

# **RESOURCE PACKET**

## **Assessment of Traumatic Brain Injury**



# **GUIDELINES FOR REFERRAL**

## **DETERMINATION OF NEED FOR EVALUATION**

To best meet the needs of a student with a Traumatic Brain Injury (TBI), the evaluation team needs to be familiar with the medical and educational definitions of Traumatic Brain Injury, the stages of improvement from a traumatic brain injury, the severity classifications of traumatic brain injury and the child's pre-injury levels of functioning (e.g. academic levels, social/emotional functioning, utilization of Special Education services, etc.). The referral process for Special Education services should be started for any student with a medical diagnosis of TBI, supported by a letter from a licensed physician, which documents the injury. There is a subset of children that may or may not require Special Education services. These are children with a Mild Traumatic Brain Injury (MTBI). Special issues related to this subset of children will be discussed later in this chapter.

### **Clinical Definition of Traumatic Brain Injury**

The Brain Injury Association of America defines a traumatic brain injury as an insult to the brain, not of degenerative or congenital nature, caused by an external physical force that may produce a diminished or altered state of consciousness, which results in an impairment of cognitive abilities or physical functioning. It can also result in the disturbance of behavioral or emotional functioning. The reader is referred to the Federal and State definition of Traumatic Brain Injury in Section I of this manual.

### **Stages of Improvement – Cognitive Perspective**

Improvement from a traumatic brain injury can be divided into three phases. The stages of improvement will be discussed as separate and distinct stages; however, an individual's progression through stages of improvement from a TBI is highly individualized and does not always follow a stair step progression. The reasons for this vary from the overall severity of the injury, the type of medical care received by the child, the child's pre-injury health, etc. A traumatic brain injury can impact a student's cognitive, physical, and/or social and emotional skills. For the purposes of determining if a student needs an evaluation for Special Education services, the Stages of Improvement will be discussed from a cognitive perspective. The stages of improvement are broken into the Early Phase of Improvement, Middle Phase of Improvement, and Late Phase of Improvement (Ylvisaker & Szekeres, 1998).

### **Early Phase of Recovery**

This phase of improvement includes the period from early medical stabilization to consistent responsiveness to environmental events (Ylvisaker & Szekeres, 1998). This phase generally occurs in a hospital setting and may last for hours, days or weeks and in some cases may persist indefinitely (Ylvisaker & Szekeres, 1998). The following descriptors are characteristic of a child/adolescent in the *early phase of improvement*.

- severely decreased arousal/alertness
- no evidence of encoding or storage of new information
- minimal awareness of self and current condition
- marginally purposeful activity
- little to no assistance given for daily care
- severely limited communication
- profound confusion or disorientation to person, place, time and condition

### **Middle Phase of Improvement**

The middle phase of improvement is characterized by the child/adolescent being alert and responsive; however, the child/adolescent is typically confused and disoriented. The child/adolescent may be receiving inpatient rehabilitation services at this time although it is not unusual for a child/adolescent in this phase of improvement to be at home and return to school. The following descriptors are characteristic of a child/adolescent in the *middle phase of recovery*

- short attention span
- recognition of information is stronger than free recall
- impulsivity, severely impaired safety and social judgment
- poor awareness of deficits
- severely impaired learning of new skills
- confabulation
- impaired social perception
- general slowness

### **Late Phase of Improvement**

At this phase of improvement, most children and adolescents are generally oriented, goal directed and demonstrate purposeful behavior. The child/adolescent will typically be in school by this time. The following descriptors are characteristic of a child in the *late phase of improvement*:

- weak concentration,
- memory problems,
- fair to good concrete reasoning in controlled settings,
- poor safety and social judgment,
- often normal digit span,
- shallow awareness of residual deficits,
- mild to severe deficits in executive functions, and
- generally goal directed behavior, but goals possibly unrealistic.

## Severity Level of TBI from a Medical Perspective

Determining the severity level of a traumatic brain injury is difficult. The following tools are routinely utilized to determine the severity of the initial injury:

- Glasgow Coma Scale (GCS) – the length of coma, and
- the length of Post Traumatic Amnesia (PTA).

This information is routinely found in the “History and Physical Discharge Report” completed by the treating physician during the acute hospitalization.

The GCS is a scale utilized by physicians at the time of injury and shortly after to determine the severity of injury and to note improvement or deterioration. The GCS consists of three subtests: best eye, best verbal and best motor response. Scores on the GCS have a range of three (no response) to fifteen (alert and oriented). The following is the severity level of a TBI as rated by the GCS:

- Mild            GCS    13 – 15
- Moderate    GCS    9 – 12
- Severe        GCS    3 – 8

The length of coma is also utilized to help identify the severity level of a traumatic brain injury. Research has found that six hours or more of coma indicates a severe traumatic brain injury (Christensen, 2001). The International Classification of Diseases classifies severity of traumatic brain injury as follows:

- Mild            less than one hour of coma
- Moderate    1 – 24 hours of coma
- Severe        24 or more hours of coma

The length of the period of post traumatic amnesia (PTA) is the third major predictor of severity of a traumatic brain injury. Post traumatic amnesia is the period of time following the initial injury characterized by confusion and disorientation and the inability to remember ongoing events. Many rehabilitation professionals feel that the length of PTA is the most useful indicator of the severity of the TBI.

- Mild            <1 hour
- Moderate    1 – 24 hours
- Severe        1 – 7 days
- Very severe   >7 days

## **MILD TRAUMATIC BRAIN INJURY**

The following definition of Mild Traumatic Brain Injury was developed by the Mild Traumatic Brain Injury Committee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation Medicine. It was formally published in the Journal of Head Trauma Rehabilitation 1993:8(3): 86-87. The definition is:

*A patient with mild traumatic brain injury is a person who has had a traumatically induced physiological disruption of brain function, as manifested by a least one of the following:*

1. *any period of loss of consciousness;*
2. *any loss of memory for events immediately before or after the accident;*
3. *any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused); and*
4. *focal neurological deficit(s) that may or may not be transient; but where the severity of the injury does not exceed the following:*
  - ⇒ *post traumatic amnesia (PTA) not greater than 24 hours.*
  - ⇒ *after thirty (30) minutes, an initial Glasgow Coma Scale (GCS) of 13-15; and*
  - ⇒ *loss of consciousness of approximately 30 minutes or less.*

### **Symptoms of a Mild Traumatic Brain Injury**

- a. cognitive deficits – a reduction in attention, concentration, perception, memory, speech/language or executive functioning skills that cannot be completely accounted for by emotional state or other causes;
- b. behavioral changes and emotional changes – irritability, quickness to anger, disinhibition and/or emotional lability that cannot be accounted for by a psychological reaction to physical or emotional stress or other causes; and
- c. physical symptoms – including nausea, vomiting, dizziness, headache, blurred vision, sleep disturbance, fatigue or other sensory loss that cannot be accounted for by peripheral injury or other causes.

## Red Flags

Ylvisaker, Feeney & Mullins (1995) provide a list of “Red Flags” to assist educators in identifying students with a Mild Traumatic Brain Injury. They note that the behaviors of the student must be compared to the student’s performance prior to the injury. The “Red Flags” fall into three distinct categories.

1. Attendance
  - Unexpected absences from school or from specific classes
  
2. Cognitive/academic performance
  - inattentiveness beyond what is normally expected of the student
  - academic performance lower than before the injury
  - weak orientation to task (“spacey”)
  - difficulty shifting from task to task (inflexible)
  - relatively slow performance
  - delayed responses
  - difficulty remembering new information or assignments
  - difficulty organizing large tasks
  - unexpectedly poor comprehension of large reading assignments
  
3. Social/behavioral performance:
  - unexpected conflicts with peers
  - inappropriate or impulsive behavior in class
  - disrespectful behavior in relation to the teacher
  - excessive moodiness
  - unexpected mood swings (e.g. silliness alternating with tears)
  - excessive tiredness

If the above listed symptoms last beyond four weeks, a formal referral for Special Education services is indicated.

## **GUIDELINES FOR EVALUATION**

A formal evaluation of a student's cognitive/communicative, academic and social/emotional/behavioral skills is not specifically required for a student to be deemed eligible for special education services under the category of Traumatic Brain Injury. The following are descriptors of the cognitive, social/behavioral and physical challenges that are important to consider when and if a formal evaluation is indicated to determine eligibility.

### **COGNITIVE CHALLENGES**

While children often reacquire physical skills and appear to be back to normal, a traumatic brain injury can significantly affect and impact the ability to use cognitive skills in all aspects of function and independence. Specific cognitive skill areas are vulnerable.

#### **Attention**

Successful school performance requires the ability to sustain attention for periods of time, to alternate attention between two tasks such as copying from the board (looking and writing) and to divide attention such as listening to the teacher and taking notes simultaneously. These attention problems are extremely pervasive following a traumatic brain injury, particularly in the early and middle stages of improvement. Most often these attention problems cannot be identified by observing the student.

#### **Perception**

Children with traumatic brain injuries can often demonstrate good visual and hearing acuity but have problems interpreting incoming information. Most often this is due to the inability to quickly scan the knowledge base for known information related to the stimuli and to integrate known factors with new aspects being perceived. This results in lost or incomplete information which impacts learning with increasingly detrimental impact. The cumulative effect of faulty or incomplete perception contributes to traumatic brain injury problems not being manifested initially but becoming more severe with time as the injury increases.

