

# Children and Adolescents with Traumatic Brain Injury: Reintegration Challenges in Educational Settings

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## Abstract

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Changes in federal law have paved the way for students with traumatic brain injury (TBI) to receive special educational services. Although not all students with TBI need special education, many will need careful planning for reintegration into the classroom. The present article presents information about the range of services that need to be considered for these students and the problems that can affect students' academic and social functioning. Characteristics that distinguish this group of students from peers with special learning needs are highlighted and specific suggestions are made to help educators work more effectively with these students when they return to school. A case study is used to highlight the issues discussed.

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Each year as many as a million children and adolescents sustain a traumatic brain injury (TBI), many serious enough to require hospitalization (Kraus, Fife, & Cox, 1986). Although children with such injuries are by no means new to the educational system, the growing number of more severely injured students may be. Advances in technology have resulted in faster and more sophisticated medical care (Carney & Gerring, 1990); therefore, more children and adolescents are surviving their injuries, even the most serious ones. Current estimates are that 95% of all children and adolescents with TBI can be expected to live, and 65% of those with more severe injuries survive the insult to the brain (Michaud, Rivara, & Grady, 1992). Because recovery often takes months, or even years, schools are an important extension of the rehabilitation that begins in the hospital. Given the structure that schools provide, and the variety of specialties represented on their staff, schools may be in one of the best positions to provide service to these students (Mira &

Tyler, 1991). Educators' lack of knowledge as to how TBI can affect a student's academic and social functioning, however, can be an obstacle in providing this service (Blosser & DePompei, 1991; Mira, Meck, & Tyler, 1988; Savage, 1985). The purpose of the present article is to inform educators about some of the challenges that school-age children with TBI face and about ways to facilitate the reintegration of students back into the classroom. For many students with TBI, this is a very significant hurdle to overcome.

## Federal Law Mandating Service

Recognizing the important role of the schools in meeting the unique needs of this population, federal legislators passed P.L. 101-476 in 1990, to include TBI as a special education category. According to this law, titled the Individuals with Disabilities Education Act (IDEA):

Traumatic brain injury means an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgement; problem-solving; sensory; perceptual and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma. (Definition from 57 Fed. Reg. 189 (1992), p. 44802)

Despite the fact that this law has been in existence for more than 4 years, a recent study conducted at the University of Utah showed that professionals working in the schools do not know which students are eligible for services under TBI and which are not (Anderson, 1995). This is not surprising, as many states have not established guidelines to serve this popula-

tion. In fact, according to a study by Katsiyannis and Conderman (1994), 16 of the 34 states surveyed were still in the process of writing their guidelines. Further, despite the fact that the guidelines in the majority of states that had established them closely paralleled federal law, several states' eligibility criteria were different. Utah, New York, and Wisconsin, for example, include "internal" causes of TBI. According to the federal law, only students who have injuries caused by "external force" to the brain, that is, children with open- or closed-head injuries, or who experienced near-drowning, are eligible for services under TBI. Children whose injuries are caused by "internal" events, such as brain tumors, stroke, central nervous system infections, and exposure to toxic substances can be served under other special education categories (e.g., Other Health Impaired, Learning Disabilities, Behavior Disorders, and Intellectual Disabilities) but are excluded under TBI.

The reasons for the decision by the federal government to exclude these students are unclear, given the fact that they share many of the same characteristics as students with "externally" caused injuries, have many of the same educational, emotional and social needs, and are likely to benefit from the same interventions (i.e., interventions that focus on reintegration and frequent monitoring of progress). The rationale is even less clear when one considers the fact that children with hypoxic encephalopathy from near-drowning are included but children who suffer the same brain injury from electrocution, cardiac arrest, or anesthetic accidents are excluded.

## Consequences of TBI

### *Motor Problems*

Problems with gait, coordination, spasticity, and speech are commonly seen in children with TBI (Levin, Benton, & Grossman, 1982). The fact

that motor function is the first function to recover, and rather quickly at that (DiScala, Osberg, Gans, Chin, & Grant, 1991; Ylvisaker, 1986), means that most students with TBI will be walking and talking by the time they return to school. Educators may interpret this as the child being "back to normal," when this is not necessarily the case. And, for the child and family, rapid recovery of motor function may set the unrealistic expectation that other functions will recover at a similarly fast rate.

### *Language Problems*

Although speech deficits recover at nearly the same rate as motor skills, receptive language and higher level communication problems are more persistent and can interfere with learning (Blosser & DePompei, 1989; Ylvisaker, 1986). Language problems such as pragmatics, verbal fluency, word finding, concept formation, and verbal comprehension are more likely to parallel the recovery of cognitive skills (Michaud, Duhaime, & Gatshaw, 1993) and are more difficult to detect.

### *Cognitive Problems*

Common cognitive problems that result from injury include difficulties with the following: attention; memory; language comprehension; concept formation; integrating, organizing, and generalizing information; problem solving; and judgment (Blosser & DePompei, 1989; Michaud, Duhaime, & Gatshaw, 1993). Research by Jaffe and his colleagues at the University of Washington (Jaffe et al., 1993) has shown that children who sustain moderate or severe head injuries are at greater risk for these types of problems than are mildly injured children. This is consistent with the literature that shows negligible cognitive deficits in children with mild TBI. Bijur, Haslum and Golding (1990) showed that on cognitive measures, children

with mild injuries were indistinguishable from their noninjured peers.

### *Behavioral and Emotional Problems*

More severely injured children are also more likely than their less severely injured peers to evidence persistent behavioral and emotional disturbances (Bijur et al., 1990; Jaffe et al., 1993). Like cognitive problems, behavioral and emotional problems can result from injury to the brain and can interfere with students' academic and social success. Families actually rate behavior disturbance and personality change as the most troublesome and persistent problem following injury (Thomsen, 1984). Although educators often fail to attribute behavior problems to injury, research has shown that children with TBI are three times more likely than the general population to develop serious behavior disorders (Michaud, Rivara, Jaffe, Fay, & Dailey, 1993). Common behavioral sequelae from injury include increased aggression, poor anger control, and hyperactivity (Bijur et al., 1990; Filley, Cranberg, Alexander, & Hart, 1987). These behaviors also happen to be the most common reason for referral to special education, regardless of the etiology of the problem (Morgan & Jenson, 1988). Although externalizing behaviors may be more apparent than internalizing problems (i.e., anxiety, depression, emotional lability, social withdrawal, and somatization), internalizing symptomatology can also interfere with the child's ability to function in school (Begali, 1992). Savage and Wolcott (1994) provided some excellent ideas for interventions with these children.

