacher is disorganized, it will add to the student’s confusion.
Cues For Teachers

Student says:

- “I can’t remember” – “I forget what I’m doing”
- “I’m losing things”
- “I can’t do my homework”
- “I can’t find my way”
- “I can’t concentrate”

These comments are heard by many teachers as excuses. Hearing the same ones often, however, could be a cue that something more is going on.

A child whose behavior and academic performance changes after a blow to the head needs to be evaluated for a TBI.

Cognitive/Executive Functions Interventions and Strategies

Again, let’s look at the Mt Sinai chart (see next page). In the section under executive functioning, there are several strategies for assisting students in organizing themselves and their environment. Teachers may assume that students know how to outline, but some will need instruction in this area, and occasional monitoring for retention.

Travel training has been designated as something that students who are visually impaired or severely disabled may need. However, this may also be necessary for a student who is having trouble with executive function. Remember, some students who do not have an IEP or 504 Plan may still require interventions. Most of the examples listed here do not require an IEP or 504 Plan.
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<td>▪ Use tape recorders to review critical information</td>
</tr>
<tr>
<td></td>
<td>▪ Use an organizer as an external memory aid</td>
</tr>
<tr>
<td></td>
<td>▪ Test using multiple-choice format</td>
</tr>
<tr>
<td></td>
<td>▪ Use fact cards and cue sheets</td>
</tr>
<tr>
<td></td>
<td>▪ Use highlighters</td>
</tr>
<tr>
<td></td>
<td><strong>Structure and Pacing</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Utilize the student’s best learning modality (visual vs. auditory input)</td>
</tr>
<tr>
<td></td>
<td>▪ Encourage taping new class content</td>
</tr>
<tr>
<td></td>
<td>▪ Encourage writing down class assignments in daily organizer</td>
</tr>
<tr>
<td></td>
<td><strong>Teach Style</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Provide adequate repetition for mastery</td>
</tr>
<tr>
<td></td>
<td>▪ Encourage student to repeat information to ensure comprehension</td>
</tr>
<tr>
<td></td>
<td><strong>EXECUTIVE FUNCTIONING</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Designate a specific location to return homework</td>
</tr>
<tr>
<td></td>
<td>▪ Display classroom activities schedule</td>
</tr>
<tr>
<td></td>
<td><strong>Macro-environment</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Develop a system to indicate that homework has been handed in</td>
</tr>
<tr>
<td></td>
<td>▪ Use a binder with subject sections and pockets for homework</td>
</tr>
<tr>
<td></td>
<td>▪ Color code binder sections by subject</td>
</tr>
<tr>
<td></td>
<td>▪ Create maps to aid between-class travel; Do in-school travel training</td>
</tr>
<tr>
<td></td>
<td><strong>Micro-environment</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Review daily routine to re-orient students</td>
</tr>
<tr>
<td></td>
<td>▪ Cue students to record homework assignments, check for accuracy</td>
</tr>
<tr>
<td></td>
<td>▪ Encourage outlining oral and written assignments</td>
</tr>
<tr>
<td></td>
<td><strong>Structure and Pacing</strong></td>
</tr>
<tr>
<td></td>
<td>▪ Encourage student to use organizer daily</td>
</tr>
<tr>
<td></td>
<td>▪ Break large projects or tasks into component parts or steps</td>
</tr>
<tr>
<td></td>
<td>▪ Prepare student before the topic shifts</td>
</tr>
</tbody>
</table>
Cognitive/Memory

Difficulties:
- Procedural memory (multi-step directions)
- Recalling and connecting segments of information
  - Recalling
    - words, word lists and/or stories
    - events, places, faces
- Holding information in working memory
- Generalizing information
  - Encoding, storage, consolidation and retrieval of information
- Retaining new information
- Spatial memory

Problems with short term memory are very common after a brain injury, often resulting in difficulties with retaining information, connecting segments of information, and following multi-step directions.