#### **Memory**

Access to previously acquired information is more likely to be spared or less impacted following a traumatic brain injury. For this reason children who are tested with routine, structured standardized measures may give the impression of relatively high functioning. Memory for new and ongoing events is challenged and makes it difficult for a child to learn without specific accommodations. Effective strategies include tying new information to old facts, repeating and actively encoding information through sensory associations, using external memory aids to support concept acquisition and previewing classroom material prior to lecture.

## **Language**

Children with a traumatic brain injury can often converse in a general way. Many are completely intelligible in terms of speech production skills.

*Discourse skills* or the organization of a substantial amount of language, either in speaking or writing, is affected. Problems center on the amount of information expressed, the coherence or logical organization of the information and the use of appropriate linguistic markers for clear communication of complex ideas. Abstract language such as understanding of humor, popular sayings, colloquial speech, figures of speech and irony is also challenging.

*Word fluency* or the ability to rapidly retrieve the appropriate word for each context, is particularly vulnerable. This decreases the flow of speech and also contributes to awkward and incomplete expression of ideas. Maintaining a fluid ever-changing conversation and managing topic shifts is difficult. The use of language in different social settings and situations to appropriately reflect social competence is also affected by a traumatic brain injury.

## **Problem-Solving/Reasoning**

The impact of attention, memory and language difficulties severely impacts the ability to reason and problem solve. In order to effectively function in this area one must consider a variety of aspects to a problem, analyze the pros and cons and select an appropriate action. Problems often encountered by this population include the inability to generate more than one possible solution, the inability to inhibit acting until a path for action is chosen, the inability to mentally manipulate several alternative actions while the best action is selected and the inability to draw from previous experiences in choosing the best alternative. Similarly, reasoning requires the integration of information with rules of logic and the experience base. The sorting and analysis required to problem solve is often beyond the basic foundational cognitive skills accessible to a child with a traumatic brain injury.

## **Executive Functions**

Frontal lobe damage in particular affects the function of children with TBI. They are unable to organize, plan and execute activities and profit from the feedback and corrective actions that stem from self-monitoring and self-regulation. For this reason systems that structure and cue these children are especially necessary in order to free their attention for the learning component. The need to internalize controls and develop self-monitoring skills, which mark the transition from elementary to middle and high school environments often trigger the emergence of challenges for children who may have functioned sufficiently well in the more predictable early learning environment.



## **ASSESSING COGNITIVE SKILLS**

Typically, structured tests that isolate specific skill areas are utilized by many disciplines to determine a child's level of function. It is critical to understand that structured tests control for and mask the key deficits a child with traumatic brain injury experiences. Many of these children, especially in the first year post-injury, are able to access previously learned information. Given the structure of a standardized test, which is typically characterized by a quiet environment, clear directions, one-on-one guidance and feedback from an examiner, controlled and often short stimuli, and organized presentation of material in a hierarchical fashion, the child with a traumatic brain injury may perform at age level and/or close to baseline. However, most children with a significant traumatic brain injury have suffered some damage to the frontal and prefrontal regions of the brain. These structures are responsible for the coordination and execution of functional activities that require integration of information from a variety of brain regions. For example, a child may be able to retrieve the name of an object in a quiet setting when given ample processing time and one stimulus per turn, which is a vocabulary task found in many evaluation measures. However, understanding conversation and participating by expressing oneself in response requires a coordinated set of activities, including:

- a search of the memory store for meaning even when the word may have been incompletely perceived
- an analysis of which nuance of the word fits the particular context
- an interpretation of visual information which may include facial gestures and body postures
- knowledge of when it is appropriate to respond, to whom the response should be directed and how much of a response to give

Children with traumatic brain injury are often able to execute single, isolated components of these tasks but lack the integrating direction provided by the prefrontal and frontal lobes to perform tasks that require coordination and association between different brain regions.

The use of standardized assessments of individual cognitive areas is most helpful in isolating specific aspects of cognition that may be strengths or particular challenges. For example, memory tests that differentiate encoding from retrieval skills and that highlight a child's natural inclination to use strategies, such as the California Verbal Learning Test, are helpful in guiding intervention strategies for new learning. A number of standardized tests useful for this population that focus on process rather than content are listed in the appendix. Nevertheless, assessment should include observation of functional activities in everyday challenging settings, particularly when structured tests do not reveal challenges for a child with traumatic brain injury. Although deficits may be circumscribed to the executive organizing, planning and monitoring roles of the frontal brain region, these skills are essential for independent function, particularly in a learning environment.

## **Emotional and Behavioral Aspects**

Students with Traumatic Brain Injury are vulnerable to significant behavioral challenges due to the high incidence of frontal lobe involvement. Due to the manner of the injury (striking front of head on dashboard, etc.) students are highly susceptible to injury to the frontal lobes which are located behind the forehead. Listed below are some of the characteristic behaviors that are exhibited by students with Traumatic Brain Injury:

- disinhibited, socially inappropriate and possible aggressive behavior
- impaired initiation
- inefficient learning from consequences
- perseverative behavior
- impaired social perception and interpretation

Students with Traumatic Brain Injury may not demonstrate social/emotional and/or behavioral challenges for months to years after an injury due to the developmental nature of the frontal lobes. The peak periods for growth and maturation of the frontal lobes are between birth to five (0 – 5) years of age and seventeen to twenty-one (17 – 21) years of age. Students with Traumatic Brain Injury tend to grow into their injury. The following are a listing of some delayed characteristics that might be exhibited (Ylvisaker, 1999):

- behavior problems associated with decreasing external control and an inability to meet the expectation for increasing behavioral self-regulation
- inability to meet increasing social demands associated with puberty
- difficulty managing increasing environmental stressors
- continued difficulty reading social cues
- inability to profit from feedback
- hypersexuality
- social withdrawal
- loss of social networks
- possible perception of differences of self and others as representing a psychiatric problem

## **Cautions in Using Standardized Evaluations**

The most accurate information concerning behavioral and social/emotional levels of functioning for students with Traumatic Brain Injury is derived from anecdotal reports. Use of standardized behavior checklists, etc. can give an unclear picture of the student's social/emotional status and may not give a correct interpretation of the underlying cause of the behavioral challenges. It is best to gather information from a variety of sources and environments and compare to pre-injury status. An example of a recently developed interview tool is the BRIEF (Behavior Rating Inventory of Executive Function). Individuals to be interviewed include:

- the student,
- the student's parents,
- the student's teachers (past and present),
- support staff at the school, and if possible
- the hospital/rehabilitation personnel.

### **Physical Aspects of Traumatic Brain Injury**

Determining levels of functioning of the physical characteristics of traumatic brain injury are twofold. Typically the impairments are in the areas of fine/gross motor and health issues.

#### ***Common physical characteristics are:***

- hemiplegia
- double vision
- visual/perceptual difficulties
- gait deviations
- switched hand dominance
- tactile defensiveness

#### ***Common health issues are:***

- headaches
- fatigue
- seizure activity
- anxiety
- metabolic disorders
- precocious puberty

Physical recovery from a traumatic brain injury is typically rapid. This quick recovery of physical functioning can easily mask the remaining long term recovery of cognitive, emotional and behavioral skills. It is important to recognize the impact that these common health issues have on the student's behavioral, cognitive and emotional levels of functioning following a traumatic brain injury.

## DETERMINATION OF ELIGIBILITY

A student meets eligibility standards as a student with Traumatic Brain Injury and may receive special education services when the following conditions and procedures have been met:

- a. an appropriate **medical statement** obtained from a licensed physician;
- b. **an interview** with the child's parent or caregiver;
- c. documental of the student's **educational history** and **current levels of educational performance**;
- d. a **functional** assessment of the student's **current cognitive/communicative abilities**;
- e. documentation of the student's **social adaptive behaviors** which relate to the traumatic brain injury;
- f. documentation of the student's **physical adaptive behaviors** which relate to traumatic brain injury;
- g. documentation of **impact on the student's level of educational performance**; and
- h. a demonstration of **need for special education services**.

## RECOMMENDED PRACTICES FOR CONSISTENT IDENTIFICATION

Nationally, students with Traumatic Brain Injury are consistently underidentified or incorrectly certified for special education services. There are a number of reasons for this challenge in correctly identifying children with Traumatic Brain Injury. Compared to students with Specific Learning Disabilities, Mental Retardation and Speech and Language Impairments, students with Traumatic Brain Injury are a low incidence, yet high prevalence disability group. According to the 22nd Annual Report by OSEP, 12,933 students in the United States are receiving special education services under the eligibility category of Traumatic Brain Injury. In 1996 the Tennessee's Legislature mandated a *Statewide Registry* to identify children and adults admitted to hospitals with a medical diagnosis indicating Traumatic Brain Injury. According to the statewide registry, there were 2,688 children between the ages of three (3) and sixteen (16) injured severely enough in 1996 through 2000 to be admitted to a hospital with the medical diagnosis of Traumatic Brain Injury. The Annual Statistical Report for Fiscal Year 1999-2000 completed by the State of Tennessee Department of Education revealed that 335 children were found eligible for special education services with Traumatic Brain Injury. These students account for 1.8% of the students served by special education in the State of Tennessee (335/178,976). This information was gathered from Table 11: Number of Children with Disabilities receiving Special Education Services: 1999-2000. This number of students identified as eligible and receiving special education services represents a huge discrepancy when compared with the number of children reported in the Department of Health's registry.

