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A review of the effects of traumatic brain injury among school aged children: implications for the occupational therapist and intervention team

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A Review of the Effects of Traumatic Brain Injury Among School Aged Children:
Implications for the Occupational Therapist and Intervention Team

A Scholarly Project

by

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CHAPTER I
INTRODUCTION

Prevalence and Causes

The incidence of pediatric traumatic brain injuries (TBI) is approximately 200 per 100,000, with a mortality rate of 10 percent. Statistically, boys are two times as likely as girls to sustain a TBI and their injuries are more likely to be severe or fatal. Children sustaining a TBI often show an increased incidence of premorbid hyperactive or aggressive personalities, and impulsivity (Francel & Snell, 1999).

The cause of brain injuries in pediatrics are numerous and differ from those of adults. According to Francel and Snell (1999), child abuse is the most common cause of TBI in infants younger than two years of age. These acquired brain injuries due to non-accidental factors result from a variety of mechanisms ranging from direct blows to the head to shaking injuries, such as “Shaken Baby Syndrome”. These non-accidental injuries tend to be seen in the younger age groups with approximately 61% of admissions involving children less than 12 months old, and are the most common cause for serious brain injury in this age group. It has been reported that 64% of head injury admissions to hospitals and 95% of serious intracranial injuries in this age group are secondary to child abuse (Wyllie, 1998).

Falls are reported to be the major cause of TBI in children four years of age and younger. As children get older, vehicle-related incidents such as bicycle and recreational activity incidents surpass falls in frequency. In the later years, as children become more
involved in contact athletics, TBI related to recreational injuries continue to increase in frequency (Francel & Snell, 1999).

Children post-traumatic brain injury (TBI) experience a host of physical, emotional, psychological, and social effects of the injury, particularly as they return to school. At the point of return to school, expectations for performance in all realms are increased in contrast to the prior protected therapeutic environments of the rehabilitation setting. Children post-TBI often struggle to meet the increased performance level expected by their teachers, peers, and family members. This study reviews the literature regarding the physical, emotional, psychological, and social consequences of a traumatic brain injury among school aged children, ages 5 to 18 years.

Through an extensive review of literature, the array of effects of traumatic brain injury among school aged children are identified, including the impact upon performance in areas of occupation. The review focuses on the relevant aspects pertaining to the occupational therapist’s role in treating a child, between the age of 5-18 years, with a traumatic brain injury in a school-based setting.

*Occupational Therapy’s Role*

Occupational therapy (OT) is one of the major team members involved in the rehabilitation process for children with TBI. Occupational therapy for children and adolescents post-TBI focuses on understanding how their ability to function has changed as a result of the injury, and how to best promote ongoing development and maximal independence in activities of daily living (Wilkins, N., Steinwender, S., & Hill, S. 2000).

In conjunction with ongoing remediation training, the occupational therapist teaches the child compensatory strategies that will assist him or her in performing ADL’s
easier. For example, teaching the child how to use a daily planner is one intervention to remember schedules of appointments, homework assignments and friends’ phone numbers. The OT can also facilitate the child’s awareness of their strengths and impairments following the brain injury, as well as their ability to adjust to new life roles and participate in both new and old meaningful activities (Wilkins, 2000).

Although children with acquired brain injuries may develop new problems as they mature and are faced with new challenges, OT can play a key role, along with other team members, in providing periodic reassessment and consultation. Knowledge of the child’s changing status at the key transition times in the child’s life will help the OT provide useful coping strategies for daily life. The occupational therapist will work along with the teacher and other professionals in order to meet the student’s physical, emotional, psychological, and social needs.

Some examples of techniques occupational therapists utilize in therapy sessions include: tasks specifically designed to help the student focus his/her attention (e.g., simple maze learning tasks or letter/number cancellation tasks, emphasizing speed, accuracy, and the self-instructions that promote heightened attention to tasks); help the student to transfer this improved, self-directed attending skill into the classroom environment. The OT also addresses the students’ memory deficit by teaching the student how to utilize one or more of the following techniques: visual imagery, “chunking” techniques (organizing information into easily retrieved segments), association techniques, mnemonic devices (such as acronyms, repetition and rehearsal techniques), or adaptive devices such as appointment books, calendars, alarm watches and tape recorders.
Through extensive review of literature the authors will develop an informational packet for occupational therapist to use in education teachers and parents of children and adolescents post-TBI. This informational packet will give occupational therapist in a school setting a resource to begin education other professionals on the effects of TBI on school aged children.
CHAPTER II
REVIEW OF LITERATURE

Objectives

This chapter provides an overview of professional literature that addresses the various impairments children and adolescents post-traumatic brain injury experience as well as how these impairments affect the school re-entry process. It is intended to assist 1) occupational therapists and 2) teachers, parents, and other service providers in understanding the various challenges that arise as a result of a pediatric traumatic brain injury. The following sections will discuss the prevalence, causes, and impairments of post-TBI in children and adolescents.