Behavioral and emotional problems are caused not only by neurophysiological disturbance from the injury, and a reaction to it, but by other factors as well. Constitutional factors, prior predisposition to psychological disturbance, secondary physical handi-

caps, cognitive problems, and psychosocial stresses can all contribute to the child's psychological status following injury (Rutter, 1981).

### **Health Problems**

Other TBI-related problems that have been shown to interfere with learning are medical. One of the most common physical complaints following injury is headache. Headaches are estimated to affect around 20% of children within the first 6 months of their injuries (Lanser, Jennekens-Schinkel, & Peters, 1988). Some children continue to complain of headaches 6 years out; however, there is no clear evidence that in these cases the injury is causally related (Lanser et al., 1988). Children with TBI are also at greater risk for developing seizure disorders, especially children who sustain penetrating head injuries (Levin et al., 1982). Seizures can have significant implications for learning and social relationships and future work. Vision and hearing can also be affected by injury, as can sense of smell and taste (Michaud, Duhaime, & Gatshaw, 1993). Some of these children will also have dysphagia, or problems swallowing (Ylvisaker & Weinstein, 1989).

### **Achievement Problems**

More than a quarter of the subjects in Klonoff, Clark, and Klonoff's (1993) study reported that they had failed a grade or been retained, and nearly a third of the parents in Greenspan and MacKenzie's (1994) study reported that their child was in special education 1 year after injury. Granted, a number of children with TBI experienced academic problems before their injuries; in fact, about half of the children Greenspan and MacKenzie studied who were in special education after injury had been receiving services before. Problems with academic achievement, however, may not be apparent for a year or more after injury (Chadwick, Rutter, Brown, Shaffer, &

Traub, 1981), and when they are detected, they may not be attributed to the injury. Like behavior problems, the longer the interval from the time of injury to the detection of achievement problems, the less likely an attribution will be made to the prior injury (Michaud, Duhaime, & Gatshaw, 1993). Even if correctly attributed, however, improvements in academic achievement are often slow.

One year after injury, the children with moderate or severe injuries in Fay et al.'s (1994) study had made modest gains in spelling, which were attributed to recovery of motor skills, and some very small improvements in reading and math since the initial testing (see Jaffe et al., 1993). When these children were retested 2 years later, there was negligible change in mean test scores, and the children with moderate or severe injuries continued to perform significantly below the control group on tests of reading, math, and spelling. Although increased severity was associated with lower test scores, it should be noted that the mean scores for all groups (mild, moderate, and severe injury) were within the normal range for the standardized test. This longitudinal cohort study highlights the importance of making appropriate group comparisons. Curriculum-based academic measures may, therefore, be particularly relevant for these children.

## **Predicting Outcomes and Providing Services**

Studies estimate that 20% of head injury survivors are left with some degree of disability (Kraus, Rock, & Hemyarai, 1990). The range of impairments, however, is quite broad. Deficits in reasoning, memory, language, visual-spatial and motor skills, and behavioral areas have been documented by a number of researchers (Ewing-Cobbs, Levin, Eisenberg, & Fletcher, 1987; Goldstein & Levin, 1985;

Jaffe et al., 1993; Thompson et al., 1994; Winogron, Knights, & Bawden, 1984). Although the literature is fairly consistent in showing that the impact on cognitive functioning from mild injury is rather negligible—that is, these children tend to be indistinguishable from their noninjured peers (Bijur et al., 1990; Jaffe et al., 1993)—it is not always easy to assess severity and thus predict which children will have what problems, and for how long.

Whereas severity of injury is commonly used to predict the outcome from TBI (Filley et al., 1987), not all severity indicators are equally useful (Costeff, Groswasser, & Goldstein, 1990). Duration of coma (a state of unconsciousness in which the person cannot be aroused and/or does not respond) and posttraumatic amnesia (PTA; loss of memory occurring immediately after injury that may continue for hours or days) have been shown to be relatively good predictors of outcome (Klonoff et al., 1993; Michaud et al., 1993). Factors other than the injury itself, however, have been shown to confound predictions based on coma and PTA. For example, many of the extracranial injuries that children with TBI sustain that produce increased physical and psychological stress (i.e., shock, hypotension, hypoxia, and metabolic disruption) result in an underestimation of the severity of injury to the brain; thus, the outcome from injury may be less favorable than initially predicted (DiScala et al., 1991). In a recently published follow-up study of 95 children with TBI, Greenspan and MacKenzie (1994) found that whereas severity was associated with physical limitations caused by the brain injury, behavioral problems were not associated with severity (with the exception of hyperactivity).

Although knowing what to expect in terms of impairments is difficult, educators can expect that children who have moderate to severe injuries will evidence their unique problems during the first year, and especially in the first 3 months (Thompson et al.,