As noted earlier, there are a variety of reasons for this discrepancy. Students with Traumatic Brain Injury (with a medical diagnosis) may not always require special education services. A small number of these students will be quite fortunate and have no residual sequelae from their injury. Another group of students with Traumatic Brain Injury is successfully served with Section 504 Implementation Plans. These students need to be carefully monitored by a Student Support Team. A high school student with a mild brain injury may need short term accommodations to cope with decreased processing speed and reduced new learning skills. Copies of class notes, oral examinations, leaving classes five minutes early and highlighted texts are examples of strategies that allow the student to stay in school while healing occurs and skills return to baseline. Generally, given appropriate accommodations, most students with a mild Traumatic Brain Injury will recover cognitive skills as long as they are not unduly stressed during the healing period.

The correct identification of students with Traumatic Brain Injury serves to help school personnel better understand the child and the causes for the underlying cognitive/communicative, social/behavioral and academic challenges seen as a result of the injury. It allows the school-based team to effectively plan for and intervene with the child. It is certainly in the best interest of the student, the family and the school that children and adolescents with Traumatic Brain Injury be accurately identified by special education services. To better assist the schools in Tennessee, the following list of available services will assist in providing information regarding Traumatic Brain Injury and services provided within the State of Tennessee.

1. Department of Health Traumatic Brain Injury Program  
1-800-882-0611

*The Department of Health TBI Program can provide information and referral services; contact names and numbers of Service Coordinators for individuals throughout the State of Tennessee with funding provided by the DOH TBI Program, and they can provide statistical information from the TBI Registry.*

2. The Tennessee Rehabilitation Center Traumatic Brain Injury Program  
Smyrna, TN.  
615-459-6811

*This program is funded by the Department of Human Services, Division of Rehabilitation Services. This program provides comprehensive vocational evaluations for students that are of working age with a Traumatic and/or Acquired Brain Injury. The TBI Program also provides comprehensive rehabilitation services to individuals with TBI. They serve individuals from the State of Tennessee with Traumatic and/or Acquired Brain Injury.*

3. The Brain Injury Association of Tennessee  
1-877-885-7511

*The Brain Injury Association of TN is a state affiliate of the Brain Injury Association of America (National Advocacy Organization).*

4. Project BRAIN  
615-383-9442

*Project BRAIN is a resource and training network for educators, families, and health care professionals who support students in Tennessee with Traumatic Brain Injury.*

# **ASSESSMENT RESOURCES**

**(Note: All Forms included in this section are OPTIONAL.)**

**Parent Release of Information**

**Physician's Medical Statement**

**TBI Confidential Parent Interview and Questionnaire**

**TBI Educational Records Review and Teacher's Observation**

**Symptoms Checklist of Traumatic Brain Injury**

# Parent Release of Information

(For Traumatic Brain Injury)

Name: \_\_\_\_\_  
Date of Birth: \_\_\_\_\_  
School: \_\_\_\_\_  
Date Sent: \_\_\_\_\_

Dear Parent or Guardian:

Your child is being evaluated for special education services following his/her head injury. According to *Tennessee State Rules and Regulations* for Special Education programs, an appropriate medical statement must be obtained from your child's licensed physician before eligibility for services can be determined. In order to comply with federal law, your written permission is required before the school system can obtain this information from your doctor.

Please complete the physician contact information and sign the permission line as indicated below. Return this form to your child's school as soon as possible. Upon receipt of the *Parent Release of Information*, this release and required medical information related to your child's injury will be sent to his/her physician. The medical form is to be completed by the doctor and returned to \_\_\_\_\_ (*Special Education Teacher*) so that we may determine eligibility and appropriate special education services.

Physician's Name \_\_\_\_\_  
Telephone Number \_\_\_\_\_  
Street Address \_\_\_\_\_  
City/State/Zip code \_\_\_\_\_

I, \_\_\_\_\_, permit my physician to release medical and neurological information related to my child's head injury to the \_\_\_\_\_ School System.

\_\_\_\_\_  
Parent's Signature

Sincerely,

\_\_\_\_\_  
Special Education Case Manager



# Physician's Medical Statement

(for Traumatic Brain Injury)

Student's Name: \_\_\_\_\_ Date of birth: \_\_\_\_\_ Age: \_\_\_\_\_  
Parent(s): \_\_\_\_\_ Address: \_\_\_\_\_

.....  
***This student has been referred for evaluation for special education services. Medical information is required in order to determine eligibility for services and develop appropriate educational programming. This information will be confidential and used only by persons directly involved with the student.***  
.....

Diagnosis/Etiology \_\_\_\_\_ Treatment \_\_\_\_\_

Prognosis \_\_\_\_\_

Medication _____	Type _____	Dosage _____
Medication _____	Type _____	Dosage _____
Medication _____	Type _____	Dosage _____

Date Expected to Return to School, if applicable \_\_\_\_\_

1. Date of student's head injury \_\_\_\_\_ Date of initial contact with the student: \_\_\_\_\_
2. Was the student hospitalized?  Yes  No  
If yes, how long was the student hospitalized? \_\_\_\_\_
3. Was the student unconscious?  Yes  No  
If yes, for how long? \_\_\_\_\_
4. Is this student still receiving medical care due to the injury?  Yes  No  
If no, date of discharge: \_\_\_\_\_
5. Has this student received rehabilitation services due to the head trauma?  Yes  No  
If yes, what specific skills or abilities have been the focus of rehabilitation (i.e., expressive communication, fine-motor skills, gross motor skills, etc.)? \_\_\_\_\_

\_\_\_\_\_  Yes  No  
Is the student still receiving rehabilitation services?  
How often? \_\_\_\_\_

6. Is there any educationally relevant physical and/or neurological information that would be useful in developing this student's educational program?
7. Please check one:
  - a)  This child is physically able to attend classes in his/her regular school.
  - b)  This child is able to attend classes in regular school for an abbreviated day.
  - c)  This child is unable to attend classes in regular school, but is able to receive home/hospital instruction. (If checked, please explain the risk to this child or other children if s/he returns to school at this time.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
*Signature of Physician*

\_\_\_\_\_  
*Date*

# TBI Confidential Parent Interview and Questionnaire

To be completed at Parent Interview

## SECTION I

### Student Information

Name: \_\_\_\_\_ Form completed by: \_\_\_\_\_

Date: \_\_\_\_\_ Date of birth: \_\_\_\_\_ Age: \_\_\_\_\_

### Parents/Legal Guardians (Check all that apply.)

#### **With whom does this child live?**

\_\_\_\_ Both parents    \_\_\_\_ Mother    \_\_\_\_ Father    \_\_\_\_ Stepmother    \_\_\_\_ Stepfather

\_\_\_\_ Other: \_\_\_\_\_

### **Parents'/Legal Guardians' Name(s):**

Address: \_\_\_\_\_

Home phone: \_\_\_\_\_ Work phone: \_\_\_\_\_ Cell phone: \_\_\_\_\_

List names/ages/relationships of people at home: \_\_\_\_\_

**Are there any languages other than English spoken at home?**     Yes     No

If yes, what language(s)? \_\_\_\_\_ By whom? \_\_\_\_\_ How often? \_\_\_\_\_

### Physician Information

Doctor's Name: \_\_\_\_\_ Date of most recent visit: \_\_\_\_\_

Address: \_\_\_\_\_

                    Number                      Street                      City/State                      Zip code

Have you signed the *Parent Release of Information* (to obtain medical information from the physician)?     Yes     No

*(If No, obtain this signature and send Release of Information and Physician's Medical Statement forms to the doctor).*

## SECTION II

### Trauma History

1. Before the injury, did your child experience any medical or educational difficulties?

Yes  No

If yes, what were they? Medical: \_\_\_\_\_

\_\_\_\_\_

Educational: \_\_\_\_\_

\_\_\_\_\_

2. When did the injury occur? \_\_\_\_\_

3. How old was your child when the injury occurred? \_\_\_\_\_

4. Describe the circumstances of your child's injury? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Was your child unconscious?  Yes  No

If so, how long? \_\_\_\_\_

6. Was your child hospitalized overnight?  Yes  No

If so, how long? \_\_\_\_\_

7. Has your child received medical rehabilitation services due to the injury?

Yes  No

If so, how long? \_\_\_\_\_

8. Does your child continue to receive medical rehabilitation services?  Yes  No

9. Have you received educational recommendations from rehabilitation personnel?

Yes  No

10. Has your child's medical condition improved since the injury?  Yes  No

In what way(s)? \_\_\_\_\_

\_\_\_\_\_

11. Is your child still receiving medical care for the injury?  Yes  No

If yes, describe: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## SECTION III

### Areas of Concern

*Explain in detail each area of concern:*

1. Health or Medical Problems:

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2. Vision Problems:

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3. Hearing Problems:

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4. Speech and/or Language Problems:

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5. Motor Problems:

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6. Behavioral/Emotional Problems:

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7. Personality Changes:

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8. Educational/Learning Ability Problems:

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9. Other:

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# TBI Educational Records Review and Teacher's Observation

## SECTION I

### A. Educational History

Review of educational records prior to Injury

1. Attendance: (check one)     Adequate             Problematic
2. Have there been any retentions?  Yes  No If yes, grade(s) retained: \_\_\_\_\_
3. Behavior: (check one)     Adequate             Problematic
4. Prior to the student's injury, did the student participate in any Special Programs (i.e., Special Education, 504 Plan, Title I, Title III)?     Yes  No If yes, *specify the services and educational area of intervention targeted.* \_\_\_\_\_