Overview of Impairments Post Traumatic Brain Injury

Traumatic brain injuries can result in a broad range of deficits and changes that affect both the physical and mental functioning of the child. TBI can initially result in loss of consciousness, vomiting, headaches, irritability, dizziness, visual change, and amnesia. Post-traumatic symptoms of TBI include physical, emotional, psychological, and social effects (Rosenthal, Griffith, Kreutzer, & Pentland, 1999).

Typically, brain injuries are classified as “mild”, “moderate”, or “severe”. Individuals with a mild traumatic brain injury experience a concussion and a brief or momentary loss of consciousness. They experience symptoms including dizziness, fatigue or mental slowness that usually improve over several months. Individuals who suffer from a moderate brain injury experience a loss of consciousness, for several minutes or hours. Typically, this loss of consciousness is followed by days or weeks of confusion. In individuals with a moderate TBI, there are noticeable physical and or
cognitive impairments that may persist anywhere from several months to a lifetime. A severe brain injury results in prolonged unconsciousness, or coma. Survivors of a severe TBI generally experience permanent physical and or cognitive impairments (Kaushansky, 2000).

Approximately 70% of all brain injuries are usually considered “mild”. For the majority of children, “mild” brain injury symptoms usually resolve in about three to six months. However, this is not the case for “moderate” or “severe” brain injuries. Moderate and severe brain injuries drastically change the life of the brain-injured child as well as the life of their family (Kaushansky, 2000).

For children whose injury is in the “moderate” to “severe” category of brain injury, there are typically post-traumatic cognitive and psychosocial problems which emerge. The most significant of these issues relate to the injury of the child’s foundation, including the disruption of language, reading, and math skills as well as the fact that the developmental processes and timetable of the learning brain may have been altered or disrupted (Kaushansky, 2000). Psychosocial problems include inappropriate social behavior, impulsivity, impaired communication skills, etc.

When disruption in the brain occurs during the child’s development, he or she begins to developmentally lag behind his or her peers and, as a result, experiences loneliness. Socially, the child may experience changes in his or her social life, often resulting in the child feeling isolated and depressed. Since these children don’t have the inner coping mechanisms to deal with these changes, it is the responsibility of the caregivers and health providers who surround this child, to offer the child support throughout these changes (Kaushansky, 2000).
In order to offer adequate support, occupational therapists, caregivers, educators, and service providers need to be aware of the effects of brain injuries in children. The major areas of development that become affected by such brain injuries include attention, memory, oral and written language, multi-tasking, motor skills and abstract problem solving. All of these brain-based inefficiencies effect the child’s performance in school as well as their social interactions within the community. (Kaushansky, 2000). For example, the child may have difficulty providing directions to their home, may have difficulty paying attention in school, the child’s speech may not be easily understood by others, etc.

The effects of TBI grow more complex as the child matures and faces new challenges. For example, as the child ages he or she may experience difficulty with complex problem solving or abstract thinking. Although neuroplasticity allows young children to develop alternative neural pathways, these alternative pathways may be less efficient and may compromise the original function of the compensating structures. Through alternative pathways, the child may develop compensatory or atypical strategies to achieve desired skill levels. For example, some children or adolescents may perform tasks one-handed that would typically be easier to perform bilaterally (i.e., tying shoes). These compensatory strategies will improve function at the child’s current developmental level but may interfere with the overall developmental process and cause delays at some future point in development. The child’s compensatory “swapping” of functions allows the overriding of a system or a function that the young child does not yet need, resulting in other impairments that appear much later in life (Cronin, 2001).
Another critical developmental period is adolescence. During adolescence features of “independence, achievement, competitiveness, sexuality and work-ethic” develop (Kaushansky, 2000, p13). By sustaining a brain injury during this period of development, the adolescent may not understand or be able to practice these pre-adult lessons, thus making it difficult for the adolescent to function appropriately within the community (Kaushansky, 2000). A common manifestation of TBI occurring during adolescents is inappropriate sexual behaviors, impulsivity, difficulty with abstract problem solving, etc.