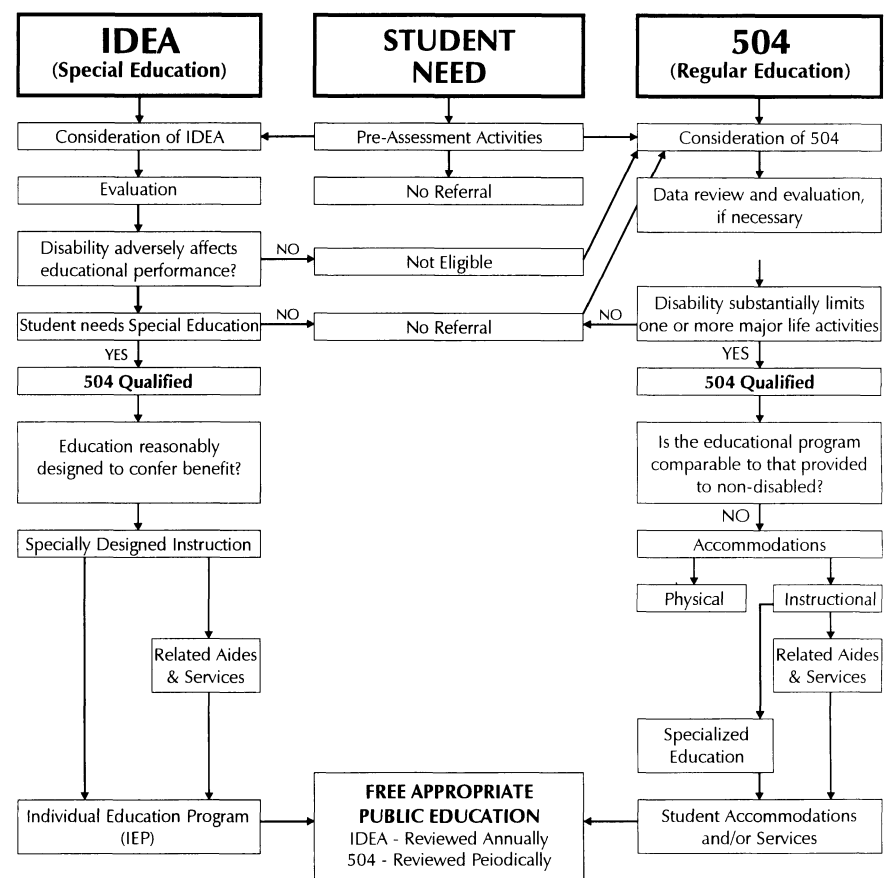
1994). The subjects in Greenspan and MacKenzie's (1994) study were still having significantly greater problems with physical health and behaviors than the general population 1 year after injury. Costeff et al. (1990) found that none of their more severely injured subjects had improved significantly in cognitive functioning after 1 year, and nearly half of the 31 children studied were still experiencing significant social and behavior problems at that time. When Fay and her colleagues (Fay et al., 1994) retested their moderate and severely injured subjects 3 years after injury, they also found that a significant number were exhibiting cognitive and behavioral problems when compared with a control group of same-aged peers. Their subjects performed worse than controls on 40 out of 53 neurobehavioral measures.

Despite the fact that research has documented persistent problems in a large number of children following brain injury, discharge from hospitals is often equated with a return to normalcy. Surprisingly few children receive any follow-up care once they are discharged from the hospital. Data obtained from the Pediatric Trauma Registry (DiScala et al., 1991) show that children who sustain traumatic injuries are more likely to be discharged to their homes than to rehabilitation facilities. Even the more severely injured children are unlikely to receive any follow-up care once they are discharged from the hospital (Carney & Gerring, 1990). For the less severely injured child, the situation may even be worse—not only does the return home come much sooner, but so does the return to school. In many cases, children with milder injuries are never even admitted to the hospital (Bijur et al., 1990). Educators may never be notified of the child's injuries, thus obscuring the potential for problems (Savage, 1991). It is not surprising that teachers often end up being the first persons to raise concerns about the student's progress.

## Issues Related to Education

Not all students with TBI require special education. However, most children with moderate to severe injuries will require some additional educational assistance. Depending on the degree and nature of the student's deficits, services can range from accommodations in the general education classroom to one-on-one assistance. Figure 1 provides a suggested guideline that takes into consideration the continuum of placement and service options that needs to be considered in order to provide the student with the least restrictive environment. Even in cases where the student is already receiving special education assistance, those services should be carefully reviewed to determine if any changes are required, including chang-

ing classification to TBI. Students who need support for their educational programs but do not qualify for special education may be able to receive services through general education under Section 504 of the Individuals with Disabilities Act of 1973. Section 504 requires that reasonable accommodations be made for students with disabilities so that they will be able to access education. Referrals for these services are typically brought to the attention of the Section 504 coordinator, although in some cases special education personnel may be involved. The act requires that school districts evaluate the student before making any change in his or her programming or placement. When significant changes are necessary, a 504 conference committee should be convened to consider what the student's unmet



**FIGURE 1.** Guidelines for serving students with TBI (adapted from the Utah State Office of Education [USOE], with permission from USOE, 1993).

needs are, the evaluation results and 504 eligibility, and the service needs based on eligibility (USOE, 1993). Staff inservice may also be a component of 504 services and may also alleviate the need to make programmatic changes or further accommodations.

Regardless of the type of service that is provided, that is, whether it is through general or special education, it is important to recognize that students with acquired traumatic brain injuries are often very different from their peers with other kinds of special learning needs, because those differences have important implications for educational programming. Unlike their peers with learning disabilities, students with TBI typically experienced success in school before their injury (Blosser & DePompei, 1989). These students are initially more likely to view themselves the way they were, not the way they are. Returning to school forces them to confront newly acquired deficits or, in some cases, a worsening of prior problems. This causes considerable frustration, as does the fact these deficits appear suddenly and recover at such an uneven and unpredictable rate. Dramatic changes in the first 3 months, followed by a slowing in recovery rate (Chadwick et al., 1981; Knight et al., 1991), often set unrealistic expectations for the student and school. Educators who understand these differences in students with TBI can help to set realistic goals, and plan more appropriately for them.

Another problem that needs to be considered when making educational plans for this population is the fact that providing services can create a fiscal crisis for the school. As Lash (1994) pointed out, schools cannot anticipate the costs for these services as easily as they can the costs for the traditional special education student already in the system. Schools have a variety of specialists who could potentially work with students who sustain brain injuries; however, the small number of TBI students in a particular school makes it difficult to divide

resources and costs among them. Optimal service for the student with TBI, however, is interdisciplinary (Michaud, Duhaime, & Gatshaw, 1993).

### *Team Approach*

A thoughtfully composed and well-informed team is critical for ensuring that services are provided, and are done so in a timely manner. Because successful transition from the hospital or rehabilitation to the school is enhanced by planning early for the student's return, the team, headed by a carefully selected case manager, should be organized before the student returns to school. Communication lines set up in advance ensure that school personnel are apprised of the student's condition and helps to prevent gaps in service. Scheduling regular team meetings will provide an opportunity for the exchange of ideas and creative problem solving.

The needs of the particular student often dictate the composition of the team, but typically it consists of a case manager, classroom teacher, special education teacher, school psychologist, speech and language pathologist, parent, and student. Students and parents offer an invaluable perspective on the problems and provide information that would otherwise be unavailable. Other potential team members who can provide important perspectives and professional knowledge include physical and occupational therapists, counselors, adaptive physical education teachers, administrators, neuropsychologists and rehabilitation specialists. The extent of these members' involvement will be determined by the student's disabilities (e.g., emotional adjustment problems, language impairments, and motor skill deficits). Other, less likely members include physicians and nurses. Other than providing information that can be used for TBI diagnosis (a requirement for special education in some states), physicians' participation is generally lim-

ited to consultation. Few schools have nurses in-house; however, when the health-care needs of the student cannot be managed by other school personnel (e.g., dealing with tracheotomies and catheters), nurses are important team members and direct service providers to the student.