When teaching students with memory problems, it may be helpful to identify the student’s preferred learning style (visual vs. auditory), and to couple new information with previously learned information.

Memory deficits are especially detrimental in the areas of mathematics and science. These subjects depend heavily on the memorization of small facts necessary for future computations and concepts, as well as formulas and codes that stand for the names of familiar items.

In some cases, students know the information but have difficulty retrieving it from long term memory, or filing it in short term memory. Other students may understand and be able to communicate their understanding, but cannot generalize that information for use in other areas where it’s needed. Additionally, there may be a Swiss cheese effect, where a child can do algebra but cannot remember coin values.

Cognitive/Memory Interventions and Strategies

The primary task in working with children with TBI is cognitive rehabilitation. Teaching the child coping mechanisms and compensatory strategies like note taking, using appointment books, and other organizational aids helps the child compensate for skills he/she may not regain, like memory.

Here again, we see that the use of tape recorders, organizers, color coding and repetition are highly recommended to assist students with memory issues (see next page).
<table>
<thead>
<tr>
<th>POST-TBI COGNITIVE CHALLENGES</th>
<th>Examples of Classroom Accommodations Addressing Cognitive Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATTENTION/CONCENTRATION</strong></td>
<td><strong>Macro-environment</strong></td>
</tr>
<tr>
<td>Seat student near teacher</td>
<td>Use peer note takers</td>
</tr>
<tr>
<td>Minimize distractions</td>
<td>Use tape recorders</td>
</tr>
<tr>
<td>Use FM unit and earplugs to minimize external noise</td>
<td>Provide assignments and current activities in writing</td>
</tr>
<tr>
<td>Out-of-classroom activities should be provided in low-stimulation environments</td>
<td>Use large print books with low density on the page</td>
</tr>
<tr>
<td><strong>INFORMATION PROCESSING SPEED</strong></td>
<td><strong>Macro-environment</strong></td>
</tr>
<tr>
<td>Use peer note takers and tape recorders</td>
<td>Review taped materials/ peer notes to identify missed, but critical, information</td>
</tr>
<tr>
<td>Review taped materials/ peer notes to identify missed, but critical, information</td>
<td></td>
</tr>
<tr>
<td><strong>MEMORY</strong></td>
<td><strong>Macro-environment</strong></td>
</tr>
<tr>
<td>Seat student next to electrical outlet for use of tape recorder</td>
<td>Use tape recorders to review critical information</td>
</tr>
<tr>
<td>Provide written materials to back up class instruction</td>
<td>Use an organizer as an external memory aid</td>
</tr>
<tr>
<td>Test using multiple-choice format</td>
<td>Use fact cards and cue sheets</td>
</tr>
<tr>
<td>Use highlights</td>
<td><strong>EXECUTIVE FUNCTIONING</strong></td>
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<td></td>
<td>Color code binder sections by subject</td>
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</tbody>
</table>
Conitive/Language

Difficulties:
- Word retrieval/word finding (naming)
- Verbal or instructional comprehension
- Phonetic discrimination
- Limited vocabulary
- Reading-writing/spelling tasks
- Conveying verbal messages

In grades K through 3, students are developing reading skills such as phonics, phonemic awareness and vocabulary. Students with language problems will have difficulty developing reading skills which, in turn, will affect their ability to acquire knowledge.

These are the years when speech difficulties may become more prevalent. While many speech problems can be “fixed,” if the difficulties are a result of a TBI, there may be no “fix.” But we can teach students strategies to focus on their strengths, and provide them with tools to help compensate for deficits.

Cognitive/Language Interventions and Strategies

- Reduce the need for oral participation
- Reduce writing requirements
- Allow extra time for spoken responses
- Small group instruction
- Give partial word lists
- Support for teachers through the speech/language pathologist (SLP)

In addition to the strategies mentioned here, it’s also acceptable to receive input from a Speech Language Pathologist (SLP) for interventions that can be used by a classroom teacher to assist a student struggling with language.