*If student had an IEP prior to the injury, complete the following information:*

Primary Disability: \_\_\_\_\_ Eligibility Date \_\_\_\_/\_\_\_\_/\_\_\_\_  
 Secondary Disability: \_\_\_\_\_ Eligibility Date \_\_\_\_/\_\_\_\_/\_\_\_\_  
 Related services: \_\_\_\_\_  
 Special education hours: \_\_\_\_\_  
 Programs listed in IEP:  
 \_\_\_\_ Inclusion \_\_\_\_ OT/PT \_\_\_\_ Consultation \_\_\_\_ Resource \_\_\_\_ S/L Therapy  
 Other: \_\_\_\_\_

5. Review of vision and hearing screenings:  
 Vision Screening:     Pass  Fail \_\_\_\_\_ Last date of screening \_\_\_\_ Wears glasses  
 Hearing Screening:  Pass  Fail \_\_\_\_\_ Last date of screening \_\_\_\_ Wears hearing aid(s)

#### 6. Grades

Report student's **annual grade averages** for the past 3 years in each of the following areas

Subject	Year: _____	Year: _____	Year: _____
Reading			
Math			
English/Language Arts			
Science			
Social Studies			

7. Statewide Assessments

**Tennessee Comprehensive Assessment Program (TCAP) Achievement Assessment Results**

Report Scores – BP (Below Proficient), P (Proficient) and A (Advanced) for the last 3 years

Test	Date of Test ____/____/____	Date of Test ____/____/____	Date of Test ____/____/____
Total Reading/Language Arts			
Total Language			
Total Math			
Science			
Social Studies			

**TCAP and TCAP-Alt PA Writing Assessment Results**

Report Scores – 1 to 6 (Note: The TCAP-Alt Writing Assessment is not a requirement if the TCAP-Alt PA entry in Reading/Language Arts is submitted in 5<sup>th</sup>, 8<sup>th</sup>, and 11<sup>th</sup> grades.)

<u>Grade</u>	<u>Score</u>	<u>Grade</u>	<u>Score</u>	<u>Grade</u>	<u>Score</u>
5		8		11	

**TCAP Gateway or End-of-Course Test Results (report most recent)**

<u>Content Area</u>	<u>Assessment</u>	<u>Pass</u>	<u>Fail</u>	<u>Test Score</u>	<u>Test Date</u>
English I					
English II (Gateway)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
English III	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
Algebra I (Gateway)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
Geometry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
Algebra II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
U.S. History	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
Biology I (Gateway)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
Chemistry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____
Physics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		____/____/____



## TBI Social/Adaptive Abilities Checklist

3. Based on observation of this student's current social adaptive behaviors, please rate the occurrence of the following (0 = Never, 1 = Seldom, 2 = Occasionally, 3 = Frequently).

Does this student exhibit:

- social disinhibition?
- irritability?
- impaired judgment?
- low frustration tolerance?
- depression/anxiety?
- egocentricity/insensitivity?
- social withdrawal?
- difficulty understanding humor?
- limited insight?
- difficulty changing behavior, even after feedback?
- perseveration?
- impaired attention?
- fatigue?
- aggression?
- confrontational behavior?
- impulsivity?
- emotional lability/mood swings?
- low self-esteem?
- (other): \_\_\_\_\_
- (other): \_\_\_\_\_

## TBI Physical/Adaptive Behaviors Checklist

4. Based on observation of this student's current physical/adaptive behaviors, please rate the occurrence of the following (0 = Never, 1 = Seldom, 2 = Occasionally, 3 = Frequently).

Does this student exhibit:

- noticeable loss of fine-motor skills (i.e., handwriting skills)?
- noticeable loss of gross-motor skills or a change in gait?
- difficulty moving through the school environment?
- difficulty taking care of personal needs (eating, toileting, dressing, etc.)?
- difficulty completing written school work?
- difficulty participating in school activities?
- difficulty participating in recreational activities?
- difficulty expressing or acquiring information?
- (other): \_\_\_\_\_
- (other): \_\_\_\_\_
- (other): \_\_\_\_\_
- (other): \_\_\_\_\_
- (other): \_\_\_\_\_



## Symptoms Checklist of Traumatic Brain Injury

A combination of the following symptoms is typical following a traumatic brain injury. Most individuals will experience several of the symptoms in each of the categories. It is the combination of three to six manifestations in each of the three categories which assists in identifying problems related to concussive injuries. Positive identification of these symptoms should indicate that there is a change from pre-injury function.

Physical	Cognitive	Affective
<p style="text-align: center;"><b>Somatic</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Nausea</li> <li><input type="checkbox"/> Vomiting</li> <li><input type="checkbox"/> Headache</li> <li><input type="checkbox"/> Sleep disturbances</li> <li><input type="checkbox"/> Fatigue</li> <li><input type="checkbox"/> Lethargy</li> </ul> <p style="text-align: center;"><b>Sensory</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Dizziness</li> <li><input type="checkbox"/> Uncoordination</li> <li><input type="checkbox"/> Balance difficulties</li> <li><input type="checkbox"/> Changes in smell</li> <li><input type="checkbox"/> Taste alterations</li> <li><input type="checkbox"/> Blurred vision</li> <li><input type="checkbox"/> Double vision</li> <li><input type="checkbox"/> Tinnitus</li> <li><input type="checkbox"/> Hypersensitivity to light/noise “environmental intolerance”</li> <li><input type="checkbox"/> Hearing problems</li> </ul>	<p style="text-align: center;"><b>Problems with:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sustained, alternating, and/or divided attention</li> <li><input type="checkbox"/> Memory for prospective events and new learning</li> <li><input type="checkbox"/> Speed of information processing</li> <li><input type="checkbox"/> Capacity for information processing</li> <li><input type="checkbox"/> Word finding</li> <li><input type="checkbox"/> Organization of thoughts</li> <li><input type="checkbox"/> Organization of expression</li> <li><input type="checkbox"/> Mental flexibility</li> <li><input type="checkbox"/> Mental control</li> <li><input type="checkbox"/> Initiation</li> <li><input type="checkbox"/> Integrative thinking</li> <li><input type="checkbox"/> Problem solving/judgment</li> </ul> <p style="text-align: center;"><b>Cognitive changes reflected by reports of:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Longer time for task completion</li> <li><input type="checkbox"/> Slower to respond to questions</li> <li><input type="checkbox"/> Decreased ability to concentrate</li> <li><input type="checkbox"/> Feeling overly distracted</li> <li><input type="checkbox"/> Unable to pay attention in noisy environments</li> <li><input type="checkbox"/> Forgetting what one was about to say or do</li> <li><input type="checkbox"/> Becoming tired more easily</li> <li><input type="checkbox"/> Feeling that hard tasks require extra effort</li> <li><input type="checkbox"/> Unable to do several tasks at once</li> <li><input type="checkbox"/> Forgetting where items were placed or the location of familiar places</li> <li><input type="checkbox"/> Forgetting the faces and names of new acquaintances</li> <li><input type="checkbox"/> Unable to organize oneself as reflected by order of work and personal appearance</li> </ul>	<p style="text-align: center;"><b>Behavioral</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Agitation</li> <li><input type="checkbox"/> Irritability</li> <li><input type="checkbox"/> Impatience</li> <li><input type="checkbox"/> Egocentricity</li> <li><input type="checkbox"/> Social withdrawal</li> <li><input type="checkbox"/> Apathetic</li> <li><input type="checkbox"/> Mood swings</li> <li><input type="checkbox"/> Disinhibition</li> <li><input type="checkbox"/> Defensiveness</li> <li><input type="checkbox"/> Confrontational attitude</li> </ul> <p style="text-align: center;"><b>Emotional</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Anger</li> <li><input type="checkbox"/> Depression</li> <li><input type="checkbox"/> Frustration</li> <li><input type="checkbox"/> Anxiety</li> <li><input type="checkbox"/> Irrational fears</li> <li><input type="checkbox"/> Insecurity</li> <li><input type="checkbox"/> Guilt</li> <li><input type="checkbox"/> Feeling helpless</li> </ul>

# **REFERENCES AND GLOSSARY OF TERMS**

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## Glossary of Terms

**AAC/augmentative and alternative communication** – a collection of communication strategies and options to assist persons who cannot meet their communication needs through natural speech

**absence seizure/petit mal seizure** – a generalized seizure with a disruption of consciousness for a few seconds and no motor component

**acalculia** – an acquired deficit that limits performance of basic arithmetic computations

**activities of daily living/ADL** – refers to functional skills such as dressing, grooming, and feeding oneself that are necessary for independent living

**acute cerebral swelling** – increased blood flow to the brain occurring because of elevated blood pressure or excessive dilation of cerebral vasculature and resulting in increased blood volume within the cranium; causes brain damage

**ADL/Activities of daily living** – refers to functional skills such as dressing, grooming, and feeding oneself that are necessary for independent living

**agnosia** – literally means “not to know”; usually preceded by an adjective (e.g., visual agnosia, auditory agnosia, verbal agnosia, etc.) specifying the sensory modality through which the person cannot assign meaning to information— example: A person with auditory agnosia has intact hearing but cannot assign meaning to the sounds that he/she hears