The case manager, perhaps the most critical team member other than the classroom teacher, is often assigned by the administrator because of his or her knowledge about TBI or willingness to learn. It is important for this person to be in a position to see the student often, preferably daily, to coordinate services. Coordinating services may also go beyond the boundaries of the school. To maximize community resources, such as state head injury associations and health service organizations, team members need to be aware of, and tied into, these agencies. These agencies are valuable resources not only for school personnel, but also for students and their families. In addition to general education teachers, support staff, such as clerical and cafeteria workers, bus drivers, and paraprofessionals, benefit from receiving information about these students.

### *Inservice Training*

One of the primary services of the team is inservice training for other key school personnel. Tyler and Mira (1993) stressed that inservice training should include both general information about head injury and its impact on behavioral, cognitive, and physical functioning, and specific information about the particular student's deficits and educational needs. Training should also include information about strategies that will assist students as they return to the classroom, including ways to modify the environment (i.e., adapting schedules, instruction, and behavior-management methods).

Inservice training serves another very important function, that is, alert-

ing staff to the possibility that some of their other students who are experiencing cognitive, behavior, or social problems may have had an earlier head injury (Michaud, Rivara, Jaffe, et al., 1993). Although they may never have been identified for any service, especially special education, this does not mean that they did not need it. Some may even be eligible for additional help under IDEA or Section 504.

### **Schedule for Reintegration Planning**

A thoughtful plan for reintegrating the student into the classroom is highly dependent upon the cooperation of a number of individuals, both inside and outside the school. Communication with hospital staff is especially important in the early stages; parent contact is essential throughout the period of time the student needs special assistance.

#### ***Immediately Following Injury***

Planning for reintegration should actually begin at the time the child is admitted to the hospital. If the school district or region has a TBI representative, he or she should be notified about the injury. This person should be able to assist in determining what resources are available, as well as the appropriate person to serve as the case manager. At this stage, contact is made with the family and a hospital representative. In some circumstances, hospital personnel will contact the schools, but school personnel need to be prepared to take responsibility for this. It may be necessary to obtain a release from the parents before making contact, especially if information about the student is provided to the hospital. Figure 2 provides a suggested checklist for these and other activities.

Information regarding the severity of injury needs to be obtained from the hospital, as this has been identified as a primary factor in recovery and long-term prognosis (Klonoff et al., 1993). Information as to how certain behaviors (in particular, agita-

tion and aggression) have been managed in the hospital is also important, as it may be helpful in planning for the student's return. Ineffective management of difficult behaviors in acute care settings increases the risk for continued problems with behavioral control (Papas, 1993). In addition to obtaining information about the student's health status, rehabilitation staff may also call on the school to be of assistance by providing them with information about the student's pre-injury strengths and weaknesses and supplying them with school texts and assignments, if needed. Rehabilitation staff may be able to use this information to conduct ecologically relevant assessments of the child's functioning and develop individualized treatment plans. Setting up situations that are similar to those that the student will face upon returning to school can be particularly useful.

A number of students with TBI will require ongoing medication management for behavior problems, as well as for medical concerns, such as headaches and seizures. Given the impact that medication alone can have on behavior and learning, educators need to have a basic understanding of the intended effects and unwanted side effects (e.g., sedation, excessive thirst and restroom trips).

#### ***After Stabilization***

After the student's condition has stabilized, a meeting needs to be arranged with the hospital representative, or case manager. This will be a good time to determine if schoolwork needs to be sent, and what special medical needs the student is likely to have upon return to school. A visit to the rehabilitation unit at the hospital not only will allow the educator to get information, but also will give students information about what is going on in school and an opportunity to talk about their feelings about returning. If a visit with the student is not possible, perhaps, the rehabilitation staff can provide a videotape that will demonstrate the student's progress. During

the student's hospital stay, educators also need to prepare for other physical concerns, including the student's need for assistive devices, continuing rehabilitation, and assistance with health-care needs. Despite the relatively fast rate of recovery of motor skill function, it still may be necessary to modify the school environment to accommodate these students (e.g., wheelchair access). Speaking with parents right before the student returns, and even visiting with the student at home, will provide an update on information about these and other problem areas (e.g., vision, hearing, fatigue, headache and other pain complaints).

An inservice should be conducted that provides general information about TBI, as well as specifics on the student's condition. Although inservices such as these will be unnecessary as educators build their knowledge base about TBI, at the present time they are important. In-class meetings may also be arranged to provide information to peers about the student's condition and to prepare them for his or her return, thus hopefully reducing the odds of the student with TBI being abandoned by peers who cannot adjust to the changes (e.g., in personality, social behavior and skills). The student with TBI, however, should be consulted about what information to share with his or her peers (Ylvisaker, Hartwick, & Stevens, 1991).

#### ***Upon Hospital Discharge***

At the time of discharge, parents and hospital representatives should be contacted by the school's designated case manager to obtain updated information about the child's condition. Copies of progress reports and pertinent hospital records (e.g., neuropsychological and psychoeducational evaluations, reports from physical therapists, occupational therapists, and speech pathologists) should be obtained. Special needs, such as speech or physical therapy, can also be assessed. At this time a tentative date for return to school can be set and a

Student: \_\_\_\_\_ School/Grade: \_\_\_\_\_

Date of Injury: \_\_\_\_\_ Parent Name/Phone #: \_\_\_\_\_

**IMMEDIATELY FOLLOWING INJURY***A school representative will be assigned to the case by administrator.**The school representative will:*

Contact parent(s) to:

- inquire about their child's condition
- obtain release for hospital contact (get release to and from school)

Contact the child's case manager at the hospital to:

- inform them of the school's concern

Meet with the child's classroom teacher(s) to:

- inform them of the child's condition
- obtain/review current educational records

**AFTER STUDENT'S CONDITION HAS STABILIZED***The school representative will:*

Arrange a meeting with the hospital case manager to:

- obtain information regarding the child's condition
- determine if/when to send school work

**PRIOR TO DISCHARGE***The school representative will:*

Visit with student and rehabilitation staff

Obtain copies of hospital evaluations (psychological, educational, PT/OT, speech)

Conduct inservice in school to:

- provide specific information about the student's condition
- provide more general information about TBI
- discuss potential modifications (ramp, wheelchair, lighting)

**IMMEDIATELY AFTER HOSPITAL DISCHARGE***The school representative will:*

Contact parent(s) to:

- determine if the child will be getting post-acute rehab. care
- set a tentative date for return to school, if no further rehab. is being provided

Follow-up with hospital case manager

- get update on discharge condition/special needs (i.e., tracheostomy, ambulation)

Establish a TBI team and designate a case manager (if different from representative)

*The team will:*

Develop a tentative plan for school reentry (consider need for environmental modification, special education, 504 and related services)

**ARRIVAL AT SCHOOL***The team will:*

- Assign personnel to conduct initial evaluation and give feedback to teachers and parents
- Further modify classroom environment to meet student's needs

**AFTER FIRST WEEKS AT SCHOOL***The team will:*

- Reassess the student's needs and modify educational plan accordingly
- Maintain contact with parents and teachers

**FIGURE 2.** Suggested school reintegration checklist.



tentative plan developed for school reentry. Any modifications to the school environment will need to be made at this time.

The timing of the student's return to school can be a factor in a successful transition. Preferably, before returning to the general classroom, the student should demonstrate capability in interacting within the school environment and an ability to respond to instruction. Mira and Tyler (1991) recommended that the student be able to tolerate multiple stimuli in the classroom and work unassisted for at least a half-hour. The exact criteria for returning to school will depend on the age of the student, as well as the school situation, but generally students should demonstrate that they can benefit from being back in the classroom (i.e., acquire new information and behave appropriately in social interactions).

### *Arrival at School*

Upon the student's return to school, the appropriate team members should conduct an initial evaluation. In many cases, this will be the responsibility of the school psychologist and/or speech-language pathologist; depending on the individual needs of the student, however, the special education teacher may also be involved. At this time, a reassessment of the student's educational needs must be made and any tentative educational plans modified as needed. Feedback needs to be provided to teachers and parents about the student's functioning. Parents may also need information about available services in the schools, and, when needed, special education laws (e.g., P.L. 101-476) and procedures (e.g., the assessment process, Individualized Education Programs [IEPs], right to due process). Some parents will also benefit from basic information about head injuries, including problems that can be expected and what they can do to manage their child's behavior at home and improve his or her performance in school (Zasler & Kreutzer, 1991).

### *In the Months Ahead*

Monitoring of school progress should not cease after the first few weeks. These students often require monitoring months and even years after their return to school. Some of these students do quite well once they settle into the routine of the classroom again, and receive additional assistance, but then begin to have difficulties at various junctures of their education, such as graduating from high school. Although issues that pertain to students' transition out of high school are beyond the scope of this article, it is important to recognize that these students are likely to need extra help and preparation when making that transition. A study by Baer (1992) showed that only 16% of high school students with disabilities received any postgraduate training or education, compared to 56% of students without any known disability.

Educators also need to keep in mind that progress monitoring should not be restricted to academic performance. The student's adjustment from a social and behavioral standpoint also needs to be considered, given the fact that problems in this area are often the most troublesome (Levin, 1987) and have the potential to interfere with later success.

## **Assessment**

Ensuring that a student receives appropriate services requires that assessments, like interventions, be aimed toward maintaining suitable levels of performance throughout the student's education. In order to do this, a student's prior level of functioning needs to be assessed. In addition, frequent assessment of progress after injury is necessary. Routine probing helps to determine what deficits are resolved and what changes are needed in terms of interventions. Because students with head injuries can recover considerable function in relatively short periods of time, specific interventions are often short-term compared to other disability categories, and so are the IEPs.

### *The IEP*

Federal law requires that the IEP address the current level of educational performance in the areas affected by the disability. Unlike most other special education students, the dramatic changes seen in students with TBI during the first several months after injury (Michaud, Duhaime, & Gatshaw, 1993) often require that their goals and objectives be more frequently reviewed to reflect the recovery process. This means that flexibility in programming is essential and that the IEP is an evolving program. A review of the IEP should be done once during the first 3 months, and periodically thereafter. Scheduling an IEP review in the spring of each school year will provide an opportunity to troubleshoot for difficulties encountered the previous year, and to plan for the next. Plans that might be considered to achieve continued progress include summer school or an extension of the student's regular school year, as well as the provision of a tutor or personal aide. Ongoing assessment is critical for ensuring that the IEP addresses problems that are interfering with the student's progress.

### *Nature of Assessment*

Because a traumatic brain injury can cause a wide variety of problems that interfere with a child's learning, many of the standard educational assessment tools are not adequate for evaluating the impact of injury. Tests such as the Wechsler scales and the Woodcock-Johnson can be useful but are most beneficial when used in conjunction with other neuropsychological measures. Table 1 provides a list of several tests that are typically found in a neuropsychological test battery. Many of these are familiar to school psychologists and educators, although some may not be. Neuropsychological assessments are generally conducted by means of a fixed or flexible battery of standardized tests. The two most widely used fixed batteries are the Halstead-Reitan (Reitan & Wolfson, 1993) and the Luria-Nebraska Neuro-



psychological Battery (Golden, Purisch, & Hammeke, 1985). These batteries contain a number of tests that measure cognitive, language, sensory, perceptual, motor, and attentional functions. Some tests measure memory functions, but supplementary memory tests, such as the Tests of Memory and Learning (Reynolds & Bigler, 1994), are recommended.

Regardless of the specific battery or tests that are selected, it is important that both a quantitative and a qualitative analysis of the child's test performance be made. Research has repeatedly demonstrated that children with TBI, even the more seriously injured, may fall in the "normal" range when their test scores are compared to those of the standardization group; however, the way in which they earned their scores is apt to be quite different (Fay et al., 1994). Assessing this difference is critical for designing interventions that maximize the student's learning style and strengths. Although it is preferable that testing be completed in the school, there may be occasions when testing needs to be done outside the school. For example, there may be cases where there is no professional in the school district or region who has adequate knowledge or experience with TBI to conduct an appropriate evaluation. In this case, a referral to an agency outside the school would be necessary.

### **Breadth of Assessment**

To further ensure that the assessment lends itself to the development of an appropriate educational plan, school staff should collect a thorough developmental, medical, family, and educational history. It is critical that the student's prior functioning (e.g., academics, social interactions) be assessed. This information, typically obtained from educational records and from talking with parents and teachers, will allow for the modification of the educational program to meet the student's needs. Many of these children have prior learning and behavior problems that can interfere with

postinjury progress (Michaud, Rivara, Jaffe, et al., 1993).