The fact that the brain of the child or adolescent is still in development creates further difficulties for the adolescent population post-TBI. For example, the frontal lobes, which are considered to be the “supervisor or overseer” of the brain, do not mature until the mid-teens. Therefore, judgment, ability to reason and the understanding of cause and effect of actions, which is the job of the frontal lobes, may only partially develop, thus leading to further obstacles that the child or adolescent must overcome (Kaushansky, 2000).

Taking into consideration all these factors related to a pediatric brain injury, the importance of rehabilitation, educational accommodations, and a support group for children and adolescents who have acquired a brain injury is evident. The fact that a child or adolescent’s brain is still developing, means that additional education and support be provided for all those who are involved with the child or adolescent (Kaushansky, 2000).

Children with mild and moderate TBI have fewer limitations but often experience a number of transient impairments that may affect school performance. These include
decreased motor control, orthopedic impairments, somatosensory system impairments, sensory system impairments cardiopulmonary impairments, cognitive impairments, psychosocial and behavioral impairments, and communication impairments (Cronin, 2001). Examples of specific limitations affecting occupation and daily life, including school performance, will be discussed in the following paragraphs.

Immediate and Long-term Impairments

**Decreased motor control.** Common initial motoric problems seen in children post traumatic brain injury include muscle stiffness; movement problems such as apraxia and motor planning; changes in muscle elasticity for example high tone and low tone; paralysis; and speech impairments such as aphasia, word finding problems and enunciation. Between 5% and 30% of children with TBI manifest some motor control impairments and may show improvements for up to 7 years after the injury (Cronin, 2001). Some long-term musculoskeletal problems include muscle contracture, altered joint mobility or stability, muscle disuse resulting in atrophy or muscle weakness, and decreased muscular endurance (Cronin, 2001).

**Orthopedic impairments.** Spasticity and prolonged posturing during the recovery period may lead to limitations in joint range of motion. Types of posturing include flexion and extension patterns and internal rotation. These can be prevented through ongoing skilled positioning, and motor interventions, provided by an occupational therapist (Cronin, 2001).

**Somatosensory system impairments.** Sensory perception may be impaired following TBI. Commonly reported difficulties are impaired postural awareness and orientation, sensation impairments such as impaired proprioception and tactile
hypersensitivity, difficulty grading muscle force which can be apparent in writing tasks (i.e. the inability to grade the amount of pressure applied when writing, thus resulting in fatigue), and increased latency before muscle firing which impairs safety reflexes. In addition, children may demonstrate impaired motor planning, tactile sensory dysfunction, and spatial disorientation (Cronin, 2001).

*Sensory system impairments.* Audiological and visual system impairments may develop as a result of brain injury. Common visual problems include diplopia, hemianopsia, changes in visual acuity and visual perception (Cronin, 2001). These sensory system impairments impact school performance by making simple classroom tasks such as reading the board and assignments difficult.

*Cardiopulmonary impairments.* Hypertension and decreased heart rate variability are common after effects of TBI among children secondary to a brain stem disturbance and deconditioning. Although the bulk of the problems are expected to resolve with neurological recovery, in some cases, continued cardiopulmonary inefficiencies persist. Cardiopulmonary limitations of this type could exaggerate other functional impairments or limitations the child may have in motor performance or cognitive organization (Cronin, 2001). Daily occupation or school performance may be impacted in the following ways: the child will demonstrate decreased endurance therefore physical activities may have to be limited (i.e. physical education activities, playground activities, etc.)

*Cognitive impairments.* Deficits in cognition cause some of the most severe problems for individuals with a TBI. The motor problems described previously are interrelated with cognitive and behavioral problems. Attention, concentration, judgment,
and impulse control are the most common persistent cognitive deficit areas in children with TBI. Functional limitations associated with these cognitive deficits may include poor initiation of tasks and difficulties with memory and decreased information processing speed. These deficits may have implications for performance in the student’s ability to complete school work in a timely manner. Often these cognitive deficits are lasting impairments following a TBI (Cronin, 2001).

**Psychosocial and behavioral impairments.** Psychosocial and Behavioral Impairments may include personality changes, mood lability, loss of self-confidence, impaired short-term memory, headaches, and other subtle cognitive impairments. Functional problems associated with these impairments may include lack of goal direction and initiative, social withdrawal, depression, denial of disabilities, immature behavior, apathy, self-centeredness, disinhibition, and aggression (Cronin, 2001). All these psychosocial and behavioral impairments will impact the student’s ability to make and maintain social relationships with peers, and interfere with their school performance.