**alexia** – an acquired reading deficit

**alexia with agraphia** – an acquired reading deficit that is accompanied by problems with writing

**alexia without agraphia** – an acquired reading deficit in which the person retains the ability to write

**aneurysm** – the ballooning out of a weakened portion of a blood vessel that is in danger of rupturing

**angiogram** – a diagnostic medical procedure in which a contrastive medium is injected into the blood stream to allow visualization of the blood vessels that supply the brain

**anomia** – an inability to recall the names of common objects

**anoxia** – lack of oxygen to the brain

**anterior** – toward the front

**anterograde amnesia** – a memory deficit in which a person cannot form new memories or learn new information subsequent to a traumatic injury

**aphasia** – an acquired language disorder

**apraxia of speech/verbal apraxia** – an acquired speech disorder in which the person can produce the sounds of speech but often rearranges the order of sounds in a word

**arachnoid** – the middle of three coverings of the brain

**ataxia** – a disturbance of muscular coordination due to cerebellar damage and characterized by impaired balance, tremors, and difficulties judging distances and strengths of movements

**athetosis** – an involuntary movement disorder characterized by slow, irregular writhing, or squirming movements of extremities, face, neck, or trunk

**atrophy** – shrinkage of muscle mass or brain tissue due to degeneration

**Broca's aphasia** – an acquired language disorder due to damage in Broca's area and characterized by nonfluent, effortful speech

**Broca's area** – an area in the frontal lobe of the dominant hemisphere that is important for speech and language

**cavitation** – the formation of gaseous bubbles in a liquid because of the impact of a swiftly moving object; brain damage occurs when gaseous bubbles form within brain cells and then burst as they return to a liquid state

**cerebellum** – a part of the brain located beneath the cerebral hemispheres that deals with muscle coordination, maintenance of muscle tone, and balance for activities such as walking and writing

**cerebral edema** – increased water content within the brain that can cause brain damage

**cerebral hemispheres** – right and left halves of the brain that contain the frontal, temporal, parietal, and occipital lobes; connected to one another by the corpus callosum

**cerebrum** – the brain

**chorea** – a movement disorder caused by damage to the extrapyramidal system and characterized by quick, random, involuntary movements

**circumlocution** – an evasive type of speech in which several words are used to express an idea that could be said with a single word

**cognitive rehabilitation/remediation** – intervention focusing on restoring any type of cognitive function (e.g., memory, attention, arousal, visual perception, hypothesis formation, initiation, problem solving, etc.)

**coma** – a period of impaired consciousness in which the person does not follow commands, has difficulty maintaining arousal, and shows minimal or no awareness of the environment and interaction with others; the duration of coma is often used as a prognostic indicator of eventual recovery

**compensatory device** – strategy or external aid that is deliberately used to achieve a goal that is difficult to attain because of impaired functioning

**complex partial seizure/partial complex seizure** – a partial seizure in which there is a loss of consciousness

**computerized axial tomography/CT scan/CT scan** – a type of two-dimensional x-ray imaging of the brain

**concussion** – condition in which there is impaired brain function due to a violent blow or impact to the head

**confabulation** – fabrication of events or experiences; often occurs as a result of memory impairment; giving answers or reciting experiences without regard for the truth

**contractures** – a chronic tightening of muscles that causes the limbs to assume contorted, flexed postures

**contralateral** – on the opposite side of the body from a reference point

**contrecoup injury** – lesion of the brain at the site directly opposite the point of impact

**contusion** – bruise

**convergent thinking** – determining relevant information to identify a main theme; for example, identifying what objects or situations have in common

**corpus callosum** – a bundle of nerve fibers that connects the two hemispheres of the brain

**cortex** – the outer surface of the brain

**coup injury** – lesion of the brain at the site of impact

**cranial nerves** – nerves that innervate the muscles of the head and neck and allow for the sensation of vision, hearing, taste, and smell

**craniotomy** – a surgical procedure in which the skull is opened to expose the brain

**CT scan/CAT scan/computerized axial tomography** – a type of two-dimensional x-ray imaging of the brain

**cytotoxic edema** – increased water content within the brain resulting from cell damage that increases the attraction of water to brain cell interiors; the resultant increased intracranial volume can contribute to brain damage

**deductive reasoning** – drawing conclusions based on global information; whole to part analysis

**deglutition** – swallowing

**dendrites** – the treelike fibers of a neuron that reach out toward other nerve cell

**denervation** – the cutting of nerves

**depressed skull fracture** – a break in the bones of the skull in which there is a visible indentation

**diadochokinesis** – rapid alternating movements such as those that occur during the rapid and repeated production of the word “buttercup”

**dichotic listening** – simultaneous presentation of two different auditory signals, one to each ear

**diffuse damage** – damage to multiple regions of the brain

**diplopia** – double vision

**disinhibition** – a lack of normal inhibition that contributes to many maladaptive characteristics of brain injury survivors such as carelessness in hygiene and dress, use of inappropriate words or gestures, and excessive talkativeness

**disorientation** – a lack of awareness of or confusion about time, place, and/or personal information



**divergent thinking** – generation of unique ideas; the ability to relate one’s knowledge to new ways of addressing problems or situations

**divided attention** – the ability to maintain attention to two or more tasks simultaneously

**dominant hemisphere** – the hemisphere of the brain that performs language functions; the left hemisphere is dominant in approximately 90% of right-handed individuals and 60% of left-handed individuals

**Dura mater** – the outermost membrane covering of the brain

**dysarthria** – a speech disorder in which the person has weakness or lack of coordination in the musculature used for speech production (e.g., the musculature of the lips, tongue, jaw, neck, larynx, or diaphragm)

**dyskinesia** – a movement disorder associated with lesions in the extrapyramidal system

**dysmetria** – an inability to judge the distance, power, or speed of a movement

**dysphagia** – swallowing difficulty

**dysprosody** – a disruption in the stress, timing, or melodic line of speech

**edema** – swelling

**EEG/electroencephalogram** – a graphic display of the brain’s electrical activity; often used to detect seizure activity

**electroencephalogram/EEG** - a graphic display of the brain’s electrical activity; often used to detect seizure activity

**emotional lability/lability** – poor control of the emotions such that laughing or crying is disproportionate to precipitating events

**epidural hematoma** – a collection of spilled blood between the skull and dura mater; also called an extradural hematoma

**etiology** – the cause of a disorder or disease

**evacuation of a hematoma** - a surgical procedure in which the spilled blood of a hematoma is drained

**executive functions** – skills involved in anticipating, setting goals, planning, self-regulating, incorporating feedback, and completing an intended activity

**extradural hematoma** – a collection of spilled blood between the skull and the dura mater; also called an epidural hematoma

**extrapyramidal system** – a motor system of the brain that indirectly controls muscle movements

**fasciculation** – twitching of muscle fibers

**flaccid** – decreased muscle tone; flabby or limp muscles

**flat affect** – decreased use of facial expressions or gestures to communicate emotions, attitudes, and responses

**flexibility of thought** – the ability to shift from one idea, hypothesis, framework, or perspective to another; opposite of rigidity of thought

**focal damage** – damage limited to one region of the brain

**focal seizure/partial seizure** – a seizure in which there is electrical firing in a specific region of the brain

**focused attention** – the ability to maintain alertness to and interact with the environment on a rudimentary level

**frontal lobe** – a part of the brain important for personality, producing speech, processing language, initiating activities, and moving body parts

**full scale IQ** – an intelligence score based on a person's overall performance on all parts of the test

**gastrostomy tube** – a tube that is surgically inserted into the stomach and used for feeding

**generalized seizure** – a seizure that spreads throughout the cerebral cortex and almost invariably involves a total loss of consciousness

**Glasgow Coma Scale** – a standardized system for rating the severity of impaired consciousness; typically administered to a head injury survivor upon admission to the emergency room; often used as a prognostic indicator of long-term outcome

**grand mal seizure/tonic-clonic seizure** – a seizure in which the person experiences 10-30 seconds of tonic movements with marked extension or flexion of muscles and 15-60 seconds of clonic movements with rhythmic muscle group shaking; generally followed by headache, sleepiness, and confusion

**gustatory** – related to the sense of taste

**hematoma** – a localized pool of blood found outside the circulatory system

**hemianopsia** – loss of vision in one half of the visual field of each eye

**hemiparesis** – weakness or partial paralysis on one side of the body

**hemiplegia** – paralysis on one side of the body

**hemorrhage** – uncontrolled bleeding

**hydrocephalus** – an abnormally large amount of fluid in the ventricular system of the brain

**hypertonia** – excessive tension in the muscles

**hypotonia** – decreased muscle tone; flaccidity

**hypoxia** – reduced oxygen to the brain

**ICU** – intensive care unit

**inductive reasoning** – drawing conclusions given parts of information; part to whole analysis

**infarction** – a region of damaged tissue resulting from a decrease of oxygenated blood

**inferior** – below

**intracranial hematoma** – a collection of spilled blood within the tissues of the brain

**intracranial pressure** – the pressure of contents within the skull; a sharp, uncontrollable rise in intracranial pressure can cause brain damage or death

**ipsilateral** – on the same side of the body as a reference point

**ischemia** – a reduction in blood flow to a specific region

**jargon** – speech comprised largely of nonsense words

**lability/emotional lability** – poor control of the emotions such that laughing or crying is disproportionate to precipitating events

**lacrimal** – related to tearing of the eyes

**lateral** – to the side

**limbic system** – neural structures deep within the brain that are responsible for controlling memory functions and regulating emotional responses; includes the hippocampus, amygdala, septum, cingulate gyrus, and anterior thalamus

**magnetic resonance imaging/MRI scan** – a type of brain imaging that utilizes magnetic fields

**mastication** – chewing of food

**medial** – toward the middle

**meninges** – coverings of the brain—dura mater, arachnoid, and pia mater

**mnemonic devices** – strategies for enhancing memory skills

**MRI scan/magnetic resonance imaging** – a type of brain imaging that utilizes magnetic fields

**MVA** – motor vehicle accident

**nasogastric tube** – a tube inserted through the nose into the stomach and used for feeding

**neologism** – a meaningless, made-up word

**neuron** –a nerve cell

**neurotransmitter** – any one of numerous chemicals that modify or result in the transmission of nerve impulses between synapses.