Informal assessments in a variety of situations, including one-on-one, small group, and large group interactions, can also provide important information about the child's functioning in settings that are less structured and more distracting, and that require more self-initiation. Informal assessments may also be useful for gathering information about other environments in which the child interacts, such as the home. Neither the child nor their

brain operates in a vacuum; rather, the student with TBI functions in an environment that consists of a family, a school, and a community. Assessment should focus on the demands that are placed on the student by these various environments and determine how well the student is responding to them. Assessment is also valuable in terms of divining how well each of the systems is functioning. In some cases, one or more of the environments is not functioning adequately enough to provide the services and support

**TABLE 1**  
Neuropsychological Test Instruments

<b>Intelligence</b>
Wechsler Intelligence Scales (WISC-III, WAIS-R, WPPSI-R); Kaufman Assessment Battery for Children; McCarthy Scales of Children's Abilities; Differential Abilities Scale
<b>Achievement</b>
Woodcock-Johnson Achievement Tests, Wechsler and Kaufman Achievement Scales, Gray Oral Reading Tests, Woodcock Reading Mastery Test, Key Math
<b>Language</b>
Clinical Evaluation of Language Fundamentals-Revised, Peabody Picture Vocabulary Test, Aphasia Screening Test, Token Test, Verbal Fluency Tests, Test of Oral Language Development, Test of Written Language, Preschool Language Scale-Revised
<b>Memory</b>
Tests of Memory and Learning, Wide Range Assessment of Memory and Learning, Wechsler Memory Scale-Revised, California Verbal Learning Test, Rey Osterrieth Complex Figure Test, Tactual Performance Test
<b>Attention</b>
Continuous Performance Test, Conners Ratings Scales, Attentional Deficit Disorders Evaluation Scale, Stroop Color and Word Test, Speech Sounds Perception Test, Seashore Rhythm Test
<b>Mental Flexibility and Concept Formation</b>
Wisconsin Card Sorting Test, Trail Making Test B, Category Test, Stroop Color and Word Test
<b>Visual Functions</b>
Rey Osterrieth Complex Figure, Motor-Free Visual Perception Test, Visual Motor Integration Test, Raven's Progressive Matrices
<b>Motor Functions</b>
Finger Tapping Test, Grooved Pegboard Test, Purdue Pegboard Test, Grip Strength, Bruininks-Osteretsky Test for Motor Proficiency
<b>Social and Adaptive Behavior</b>
Achenbach Child Behavior Checklist (parent, teacher, and youth forms); Vineland Adaptive Behavior Scales; Scales of Independent Behavior; AAMD Adaptive Behavior Scales (school and parent versions)
<b>Personality</b>
Personality Inventory for Children-Revised, Personality Inventory for Youth, Minnesota Multiphasic Personality Inventory-Adolescent

*Note.* Readers can locate these tests in *Tests in Print* (Murphy, Close-Conoley, & Impara, 1994).

these students need. Assessing family functioning is especially important, because the sudden onset of impairments and the uncertainty of outcome make it difficult for some families to cope (DePompei & Blosser, 1991). Once the child is discharged from the hospital, families are often left without the support network they have come to depend on. At the same time other children in the family begin to demand attention and parity with their siblings (e.g., household chores). Parents often find themselves with less time and fewer financial resources (DePompei & Blosser, 1991). Financial problems following injury can be due to a number of factors, including added costs for medical care and parents taking more time off from work to care for the child (Max, MacKenzie, & Rice, 1991).

### *Timing*

The timing of assessments, like interventions, is also an important consideration. Although formal assessments that are conducted during a more stable period of the student's recovery will typically be more helpful than those undertaken during periods of dramatic change (e.g., shortly after injury), it is also important that the child be evaluated as early as possible after injury, as postinjury IQ has been found to be one of the two best predictors of outcome (Klonoff et al., 1993). Regardless of when the student with TBI is tested, it is important to consider factors that may influence performance, such as physical problems, fatigue, and medication effects. These same factors can interfere with any planned interventions.

Many students will not be able to participate in a full-day program immediately after returning to school. In some cases, brief rest periods may suffice, while in other situations a reduction in the school day or class assignments will be necessary. Because children with TBI typically have more difficulty later in the day, more difficult subjects should be scheduled early

in the school day. Pull-out services by specialists such as speech pathologists and occupational therapists, as well as in-class side-by-side teaching, should also be timed to occur when the student is at the peak of her or his performance.

Scheduling also plays a key role in increasing academic productivity by reducing distractions and excessive stimulation. Some students will require early class release to avoid the congestion and chaos in hallways during class period changes. This may also benefit the student who has problems with balance and orientation by providing extra time to navigate the hallways and get to the next class safely. Aides can also help in this regard, by assisting the student to move about the school and access various facilities, including the laboratories. Although a peer tutor can assist these students with homework assignments and time management, caution needs to be taken when using peers in areas of hygiene.

### **Case Study: Frank**

While traveling over the Thanksgiving holiday, Frank, a 10th-grade student, was ejected from the family's car when it spun out of control and rolled over. As a result of the accident he suffered a severe brain injury. He was unconscious at the scene and remained in a coma for 1 week. He spent 2 weeks in intensive care and an additional 4 weeks in the hospital's rehabilitation unit. Two days after the accident, the school principal contacted Frank's parents. After determining that the injury was quite serious, the principal asked the school psychologist to serve as the school's representative and Frank's case manager.

The school psychologist phoned the rehabilitation unit and was put in touch with the speech therapist who was serving as Frank's hospital case manager. The school psychologist imparted details about Frank's prior school performance, including the fact

that he was receiving LD services at the time of the accident. Two weeks before discharge, the school psychologist visited Frank at the hospital and met with the speech therapist and other representatives from the rehabilitation team. The team provided copies of their evaluations at that time and also discussed their recommendations. Given the fact that Frank was continuing to be aggressive and noncompliant, the hospital team recommended that he spend some time in a postacute rehabilitation facility that specialized in behavior management. Frank was subsequently transferred to that facility. During the time he was at the facility, the school psychologist conducted an inservice training session at the high school to discuss issues pertaining to head injuries in general, as well as to Frank's particular case.