In small group instruction, you might give kids prior notice when they will need to answer a question. Give the question ahead of time and then go back to it. This decreases stress for the child and provides the opportunity to be successful.
Visual / Spatial-Perceptual-Motor

Difficulties:
- Timed/fluency tasks
- Spatial orientation skills
- Taking notes
- Scanning/tracking
- Shifting across planes
- Visual-motor integration/perceptual tasks
- Writing tasks

Visual, spatial, perceptual and motor problems can wreak havoc for students in high school, where more tasks tend to be timed, and students copy from white boards, overheads and flip charts simultaneously.

This may be a good time to provide notes in advance, advanced organizers, and possibly a peer note taker. Students having difficulty with writing may need to use a word processor or a write out loud program that helps them to organize their thinking.

Visual / Spatial-perceptual-Motor Interventions and Strategies

- Avoid timed testing when possible.
- Provide slower paced activities
- Provide notes or copy notes of a designated note taker.
- Use word processor or other technology.
- Give additional time for response.
- Florida Alliance for Assistive Services and Technology (FAAST)

In addition to the suggestions listed here, the FL Department of Education has evaluation services for assistive technology and equipment available to loan to students.

The Florida Alliance for Assistive Services and Technology (FAAST) can also help with student evaluations, and has a loan closet for students to try out available technology. For more information about FAAST, see the handout section that accompanies this training.

Psychological

Difficulties:
- Sadness/depression/despair
- Lack of interest in activities
- Intense/highly changeable emotions
- Irritability/moodiness
- Unexpected rages/anger outbursts
- Impaired judgment
- Under/Over-stimulation

Some psychological issues can be extreme, and this is why many students whose TBI is manifested in this manner are served under the EBD category.

For those students who are not “extreme” enough to be identified remember that they may not be in control of their behavior. When TBI is a factor, behavior management contracts or plans won’t work. The focus here is to assist the student in recognizing when they’re in an emotional state, and provide them with coping strategies.
Psychological Difficulties (continued):

- Activity avoidance
- Increased isolation
- Compromised awareness
  - self, others and environment (i.e. social cues)
  - failure to accept or understand difficulties resulting from the injury.
- Nervousness / Anxiety
- Increased risk-taking
- Immaturity as compared to peers
- Resistant to change
  - rigid thinking
  - poor cognitive flexibility
- Boundary issues
- Socially inappropriate
- Trust issues
- Interpersonal relationship difficulties
- Self focus
- Changes in motivation levels
- Difficulties staying on topic
- Impulsive behavior patterns
- Oppositional behavior patterns

Students with TBI may not be thinking, acting or reacting in an age appropriate manner, and may not know it. Be alert for “teachable moments” in this regard. Recognize that these students are often resistant to change, and tend to have difficulties following a lesson or activity that is evolving as it goes along.

Consequences like “time out” rarely work with children with TBI because they may not remember why they’re in time out. Being confrontational is also counter-productive. What does help is teaching alternative behaviors and “scenarios” as they happen.

Students with TBI often lose their friends because they act differently and are unable to keep up with them. They experience sadness because they remember who they were, or what they wanted to be before their injury. These children should not be allowed to become isolated. Helping them develop new interests and friends is important.

Psychological Interventions and Strategies

- Adjust activities/schedule to optimal time of day.
- Academics in morning; physical activities in the afternoon or interspersed as appropriate.
- Provide support in areas of limitations
- Behavior intervention plans
- Immediate feedback to inappropriate behavior.
- Avoid confrontational stances/positions.

Students could be given class schedules that are more suited to their learning needs. Courses that cause anxiety might be spaced apart or taken at more optimal times. Although confrontational stances are not effective, students with TBI need extra feedback and support to overcome areas of limitation.

ESE educators can easily see this in students with extreme behaviors, but don’t always recognize these needs in students with more moderate behavior.
**COGNITIVE ASSESSMENT:** In this chart, the tools and focus of traditional and cognitive (neuropsychological) assessments are compared. With each approach to testing, examples of tools are suggested that address the objectives of the assessment.