**neuropsychology** – a branch of psychology that deals with the assessment of cognitive functions, such as memory and perception, and attempts to determine the site and mechanism of damage responsible for changes in cognitive functions

**nystagmus** – rhythmic movement of the eye in a vertical, horizontal, or rotary direction

**occipital lobe** – a part of the brain important for processing visual information

**olfactory** – related to the sense of smell

**oral apraxia** – an inability to sequence oral muscle movements in imitation of others or on command; (normal spontaneous oral movements typically occur during eating, swallowing, yawning, sucking, blowing, etc.)

**paraphasic errors** – errors in speech or language production in which words either contain extraneous sounds, deleted sounds, or mis-sequenced sounds or are substituted for other words

**paraplegia** – paralysis of both lower extremities

**paresis** – partial paralysis

**parietal lobe** – a part of the brain important for interpreting sensory information about body movement, pain, temperature, and proprioception

**partial complex seizure/complex partial seizure** – a partial seizure in which there is a loss of consciousness

**partial seizure/focal seizure** – a seizure in which there is electrical firing in a specific region of the brain

**partial simple seizure/simple partial seizure** – a partial seizure in which there is no disturbance of consciousness

**performance IQ** – an intelligence score based on a person's performance of subtests of the Wechsler Intelligence Test (WAIS-R, WISC-III, WPPSI-R) such as picture completion, picture arrangement, block design, object assembly, and digit symbol, coding, and mazes; provides an indication of perceptual organization and visual processing

**perseveration** – motor or verbal response that is inappropriately repeated over and over

**persistent vegetative state** – a condition in which a head injury survivor remains unresponsive for an extended period of time

**PET scan-positron emission tomography** – a type of brain imaging that shows how much and what parts of the brain are metabolizing glucose during the performance of various types of activities

**petit mal seizure/absence seizure** – a generalized seizure with a disruption of consciousness for a few seconds and no motor component

**physiatrist** – a physician who specializes in rehabilitation medicine

**pia mater** – the innermost covering of the brain

**posterior** – toward the back

**postmorbid** – after the time of injury

**post-traumatic amnesia/PTA** – a period of confusion extending from the time of injury until the individual can recall daily events for a 24-hour period; the duration of PTA is often used as a prognostic indicator of eventual recovery

**post-traumatic epilepsy** – a seizure disorder that results from Traumatic Brain Injury

**premorbid** – before the injury

**primary mechanisms of injury** –injuries that occur at the actual time of trauma

**proprioception** – awareness of the location of body parts in space and in relation to one another

**prosopagnosia** – an inability to recognize faces of familiar people

**PTA/post-traumatic amnesia** – a period of confusion extending from the time of injury until the individual can recall daily events for a 24-hour period; the duration of PTA is often used as a prognostic indicator of eventual recovery

**ptosis** – drooping of the eyelid

**pyramidal system** – a motor system of the brain that is responsible for controlling voluntary movements

**Quadriplegia** – paralysis of all four limbs

**Rancho Los Amigos Scale of Cognitive Functioning** – an eight point scale used for identifying the level of a head injury survivor’s functioning

**residual impairments** – long-lasting or persistent effects of a brain injury

**retrograde amnesia** – a memory impairment affecting the recall of events or experiences that occurred prior to the traumatic injury

**rigidity of thought** – the inability to shift from one idea, hypothesis, framework, or perspective to another; opposite of flexibility of thought

**rotational acceleration** – a vector of force that does not pass through an object’s center of gravity

**secondary mechanisms of injury** – injuries that occur several minutes to weeks after trauma

**seizure** – random electrical activity within the brain that may or may not disrupt consciousness and/or produce perceptual or motor alterations

**selective attention** – the ability to maintain alertness to specific stimuli in the environment despite the presence of internal or external distractors

**sequelae** – the pathological consequences following a head injury or onset of disease

**shearing strain** – the simultaneous pulling of adjacent structures in two directions; shearing lesions are recognized as tears in nerve fibers

**shifting of set** – changing from one activity or perspective to another

**simple partial seizure/partial simple seizure** - a partial seizure in which there is no disturbance of consciousness

**somesthetic** – relating to the sensation of pain, temperature, position, and pressure

**spasticity** – uncontrolled contractions of muscles

**status epilepticus** – two or more seizures superimposed on one another such that there is an incomplete or no recovery of consciousness between them; sometimes referred to as continuous seizures

**stereognosis** – the ability to recognize an object placed in the hands without looking at it

**subarachnoid** – below the middle covering (i.e., the arachnoid) of the brain

**subdural** – below the outermost covering of the brain

**subdural hematoma** – a collection of spilled blood between the membranes covering the brain

**superior** – above

**sustained attention** – the ability to maintain a consistent behavioral response during continuous and repetitive activities

**synapse** – the functional connection that permits one neuron to communicate with another neuron (through the action of a neurotransmitter)

**temporal lobe** – a part of the brain important for processing language and interpreting sounds

**temporal orientation** – awareness of time information such as the current time of day, day of week, date, month, or year

**tinnitus** – a constant or intermittent ringing sound in the ears

**tonic clonic seizure/grand mal seizure** – a seizure in which the person experiences 10-30 seconds of tonic movements with marked extension or flexion of muscles and 15-60 seconds of clonic movements with rhythmic muscle group shaking; generally followed by headache, sleepiness, and confusion

**translational acceleration** – a linear vector of force passing through an object's center of gravity

**tremor** – a purposeless, involuntary, and repetitive movement

**vapor pressure level** – the point at which liquid changes to gas

**vasogenic edema** – increased water content within the brain resulting from a breakdown in the blood-brain barrier allowing water from the blood stream to pass into brain tissue; can lead to brain damage



# ASSESSMENT INSTRUMENTS

The list of assessments that follow are not comprehensive and do not necessarily reflect the most recently standardized instruments or tools for assessment of Traumatic Brain Injury. A more comprehensive list of assessment instruments can be found on the Special Education Assessment web page under the title of Assessments in Easy IEP on the Initial Eligibility tab at the following site:

<http://state.tn.us/education/speced/seassessment/>

Test	Publisher	Telephone #
Adolescent Test of Problem Solving The Phonological Awareness Test The Word Test – Elementary and Adolescent	LinguiSystems	1-800-776-4332
Behavior Rating Inventory of Executive Function Rey Auditory Verbal Learning Test Wisconsin Card Sorting Test Test of Everyday Attention for Children	Psychological Assessment Resources (PAR)	1-800-331-TEST
California Verbal Learning Test for Children Clinical Evaluation of Language Fundamentals – Category Naming Task Test of Language Competence	The Psychological Corporation	1-800-872-1726
Controlled Oral Word Association Test (Word Fluency Measure) <i>A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary</i> , by Otfried Spreen, Esther Strauss. pgs. 219-227	Oxford University Press	
Test of Adolescent/Adult Word Finding	Pro-Ed	(512) 451-3246
Woodcock Johnson Psychoeducational Battery – III: Tests of Cognitive Ability	Riverside Publishing	1-800-323-9540

# Tables and Charts

## TBI Characteristics

**Research-based instructional strategies related to characteristics of many students with TBI<sup>1</sup>**

**Integrated approaches to educational, behavioral, and social intervention that have a research base and are applicable to many students with TBI<sup>2</sup>**

**Aspects of Cognition and Phases of Improvement after TBI**

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<sup>1</sup> Reprinted/Adapted with permission from "Educating Students with TBI", Journal of Head Trauma Rehabilitation, pages 81, 85, 86; February 2001, Aspen Publishers, Inc.

<sup>2</sup> Reprinted/Adapted with permission from "Educating Students with TBI", Journal of Head Trauma Rehabilitation, pages 81, 85, 86; February 2001, Aspen Publishers, Inc.

**Table 1**  
**Common consequences of TBI in children and their educational implications<sup>3</sup>**

### **NEUROLOGICAL RECOVERY**

Often, children experience prolonged and unpredictable improvement, based on several dynamics of neurological recovery.

#### **Implications:**

- Educational systems need to be flexible and programs highly individualized.
- Frequent review and modification of the student's placement and program may be required, a practice not consistent with the tradition of annual reviews.

### **EVOLVING ABILITY PROFILES**

In some cases, the student's disability increases over time, possibly related to a type of brain injury that has its first noticeable consequences at a later developmental stage or to the dynamics of the student's adjustment.