Although the school psychologist maintained biweekly contact with Frank's parents throughout Frank's 3-month rehabilitation stay, the school psychologist did not have any contact with the rehabilitation facility staff until 3 weeks prior to Frank's discharge. At this time the school psychologist met with the staff at the facility to obtain information about Frank's progress and current problems. An IEP meeting at the school was immediately arranged and held before Frank returned.

Because Frank did not exhibit any residual motor or language problems by the time he was discharged from the rehabilitation facility, the only school personnel at the meeting besides the school psychologist were the LD resource teacher who had worked with Frank before the accident, the school guidance counselor, and the principal. Frank and his parents also attended the meeting, along with one of the rehabilitation specialists from the facility. At the IEP meeting, the parents were given information about additional services the school could provide besides the LD services he was already receiving. A decision was made to change his diagnosis to TBI, although he was to continue to receive

resource from the LD consultant. In addition to this, counseling services were added to his IEP and biweekly meetings scheduled. There was unanimous agreement that Frank would have to gradually reintegrate into school by attending only half days for a couple of weeks and receiving home teaching the other half. As a result of fatigue and headache, it was actually 4 weeks before Frank was able to tolerate a full day.

Throughout the remainder of the year, the school psychologist monitored Frank's progress by maintaining weekly contact with the school counselor. IEP meetings were also held every 3 months to ensure that the services were adequate. Although there were no instances of physical aggressiveness in school, his teachers continued to complain that he was argumentative and noncompliant. He did not complete or turn in his homework on a regular basis and refused to participate in certain classroom activities. As a result of this, Frank was assigned a study buddy. Testing at the end of the year showed that Frank was achieving at a rate quite similar to the one before the accident. The decision was made to continue his LD services but keep him classified as TBI. To ensure that transition planning would be addressed by the age of 16, at the beginning of Frank's 11th-grade year a transition plan that included vocational education was added to his IEP. Frank acquired some mechanical skills while in the program and ended up graduating on time. Following graduation he got a full-time job with the forest service.

## Conclusions

Frank is a good example of a student who benefited from early and appropriate reintegration planning. However, not all adolescents who sustain a traumatic brain injury have as positive an outcome as Frank. Although recent changes in federal legislation have paved the way for stu-

dents with TBI to receive this type of service, educators often feel unprepared to address the unique needs of these students. Most educators are not well informed as to what TBI is all about and do not know what to do for these students. Given the range of problems that occur as a result of TBI, this is not surprising. Because recovery often takes months, or even years, schools are an important extension of rehabilitation that begins in the hospital. In order to provide the service that these students need, school personnel must be prepared in advance to help them as they return to school. A well-thought-out, comprehensive plan for services that takes into account the student's strengths and weaknesses, both before and after injury, is critical if the student is to succeed academically and socially. Frequent reassessment of the plan and modification of goals and objectives that reflect the student's recovery are essential in order to provide all the academic and social support that is needed, when it is needed. Even the most creative and flexible educational plan, however, does not guarantee that reentry into school will be easy. Reentry is challenging for students with TBI regardless of the circumstances (Savage & Wolcott, 1988). Educators who are aware of this and have some knowledge of what to do to assist these students as they return to the classroom, will have the best chance at helping the student meet these challenges.

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### REFERENCES

Anderson, N. (1995). *Perceptions of school-based professionals regarding traumatic brain*

*injury*. Unpublished master's thesis, University of Utah, Salt Lake City.

Baer, R. (1992). *One year follow-up of Utah students exiting special education in 1990-92*. (Available from Mountain Plains Regional Resource Center, 178 N. Research Parkway, Suite 112, Logan, UT 84321)

Begali, V. (1992). *Head injury in children and adolescents*. Brandon, VT: Clinical Psychology.

Bijur, P. E., Haslum, M., & Golding, J. (1990). Cognitive and behavioral sequelae of mild head injury in children. *Pediatrics, 86*, 337-344.

Blosser, J. L., & DePompei, R. (1989). The head-injured student returns to school: Recognizing and treating deficits. *Topics in Language Disorders, 9*(2), 67-77.

Blosser, J. L., & DePompei, R. (1991). Preparing education professionals for meeting the needs of students with traumatic brain injury. *Journal of Head Trauma Rehabilitation, 6*(1), 73-82.

Carney, J., & Gerring, J. (1990). Return to school following severe closed head injury: A critical phase in pediatric rehabilitation. *Pediatrician, 17*, 222-229.

Chadwick, O., Rutter, M., Brown, G., Shaffer, D., & Traub, M. (1981). A prospective study of children with head injuries: II. Cognitive sequelae. *Psychological Medicine, 11*(1), 49-61.

Costeff, H., Groswasser, Z., & Goldstein, R. (1990). Long-term follow-up review of 31 children with severe closed head trauma. *Journal of Neurosurgery, 73*, 684-687.

DePompei, R., & Blosser, J. L. (1991). Families of children with traumatic brain injury as advocates in school reentry. *Neuro-Rehabilitation, 1*, 29-37.

DiScala, C., Osberg, J. S., Gans, B. M., Chin, L. J., & Grant, C. C. (1991). Children with traumatic head injury: Morbidity and post-acute treatment. *Archives of Physical Medicine & Rehabilitation, 72*, 662-666.

Ewing-Cobbs, L., Levin, H. S., Eisenberg, H. M., & Fletcher, J. M. (1987). Language functions following closed-head injury in children and adolescents. *Journal of Clinical and Experimental Neuropsychology, 9*, 575-592.

Fay, G. C., Jaffe, K. M., Polissar, N. L., Liao, S., Rivara, J. B., & Martin, K. M. (1994). Outcome of pediatric traumatic brain injury at three years: A cohort study. *Archives of Physical Medicine & Rehabilitation, 75*, 733-741.