<table>
<thead>
<tr>
<th>TEAM MEMBER</th>
<th>TRADITIONAL ASSESSMENT</th>
<th>COGNITIVE ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INFORMATION SOURCES AND TOOLS</td>
<td>ASSESSMENT FOCUS</td>
</tr>
</tbody>
</table>
| SOCIAL WORKER     | ▪ Parent interview  
 ▪ Classroom observation | ▪ Reason referred to team  
 ▪ Developmental, educational, and medical history of child  
 ▪ Family history, composition; attitude toward special education and due process | ▪ Screening for a history of brain injury, e.g., Brain Injury Screening Questionnaire | ▪ Identify if a brain injury is a source of school failure  
 ▪ Identify physical, cognitive and behavioral changes secondary to brain injury |
| SCHOOL PSYCHOLOGIST | ▪ IQ testing, e.g., WPPSI-R, WISC-III, Stanford-Binet  
 ▪ Bender Gestalt  
 ▪ Projective testing, e.g., Thematic Apperception Test (TAT), Rorschach, Human Figure Drawing | ▪ Level of intellectual functioning  
 ▪ Pattern of verbal and performance abilities  
 ▪ Visual and perceptual functioning  
 ▪ Emotional adjustment | ▪ Additional IQ subtests, e.g., WISC-III Mazes, WISC-III Index Scores  
 ▪ Additional testing of memory function, e.g., Wide Range Assessment of Memory and Learning (WRAML) California Verbal Learning Test for Children (CVLT-C), Children’s Memory Test  
 ▪ Assessment of executive functions, e.g., Rey Complex Figure (RCF), Children’s Category Test (CCT) Trail Making Test | ▪ Identify cognitive strengths and weaknesses in: information processing speed, attention (simple, complex, divided), memory (verbal, visual; short vs. long-term recall), learning (amount of repetition needed to acquire information, best modality for learning), problem solving, cognitive flexibility, planning, prioritizing, and organization |
| EDUCATION EVALUATOR | ▪ Achievement testing, e.g., Woodcock Johnson (WJ) – Test of Achievement Skills, Key Math | ▪ Grade and age equivalents for core academic abilities | ▪ Cognitive testing e.g., WJ Tests of Cognitive Abilities  
 ▪ Evaluation of strengths and weaknesses within academic testing | ▪ Validate cognitive findings within traditional academic assessment |

This is another chart from the Mount Sinai document. Under Cognitive Assessment, the section marked, “Assessment Focus” shows strategies for education professionals to identify and assess children with cognitive impairments.
### How Are Students with TBI Different From Other Student Classifications?