**Communication impairment.** Children post-TBI may experience impairments in both expressive and receptive language. In mild to moderate TBI it is common to see expressive language being more impaired than receptive. Deficits most commonly noted include memory, word retrieval, labeling, verbal organization, efficient verbal learning, the effective use of spoken language. These deficits will have an impact on students’ ability to communicate with teachers and peers, thus impairing his or her social and school performance. Improvements in speech correlate with improvements in motor function. Receptive language improvements correlate with gains in cognitive and perceptual function (Cronin, 2001).
Long-Term Developmental Impairments

Of the few studies describing long-term recovery from pediatric head injury, most indicate that children have far fewer residual deficits than adults. However, recent studies suggest that children demonstrate less impairment early in recovery, but deficits can emerge later as the child matures. Common problems may include need for supervision in administrative tasks, writing letters and calculating numbers, planning the week, and using public transportation. These problems can be subtle and difficult to identify in children because during childhood, autonomous function gradually develops (Cronin, 2001).

The impairments described in the previous sections strongly affect the school reentry process for children with TBI. The following section will address the school reentry process as well as what available resources are needed to support the child and promote successful school reentry and continual success throughout the student’s school career.

School Reentry

Children and adolescents who sustain brain injuries present a major challenge to the school system. Some students are often encouraged to return to school too quickly after their accident leaving school personnel unprepared for dealing with these students in this acute recovery stage (Littleford, 2000).

Some children and adolescents post-TBI and their parents face many obstacles in regards to school reentry. These obstacles include 1) inappropriate classroom placement, 2) ineffective educational intervention strategies, 3) insensitivity on the part of mainstream teachers, 4) limited teacher education or understanding, 5) isolation of the
child and parent from previous activities and social groups and 6) the burden of homework demands (Littleford, 2000). Other obstacles impede the reintegration process. These are lack of funding; lack of appropriate classroom placements, less academic, more vocational skills-based classes; complexity of the diagnosis, particularly when combined with pre-existing learning, language and behavior issues; and fear of the cognitive and behavior outcome (Littleford, 2000).

Students post-TBI will have much variability in the nature and duration of the rehabilitation, the schools they attend (including the schools’ experience with TBI), the families, and their supports. Because of this variability, seeking a single school reentry program or a process that is applicable to all students is not appropriate. The school reentry program must be individualized to the students unique and specific needs. It must also be flexible for the child is continually developing and there abilities and needs are constantly changing (Ylvisaker, 1998).

Facilitation of Cognitive and Behavioral Outcomes

As children with TBI return to home and schools they are often faced with long-term impairments that impede their ability to function. Primary care clinicians and educators who work with these children often lack information about their long-term abilities to function. Coordination of rehabilitation therapists and school therapists prior to school reentry can speed up the evaluation procedure and ease the reentry process. This can avoid delays in services for families and children who are already emotional and physically stressed. Strategies that assist with the transition back to school include the following: building a team that includes the family, child, educators, and rehab professionals; acquiring information, including an assessment of the child’s performance
and support for educators in planning an educational program; adapting the curriculum to meet the student's individual needs; offering options for learning; preparing the student for transitions; and establishing a comprehensive individual educational plan (IEP) (Yim-Chiplis, 1998).

A brain injury may affect the growing child by causing the child or adolescent to lose some of their previously learned skills, reduce their performance of a skill, or change the child's ability to achieve a future developmental level. Thus, the effects of a brain injury may not appear until schoolwork demands a higher level of performance from the child (Yim-Chiplis, 1998).

A child with a brain injury needs frequent educational assessments, especially during educational stress points where the child is expected to operate at a more independent level than previously expected, such as during the transition from elementary to middle school, or middle school to high school. Monitoring a child's progress every 30 to 60 days during the first year post-injury is recommended due to the variability in performance, which is common in children with TBI (Yim-Chiplis, 1998). The student's progress is monitored by the treatment team which includes the occupational therapist, physical therapist, speech language pathologist, special education teachers, parents and school administrator.