Filley, C. M., Cranberg, L. D., Alexander, M. P., & Hart, E. J. (1987). Neurobehav-



- ioral outcome after closed head injury in childhood and adolescence. *Archives of Neurology*, 44, 194–198.
- Golden, C. J., Puisch, A. D., & Hammeke, T. A. (1985). *Luria-Nebraska neuropsychological battery: Forms I and II manual*. Los Angeles: Western Psychological Corp.
- Goldstein, F. C., & Levin, H. S. (1985). Intellectual and academic outcome following closed head injury in children and adolescents: Research strategies and empirical findings. *Developmental Neuropsychology*, 1, 195–214.
- Greenspan, A. L., & MacKenzie, E. J. (1994). Functional outcome after pediatric head injury. *Pediatrics*, 94(2), 425–432.
- Jaffe, K. M., Fay, G. C., Polissar, N. L., Martin, K. M., Shurtleff, H. A., Rivara, J. B., & Winn, H. R. (1993). Severity of pediatric traumatic brain injury and neurobehavioral recovery at one year—A cohort study. *Archives of Physical Medicine & Rehabilitation*, 74, 587–595.
- Katsiyannis, A., & Conderman, G. (1994). Serving individuals with traumatic brain injury. *Remedial and Special Education*, 15, 319–325.
- Klonoff, H., Clark, C., & Klonoff, P. (1993). Long-term outcome of head injuries: A 23 year follow up of children with head injuries. *Journal of Neurology, Neurosurgery and Psychiatry*, 56, 410–415.
- Knight, R. M., Ivan, L. P., Ventureyra, E. C., Bentivoglio, C., Stoddart, C., Winogron, W., & Bawden, H. N. (1991). The effects of head injury in children on neuropsychological and behavioral functioning. *Brain Injury*, 5, 339–351.
- Kraus, J. F., Fife, D., & Cox P. (1986). Incidence, severity and external causes of pediatric brain injury. *American Journal of Diseases of Children*, 140, 687–693.
- Kraus, J. F., Rock, A., & Hemyarai, P. (1990). Brain injuries among infants, children, adolescents and young adults. *American Journal of Diseases of Children*, 144, 684–691.
- Lanser, J. B., Jennekens-Schinkel, A., & Peters, A. C. (1988). Headache after closed head injury in children. *Headache*, 176–179.
- Lash, M. (1994, Summer). *Families and students get caught between medical and educational systems*. (Available from Research and Training Center in Rehabilitation and Childhood Trauma, 750 Washington St., #75K-R, Boston, MA 02111)
- Levin, H. S., Benton, A., & Grossman, R. G. (1982). *Neurobehavioral consequences of closed head injury*. New York: Oxford University Press.
- Long, C. J., & Ross, L. K. (1992). *Handbook of head trauma*. New York: Plenum Press.
- Max, W., MacKenzie, E. J., & Rice, D. P. (1991). Head injuries: Costs and consequences. *Journal of Head Trauma Rehabilitation*, 6, 76–87.
- Michaud, L. J., Duhaime, A., & Gatshaw, M. L. (1993). Traumatic brain injury in children. *Pediatric Clinics of North America*, 40, 553–565.
- Michaud, L. J., Rivara, F. P., & Grady, M. S. (1992). Predictors of survival and severity of disability after severe brain injury in children. *Neurosurgery*, 31, 254–264.
- Michaud, L. J., Rivara, F. P., Jaffe, K. M., Fay, G., & Dailey, J. L. (1993). Traumatic brain injury as a risk factor for behavioral disorders in children. *Archives of Physical Medicine and Rehabilitation*, 74, 368–375.
- Mira, M. P., Meck, N. E., & Tyler, J. S. (1988). School psychologists' knowledge of traumatic head injury: Implications for training. *Diagnostique*, 13, 174–180.
- Mira, M. P., & Tyler, J. S. (1991). Students with traumatic brain injury: Making the transition from hospital to school. *Focus on Exceptional Children*, 23(5), 1–12.
- Morgan, D. P., & Jenson, W. R. (1988). *Teaching behaviorally disordered students: Preferred practices*. Columbus, OH: Merrill.
- Murphy, L. L., Close-Conoley, J., & Impara, J. C. (1994). *Tests in print* (Vol. 4). Lincoln: University of Nebraska Press.
- Papas, B. (1993). Managing aggression: New strategies for the hospital setting. *Headlines*, 4(2), 2–8.
- Reitan, R. M., & Wolfson, D. (1993). *The Halstead-Reitan neuropsychological test battery*. Tucson, AZ: Reitan Neuropsychology Lab.
- Reynolds, C. R., & Bigler, E. D. (1994). *Tests of memory and learning*. Austin, TX: PRO-ED.
- Rutter, M. (1981). Psychological sequelae of brain damage in children. *American Journal of Psychiatry*, 138, 1533–1544.
- Savage, R. (1985). *A survey of traumatically brain injured children within school-based special education programs*. Rutland, VT: Head Injury/Stroke Independence Project.
- Savage, R. (1991). Identification, classification and placement issues for students with traumatic brain injuries. *Journal of Head Trauma Rehabilitation*, 6(1), 1–9.
- Savage, R. C., & Wolcott, G. F. (1988). *An educator's manual: What educators need to know about students with traumatic brain injury*. Southborough, MA: National Head Injury Foundation.
- Savage, R. C., & Wolcott, G. F. (1994). *Educational dimensions of acquired brain injury*. Austin, TX: PRO-ED.
- Thompson, N. M., Francis, D. J., Stuebing, K. K., Fletcher, J. M., Ewing-Cobbs, L., Miner, M. E., Levin, H. S., & Eisenberg, H. M. (1994). Motor, visual-spatial and somatosensory skills after closed head injury in children and adolescents: A study of change. *Neuropsychology*, 8(3), 333–342.
- Thomsen, I. (1984). Late outcome of very severe blunt head trauma: A 10-15 year second follow-up. *Journal of Neurology, Neurosurgery and Psychiatry*, 47, 260–268.
- Utah State Office of Education (USOE). (1993). *Guidelines for serving students with traumatic brain injuries*. Salt Lake City: USOE.
- Winogron, H. W., Knights, R. M., & Bawden, H. N. (1984). Neuropsychological deficits following head injury in children. *Journal of Clinical Neuropsychology*, 6, 269–286.
- Ylvisaker, M. (1986). Language and communication disorders following pediatric head injury. *Journal of Head Trauma Rehabilitation*, 1(4), 48–56.
- Ylvisaker, M., Hartwick, P., & Stevens, M. (1991). School reentry following head injury: Managing the transition from hospital to school. *Journal of Head Trauma Rehabilitation*, 6, 10–22.
- Ylvisaker, M., & Weinstein, M. (1989). Recovery of oral feeding after pediatric head injury. *Journal of Head Trauma Rehabilitation*, 4, 51–63.
- Zasler, N. D., & Kreutzer, J. S. (1991). Families of children with traumatic brain injury as advocates in school reentry. *Neuro-Rehabilitation*, 1, 29–37.