#### **Implications:**

- Long-term monitoring systems must be implemented, even if the student is not receiving special education services (e.g., using Section 504 of the Rehabilitation Act)
- School staff need to be alert to the possibility that disability may gradually increase over time, so that intervention can be implemented as promptly as possible.

### **DISABILITY RELATED TO VULNERABLE PARTS OF THE BRAIN**

Theoretically, any part of the brain can be involved in TBI. However, closed head injury is frequently associated with damage to the frontal lobes and anterior and medial temporal lobes, with relative sparing of posterior regions.

1. **Challenges related to frontal lobe injury** include reduced awareness of strengths and limitations; disinhibited thinking and behavior; weak initiation; relatively weak control over cognitive processes, such as attention; disorganized thinking and acting; relatively weak planning, problem solving, and strategic behavior; relatively weak learning from consequences; relatively weak effortful learning and retrieval; difficulty holding several thoughts in mind at one time; inflexibility; perseveration; inconsistent behavior and academic performance; concrete thinking and difficulty generalizing; relatively weak social perception and awkward social behavior.

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**Implications:**

- Impairment may be difficult to assess. Many of these impairments are consistent with good performance on psychological, neuropsychological, and psychoeducational testing. Therefore, necessary services and supports may not appear to be justified based on testing.
- Disability may be misinterpreted (e.g., neurological disinhibition as a psychiatric disorder), with inappropriate services a possible consequence.
- Traditional teaching and behavior management that emphasizes manipulation of consequences may be ineffective.
- Long-term, contextualized coaching in “executive functions” may be necessary.

2. **Needs related to temporal lobe (including limbic system) injury** may include weak learning (new learning) relative to the existing knowledge base acquired before the injury and weak emotional/behavioral regulation.

**Implications:**

- The student may need much more repetition than would seem necessary.
- The student may need substantial antecedent support for behavioral self-regulation.

3. **Needs related to widespread microscopic damage** include relatively slowed processes.

**Implications:**

- The student may need reduced assignments, evaluation of work based on quality, not quantity, and time accommodations.

4. **Strengths related to relative sparing of posterior parts** of the brain may include retention of much pre-injury knowledge and skill, and basic motor and sensory functions.

**Implications:**

- Assessments must go far beyond testing academic knowledge and skill (acquired before the injury) and sensorimotor functions.

**PSYCHOREACTIVE PHENOMENA**

The evolution of emotional consequences after a life-altering injury is unpredictable but may include reactions that profoundly influence educational performance. At one stage or another after the injury, some children become depressed and withdrawn, others angry and defiant, and others overly desirous of pleasing, resulting in social vulnerability.

**Implications:**

- Schools should monitor students’ mental health and social relationships after an injury, and provide counseling and support when indicated.

**Table 2**  
**Research-based instructional strategies related to**  
**characteristics of many students with TBI<sup>4</sup>**

<b>TBI Characteristic</b>	<b>Instructional Strategy</b>	<b>Description</b>
Fluctuating attention	Appropriate pacing	Delivering material in small increments and requiring responses at a rate consistent with a student's processing speed increases acquisition of new material
Memory impairment (associated with need for errorless learning)	High rates of success	Acquisition and retention of new information tends to increase with high rates of success
High rates of failure Organizational impairment Inefficient learning	Task analysis and advance organizational support	Careful organization of learning tasks, including systematic sequencing of teaching targets and advance organizational support, increases success
Inefficient learning Inconsistency	Sufficient practice and review (including cumulative frequent review)	Acquisition and retention of new information is increased with review
Inefficient feedback loops Implicit learning of errors	Errorless learning combined with corrective feedback when errors occur	Students with severe memory and learning problems benefit from errorless learning. When errors occur, learning is enhanced when those errors are followed by nonjudgmental corrective feedback
Possibility of gaps in the knowledge base	Teaching to mastery	Learning is enhanced with mastery at the acquisition phase
Frequent failure of transfer Concrete thinking and learning	Facilitation of transfer/generalization	Generalizable strategies and general case teaching (wide range of examples and settings) increase generalization
Inconsistency Unpredictable recovery	Ongoing assessment	Adjustment of teaching based on ongoing assessment of students' progress facilitates learning
Unusual profiles Unpredictable recovery	Flexibility in curricular modification	Modifying the curriculum facilitates learning in special populations

<sup>4</sup> Reprinted/Adapted with permission from "Educating Students with TBI", Journal of Head Trauma Rehabilitation, pages 81, 85, 86; February 2001, Aspen Publishers, Inc.  
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**Table 3**  
**Integrated approaches to educational, behavioral, and social intervention**  
**that**  
**have a research base and are applicable to many students with TBI<sup>5</sup>**

<b>TBI characteristic</b>	<b>Approach</b>	<b>Description</b>
New learning needs Impaired strategic behavior Impaired organizational functioning	Metacognitive/strategy intervention	Organized curricula designed to facilitate a strategic approach to difficult academic tasks, including organizational strategies; validated for adolescents with and without specific learning disabilities
Decreased self-awareness Denial of deficits	Self-awareness/attribution training	Facilitation of students' understanding of their role in learning; validated for students with learning difficulties
Weak self-regulation related to frontal lobe injury Disinhibited and potentially aggressive behavior	Cognitive behavior modification	Facilitation of self-control of behavior; validated with adolescents with ADHD and aggressive behavior
Impulsive behavior Inefficient learning from consequences History of failure Defiant behavior Initiation impairment Working memory impairment	Positive, antecedent focused behavior supports	Approach to behavior management that focuses primarily on the antecedents of behavior (in a broad sense); validated in developmental disabilities and with some TBI subpopulations
Frequent loss of friends Social isolation Weak social skills	Circle of friends	A set of procedures designed to support students' social life and ongoing social development; validated in developmental disabilities and TBI

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**Table 4**  
**Aspects of Cognition and Phases of Improvement after Traumatic Brain Injury**

<b>Aspects of Cognition</b>	<b>Early Phase</b>	<b>Middle Phase</b>	<b>Late Phase*</b>
<p><b>Component processes</b>  <b>Attention:</b>            holding objects, events, words or thoughts in consciousness,  <i>Components:</i> span, selectivity, filtering, maintaining, shifting, dividing</p>	<ul style="list-style-type: none"> <li>• Severely decreased arousal or alertness</li> <li>• Minimal selective attention, focusing, shifting</li> <li>• Possibly, attention primarily to internal stimuli</li> </ul>	<ul style="list-style-type: none"> <li>• Attention generally focused on external events</li> <li>• Short attention span</li> <li>• Poor control of attention: highly distractible, inflexible</li> </ul>	<ul style="list-style-type: none"> <li>• Attention span possibly reduced</li> <li>• Relatively weak concentration, selective attention, and fluid attentional shifts</li> <li>• Possibly, weak organizational processes, absence of goals, or both reflected by attending problems</li> </ul>
<p><b>Perception:</b>            recognition of features and relationships among features; affected by context (figure-ground) and intensity, duration, significance, and familiarity of stimuli</p>	<ul style="list-style-type: none"> <li>• Begins to recognize (and perhaps use familiar objects when they are highlighted</li> <li>• May perceive only one feature or aspect of stimulus</li> <li>• Adaptation to continuous stimulation</li> </ul>	<ul style="list-style-type: none"> <li>• Clear recognition of familiar objects and events</li> <li>• Inefficient perception in context</li> <li>• Sharp deterioration with increases in rate, amount, and complexity of stimuli</li> <li>• Difficulty in distinguishing whole from part</li> </ul>	<ul style="list-style-type: none"> <li>• Possibly subtle versions of perceptual problems related to rate, amount, and complexity</li> <li>• Possible specific deficits (e.g., field neglect)</li> <li>• Possibly inefficient shifting of perceptual set</li> <li>• Possibly weak perception of relevant features</li> </ul>
<p><b>Memory and learning:</b>  <i>encoding:</i> recognition, interpretation, and formulation of information, including language, into an internal code; coding affected by knowledge base, personal interest, and goals  <i>Storage:</i> retention over time  <i>Retrieval:</i> transfer from long-term memory to consciousness</p>	<ul style="list-style-type: none"> <li>• Progression in comprehension from minimal responses to vocal intonation and stress to recognition of simple, context-bound instructions</li> <li>• No evidence of encoding or storage of new information</li> </ul>	<ul style="list-style-type: none"> <li>• Weak encoding due to poor access to knowledge base, poor integration of new with old information, or inefficient attention or perception</li> <li>• Inefficiently encoded information often lost after short delay</li> <li>• Recognition stronger than recall; receptive vocabulary superior to expressive vocabulary</li> <li>• Disorganized search of storage system</li> </ul>	<ul style="list-style-type: none"> <li>• Possible subtle versions of earlier problems, particularly with increases in cognitive stress</li> <li>• Memory problems-any combination of comprehension, encoding, storage, or retrieval deficits</li> <li>• Memory problems- problems recalling information related to personal experience (episodic memory) or abstracted knowledge (semantic memory)</li> </ul>
<p><b>Organizing: analyzing:</b>            classifying, integrating, sequencing; identifying relevant features of objects and events; comparing for similarities or differences; integrating into organized descriptions, higher-level categories, and sequenced events; these processes presupposed by higher-level reasoning and efficient learning</p>	<ul style="list-style-type: none"> <li>• No evidence of these processes</li> </ul>	<ul style="list-style-type: none"> <li>• Weak or bizarre associations</li> <li>• Weak analysis of objects into features</li> <li>• Disorganized sequencing of events</li> <li>• Weak identification of similarities and differences in comparisons and classifications</li> <li>• Can integrate concepts into propositions; difficulty integrating propositions into main ideas</li> <li>• Major difficulty imposing organization on unstructured stimuli</li> </ul>	<ul style="list-style-type: none"> <li>• Possibly subtle versions of earlier problems</li> <li>• Difficulty maintaining goal-directed thinking Ongoing difficulty discerning main ideas and integrating main ideas into broader themes</li> <li>• Possibly gets lost easily in details</li> <li>• Can impose organization unstructured stimuli with prompting</li> </ul>