Educators indicate a need for additional support and education in managing students with TBI (Cronin, 2001). The child with TBI must be provided with emotional support, informational supports, and physical supports in the transition to school and be provided with continual support beyond the point of apparent cognitive recovery. Recommended transition services include (a) establishing communication among all
those involved in caring for the child (b) initiating the evaluation process, (c) integrating assessment information in an interdisciplinary forum, (d) planning and adapting educational programs to meet the student’s needs, (e) preparing the student for transitions, and (f) providing ongoing monitoring for late-emerging functional deficits (Cronin, 2001).

When establishing a school program for individuals with TBI it is important that the team members understand the unique challenges each child, adolescent, and their families face in planning appropriate individualized transition, reintegration, and maintenance plans within a school program. Proactive planning and treatment are central to successful involvement in school over the student life cycle. Proactive planning and treatment include continual assessment of the student’s function and adequate communication among all team members. Being proactive enables school personal and family to identify challenges that might affect success, formulate directions for change, establish priorities for education, define the roles of important individuals in the school environment, and develop strategies and plans for accomplishment of goals. It also allows equal partnerships with families in the planning and treatment process (Rosenthal, Griffith, Kreutzer & Pentland, 1999).

Chapter III will discuss ten questions the planning team can address as it develops an educational plan for the student with TBI.
CHAPTER III

ACTIVITIES AND METHODOLOGY

Through an extensive literature review, the authors developed an informational packet for school-based occupational therapists, teachers and parents of children and/or adolescents with a traumatic brain injury. This packet focuses on 1) long-term cognitive effects of a traumatic brain injury on classroom functioning; and 2) suggestions for instructional and compensatory strategies for teachers to utilize in their classroom. The packet also provides parents with helpful tips and information on an individual educational plans and individualized transitional plan. The role of the occupational therapist is also described, with a few examples.

The following information from Rosenthal, Griffith, Kreutzer & Pentland (1999) and Cronin (2001) form the basis for the development of the information packet described in chapter IV.

There are 10 questions the planning team can ask as it develops an educational road map for the journey of the student with TBI (Rosenthal, Griffith, Kreutzer & Pentland, 1999, p 393-403). These questions will be discussed in the following sections and in Chapter IV.

1.) What Basic Information Do We Need?

To serve children and adolescents with TBI, knowledge about the laws, rules, and regulations that can affect service provision is essential. These laws, rules, and regulations ensure that these students post-TBI receive the services they need to promote success in school and in the community.
Laws, Rules, and Regulations

Several initiatives through national and state legislation and international accreditation bodies have provided the incentive for developing procedures for treatment and community access for children and adolescents. These include the following: the Americans with Disabilities Act (ADA), Individuals with Disabilities Education Act (IDEA), Section 504 of the Rehabilitation Act of 1973, and Commission on Accreditation for Rehabilitation Facilities (CARF) new standards for TBI and children with medical conditions.

*Americans with Disabilities Act*

The present ADA provides individuals with disabilities with access and accommodation to employment, transportation, government activities, and communication. Children with TBI have access to all provisions of ADA (Rosenthal, 1999).

*Individuals with Disabilities Education Act (IDEA)*

The IDEA legislation requires states and schools to provide eligible children with special services, including occupational therapy, physical therapy, and speech therapy, to assure academic access. TBI is a disability category under IDEA, and children exhibiting functional problems are eligible for referral and screening for early intervention or school services (Cronin, 2001).

*Individualized Education Program (IEP)*

The IEP supports the entire educational program planning for students with special needs. It is the educational map that guides what is provided for the student and the contract between the family and school for the delivery of educational services to the
child. The IEP team consists of the child, family, educational representatives, and health related clinicians. The IEP is typically written annually by the special education teacher with input from all team members (Rosenthal, 1999).

*Individual Transition Plan (ITP)*

The ITP is a plan for transition to and from school for individuals with disabilities. It includes information about how the school and other agencies plan to assist the child with the transitioning process including transitioning the child or adolescent into the community, a new job or to independent living. The ITP can be incorporated into the IEP or written as a separate document (Rosenthal, 1999).

*Section 504 of the Rehabilitation Act of 1973*

Section 504 ensures that all students with disabilities have access to appropriate postsecondary education and provides for schools to prepare these students for that opportunity (Rosenthal, 1999).

*Commission for Accreditation of Rehabilitation Facilities Standards (CARF)*

In July 1997, CARF outlined special educational regulations for children and adolescents who have medical problems, including TBI. These regulations include the following: 1.) The inclusion of a developmental specialist and educational specialist services; 2.) the coordination of school reintegration services that require the collaboration of hospital and school personal and the knowledge of laws and regulations regarding special education services; 3.) the inclusion of the student’s family in the school reentry process, designating them as planners and decision-makers (Rosenthal, 1999).
2.) What Systems Can Help?