<table>
<thead>
<tr>
<th>AREAS OF DIFFERENCE</th>
<th>TRAUMATIC BRAIN INJURY</th>
<th>LEARNING DISABILITY</th>
<th>EMOTIONAL DISABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ONSET</strong></td>
<td>Sudden</td>
<td>Early</td>
<td>Slow, reactive to environment</td>
</tr>
<tr>
<td><strong>CAUSE</strong></td>
<td>One or more blows to the head accompanied by altered mental status, including loss of consciousness</td>
<td>Unclear</td>
<td>Unclear</td>
</tr>
<tr>
<td><strong>FUNCTIONAL CHANGES</strong></td>
<td>Marked contrast between pre- and post-onset capacities: memory loss, reduced processing speed, impaired executive functions</td>
<td>No before-after contrasts in capacities</td>
<td>Changes in functioning emerge slowly and gradually</td>
</tr>
<tr>
<td><strong>PHYSICAL DISABILITIES</strong></td>
<td>May include loss of balance, weakness, paralysis, visual/sensory changes, headaches</td>
<td>Poor coordination is the most frequent impairment</td>
<td>Physical disabilities unlikely</td>
</tr>
<tr>
<td><strong>EMOTIONAL DIFFICULTIES</strong></td>
<td>Labile mood, depression and anxiety frequently found</td>
<td>Prone to outbursts related to situation</td>
<td>Reactions attributable to distortions of reality</td>
</tr>
<tr>
<td><strong>BEHAVIORAL DIFFICULTIES</strong></td>
<td>Unpredictable: possible agitation, aggressiveness, restlessness, impulsivity</td>
<td>Restlessness, impulsivity</td>
<td>Variable, depending on diagnosis</td>
</tr>
<tr>
<td><strong>AWARENESS OF DEFICITS</strong></td>
<td>Limited-to-full awareness</td>
<td>Typically aware</td>
<td>Varies</td>
</tr>
<tr>
<td><strong>SKILLS AND KNOWLEDGE</strong></td>
<td>Pre-TBI learning is largely intact</td>
<td>Splintered and under-developed</td>
<td>Acquisition may be limited by emotional difficulties</td>
</tr>
<tr>
<td><strong>DIFFICULTIES WITH LEARNING</strong></td>
<td>Old information is easier to recall than new</td>
<td>New learning can be linked with past learning</td>
<td>New learning can be linked with past learning</td>
</tr>
<tr>
<td><strong>ACADEMIC DEFICITS</strong></td>
<td>Based on disrupted cognition</td>
<td>Based on type of learning disability</td>
<td>Not based on impaired cognition</td>
</tr>
<tr>
<td><strong>PEER INTERACTIONS</strong></td>
<td>Affected by cognitive deficits, behavioral difficulties, reduced social skills</td>
<td>Affected by poor social skills</td>
<td>Affected by behavioral difficulties</td>
</tr>
</tbody>
</table>

Although many difficulties experienced after TBI are similar to those found in students with learning disabilities and emotional/behavioral disorders, the **differences** are important, as they require different strategies for helping the student learn in school.

This last chart from the Mt. Sinai publication highlights these areas of difference. In looking at traumatic brain injury, one of the first things you notice is that it happens suddenly. It’s not a condition that the person has known all of their life. As a result, most students can remember that things were different before their injury. They remember when they were more in control, and able to handle tasks in an entirely different way.
School Interventions and Strategies

Interventions and strategies need to be specific to the deficits or difficulties noted post-injury.

- Progress Monitoring Model:
  - Monitor effectiveness of interventions
  - Monitor progress over time
  - Monitor changes in outcome
  - Make changes to interventions as needed

Current research indicates that targeted interventions and strategies work best. Once the area of difficulty is specified, and the intervention strategy is chosen, it’s important that progress be monitored carefully.

A specific intervention should produce the required outcome, and should be monitored over time with the intention of being revised as needed to ensure student success. Waiting until the end of a semester or school year is not appropriate. Increased frequency of monitoring can lead to the discovery of the ineffectiveness of an intervention before a student is too far “gone” to be successful.

Remember, a child who has sustained a brain injury often looks fine. That’s why we call TBI a Disability Often in Disguise. Cognitive recovery usually takes a lot longer than physical recovery. As a result, the student may be thought of as lazy or unmotivated and learning needs may go unrecognized.

Many of the interventions and strategies discussed in this session may not require an IEP or 504 plan, but do call for flexibility on the part of the teacher.

Awareness and knowledge about Traumatic Brain Injury, the types of problems it can cause, and the strategies that work best for educating students with TBI can give educators a great advantage in dealing with this difficult and unique challenge.

The information presented in this course has been provided by Brain Injury Association of Florida with support from the Florida Department of Health, Children’s Medical Services and the Brain & Spinal Cord Injury Program. Please see the accompanying handout section for more information and resources on TBI and Education in Florida.

Thank you for your interest in traumatic brain injury and education in Florida. You can contact Brain Injury Association of Florida on our toll-free helpline at 800-992-3442 or by visiting our website at www.biaf.org.