Aspects of Cognition	Early Phase	Middle Phase	Late Phase*
<p><b>Reasoning:</b> Considering evidence and drawing inferences and conclusions, involving flexible exploration of possibilities (divergent thinking) and use of past experience <i>Deductive:</i> strict logical formal inference <i>Inductive:</i> direct inference from experience <i>Analogical:</i> indirect inference from experience</p>	<ul style="list-style-type: none"> <li>No evidence of these processes</li> </ul>	<ul style="list-style-type: none"> <li>Minimal inferential thinking; may deal with concrete cause-effect relationships, particularly if overlearned</li> <li>General inefficiency with abstract ideas and relationships</li> </ul>	<ul style="list-style-type: none"> <li>Fair to good concrete reasoning in controlled settings; disorganized thinking in stressful or uncontrolled settings</li> <li>Abstract thinking deficient</li> </ul>
<p><b>Problem solving and judgment:</b> <i>Problem solving:</i> occurs when a goal cannot be reached directly; ideally involves goal identification, consideration of relevant information, exploration of possible solutions, and selection of the best Judgment: <i>decision to act</i>, based on consideration of relevant factors, including prediction of consequences</p>	<ul style="list-style-type: none"> <li>No evidence of these processes</li> </ul>	<ul style="list-style-type: none"> <li>Inability to see relationships among problems, goals, and relevant information</li> <li>Inflexibility in generating or evaluating possible solutions; impulsive; trial-and-error approach</li> <li>Inability to assess a situation and predict consequences</li> <li>Severely impaired safety and social judgment</li> </ul>	<ul style="list-style-type: none"> <li>Possibly subtle versions of earlier problems</li> <li>Impulsive, disorganized problem solving</li> <li>Inflexible thinking and shallow reasoning</li> <li>Primary residual deficits possibly poor safety and social judgment manifested in academic and social situations</li> </ul>
<p><b>Component systems</b> Working memory (attentional focus): storage or holding "space" where coding and organizing occur; limited information capacity; <i>functional</i> capacity increased by making processes automatic or by "chunking" information</p>	<ul style="list-style-type: none"> <li>Severely limited capacity</li> <li>Progression from single-modality to multi-modality processing of simple stimuli</li> <li>Attentional space possible exhausted by attention to internal stimuli</li> </ul>	<ul style="list-style-type: none"> <li>Gradual increase in attention span to near normal, as measured by digit span</li> <li>Possibly maintained severe restriction of <i>functional</i> capacity due to lack of automatic organizing processes</li> <li>Rapid deterioration of processing with increases in the information load</li> </ul>	<ul style="list-style-type: none"> <li>Often normal digit span</li> <li>Possibly, continual reduction of <i>functional</i> capacity, due to in-efficient organizing processes, as information load increases, and to generally inefficient executive functions</li> </ul>
<p><b>Long-term memory:</b> Contains knowledge of concepts and words, rules, strategies, and procedures; organizational principles and knowledge frames; goals, experience and self-concept</p>	<ul style="list-style-type: none"> <li>Emerging evidence of remote memory; recognition of familiar objects and persons</li> <li>May assume that other contents are present but inaccessible</li> </ul>	<ul style="list-style-type: none"> <li>Growing access to pre-trauma contents</li> <li>Recognition of strong associations (e.g., hammer-nail), basic semantic relations, and common two- or three-event sequences</li> </ul>	<ul style="list-style-type: none"> <li>Stabilization of recovery of access to pretraumatically acquired knowledge base</li> <li>Variable growth of long-term memory, depending on type and severity of residual cognitive deficits</li> </ul>

Aspects of Cognition	Early Phase	Middle Phase	Late Phase*
<p><b><u>Response system:</u></b> Controls all output, including speech, facial expression, and fine-and gross-motor activity: includes motor planning</p> <p><b><u>Executive system (“central processor”):</u></b> Sets goals; plans and monitors activity; directs processing and operations according to goals current input, and perceptual-affective set</p>	<ul style="list-style-type: none"> <li>• Severely limited; often perseverative responses</li> <li>• May use some gestures and speech toward end of this stage, but with motor planning problems or delayed responses</li> <li>• Minimal awareness of self and current condition</li> <li>• No apparent self-direction of behavior or cognitive processes</li> </ul>	<ul style="list-style-type: none"> <li>• Speaks or begins augmentative system</li> <li>• Possible motor-planning problems or general slowness</li> <li>• Impulsiveness and possible preservation</li> <li>• Variable motor function depending on site and extent of injury</li> <li>• Growing awareness of self; poor awareness of deficits</li> <li>• Weak metacognitive awareness of self as thinker</li> <li>• Minimal goal setting, self initiation or self-inhibition, self-monitoring or self-evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Generally functional communication system-</li> <li>• Usually speech</li> <li>• Possible motor-planning problems or slowness</li> <li>• Possible rapid fatigue</li> <li>• Shallow awareness of residual deficits</li> <li>• Middle to severe deficits in executive functions, related in part to anterior frontolimbic damage</li> <li>• Strategy training possible, depending on meta-cognitive level</li> </ul>

## Functional Integrative Performance

Aspects of Cognition	Early Phase	Middle Phase	Late Phase*
<p><b>Functional behavior:</b> Performance of real-life tasks and activities (e.g., reading a book or conversing)</p> <p><b>Efficiency:</b> rate of performance and amount accomplished</p> <p><b>Level:</b> developmental or academic level of performance</p> <p><b>Scope:</b> variety of situations in which child can a maintain performance</p> <p><b>Manner:</b> dependence or independence (need for prompts and cues; impulsive or reflective style)</p>	<ul style="list-style-type: none"> <li>• Cannot adapt to environment; activity level ranges from inactive to hyperactive; activity marginally purposeful (e.g., pulling at tubes, restraints, clothes; attempting to get out of be); gives little or no assistance to daily care</li> <li>• May prefer a limited range of routine task when prompted (e.g., brushing hair)</li> <li>• Profound confusion disorientation to person place, time, and condition</li> <li>• Communication severely limited, inconsistent, and prefunctional; may begin to comprehend simple context-bound instructions</li> </ul> <p>Minimal social interaction; little variation in facial expression; reflexively hold or shake hands</p> <p>Agitated behavior at the end of this stage more pronounced in adolescents</p>	<ul style="list-style-type: none"> <li>• Performs many overlearned routines (e.g., self-care, games) in structures setting with prompts; poor retention of information from day to day; severely impaired learning of new skill</li> <li>• Performs simple sequential task (e.g., dressing) in structured setting of stimuli are controlled for rate, amount, and complexity; rapid deterioration organization of behavior in uncontrolled setting</li> <li>• Continued confusion but growing orientation to person , place, and time in structured setting and with orientation curs; gross awareness of the structure of the day</li> </ul> <p><b>Communication:</b></p> <ul style="list-style-type: none"> <li>• <i>Expressive:</i> Usually verbal and functional (barring motor speech disorder), but often characterized by confabulations, word retrieval problems, excessive and often inappropriate output</li> <li>• <i>Receptive:</i> Control of rate amount and complexity of verbal interaction necessary to assure comprehension</li> <li>• Social interruption strained and often unsuccessful, due to disinhibition, inappropriateness, impaired social perception</li> <li>• Possibly minimal adaptation to the environment due to impulsiveness, agitation, and inability to set goals</li> </ul>	<ul style="list-style-type: none"> <li>• Performance of pretraumatically acquired skills related to type and extent of residual deficit and ability to compensate; possible continued sharp deterioration of performance with increasing processing load; reduced rate learning of new skills and strategies</li> <li>• Deficient performance of complex tasks requiring organization, persistence, and self-monitoring; low efficiency, with slow rate and low productivity</li> <li>• Solid orientations to person, place, and time, but possible recurrence or disorientation sudden changes in routine</li> <li>• Communication usually conventional in form, with possible word-finding problems, expressive disorganization, and comprehension limited in efficiency; social use of language possible staid or inappropriate</li> <li>• Social interaction and judgment possible dominant residual systems, related to weak awareness of social conventions and rules, persistent impulsiveness and poorly defined self-concept (with shallow awareness of residual deficits)</li> <li>• Generally goal-directed behavior, but goals possibly unrealistic and social and safety judgment significantly impaired; prompts needed to set goals and subgoals</li> </ul>

\* Reprinted/Adapted with permission from *Functioning also related to age and pretrauma development and educational level*. Source; SF Szekeres, M Ylvisaker, AL Holland (1985). *Cognitive Rehabilitation Therapy: A Framework for Intervention*. In M Ylvisaker (ed), *Head Injury Rehabilitation: Children and Adolescents*. Austin, TX: PRO-ED, 230. Copyright 1997 Butterworth-Heinemann