Children and Adolescents Post-TBI are continually confronted with new challenges every time they transition from one situation to the next, or from one setting to another. In school, the child and adolescent is faced with a new challenge whenever he or she is required to change subjects, transition to another classroom or building, or when he or she is changes teachers or study groups. In order to be successful and adequately adapt to these transitions a student post-TBI requires a continual comprehensive service that assists the student through each transition including transitioning from the emergency room through rehabilitation programs, into the school, and into the community. A transitional service that is appropriate to the individual strengths and needs of the student post-TBI can only be ensured if an adequate networking process that ensures good communication is in place (Rosenthal, 1999).

Transitioning and networking for the child or adolescent is necessary throughout the life of the individual. General guidelines for transitioning the child or adolescent into school, community, or vocational opportunities may include the following:

1. Inclusion of the child or adolescent and his or her family as active participants in the transition process.

2. Providing the child or adolescent with options and opportunities to participate in a variety of community experiences.

3. Including a vocational assessment in the IEP or ITP for the student after he or she reaches the age of 14.

4. Clearly identify the transitions that the child or adolescent is likely to encounter.
5. Developing a multiyear transitional plan that includes the students needs, strengths, and interests, and taking steps to ensure that the student will develop the necessary skills needed to be successful.

6. Keeping a record of the individuals who will be responsible for the delivery of transitional services for the student.

7. Establishing interagency collaborative agreements to develop action plans to deliver transitional services for the student.

8. Developing policies to ensure that treatment plans will be in place at the beginning of each transition.

9. Preparing the environment for the student to facilitate full inclusion and participation (Rosenthal, 1999).

3. Where is This Student Now?

In order to understand the student's potential for performance in the classroom, it is necessary to know his or her impairments, strengths, and needs, and how these behaviors may impact overall performance in the classroom. Providing consistent and appropriate assessments by the treatment team throughout the child’s school year is necessary to keep current with the child’s current level of functioning (Rosenthal, 1999).

4. Where Do We Want the Student to Go?

Long term educational goals and activities should be discussed and agreed upon by treatment team. They should be designed to bring about the desired educational outcomes. All those who have a role in the student’s success need to have an equally active role in this discussion (Rosenthal, 1999).
5. When Do We Want The Student To Get There?

Timelines and outcomes should be designed for the child or adolescent’s performance, the strategies to use, the people involved, and the desired outcomes. These timelines and outcomes should be continually evaluated due to constant transitions (Rosenthal, 1999).

6. Who Do We Want and Need to Help?

People with the most significant involvement in the child and adolescent’s life should be involved in the planning and implementation of programs. These people need to understand TBI, the child or adolescent’s strengths and limitations, the policies regarding school placement and programming, the likely challenges the child or adolescent will face, and available resources for support. The team will need to function collaboratively in order to achieve successful classroom integration. Examples of team members include: teachers, school administrators, family, and health care providers including occupational therapist, physical therapist, speech language pathologist, psychology, and nursing (Rosenthal, 1999).

7. How Do We Proceed?

Educational interventions must be individualized to the child or adolescent. After the team agrees upon the priority skill areas an analysis of where and how student’s needs can be met must be conducted. Discussion must include the most appropriate class placement and whether special education or related services are needed. Special modifications and instructional methods can then be selected and applied (Rosenthal, 1999).
8. How Much Will It Cost?

Adequate resources are necessary to meet the child or adolescent’s needs. In order to appreciate the costs the team, should include finances as a resource consideration. Laws determine the financial responsibility of the schools. Other considerations include: personal finances, time, and service options. Educating family members on how to identify and access resources can enhance their ability to advocate for programming needs (Rosenthal, 1999).

9. How Will We Know When The Goal Has Been Met?

The IEP should be evaluated on a continual basis to determine its ability to meet the student’s and family needs. In the school setting a child with special needs must be reevaluated at least annually. Students post-TBI may experience frequent changes and transitions throughout their development and progress through school. For children post-TBI, their educational program should be reevaluated at these key points: movement to a new grade class or teacher, or significant change in performance or behavior (Rosenthal, 1999).

10. How Can Families Help Their Child?

Families are encouraged to accept responsibility in planning or implementing the educational program. A partnership between the families and the treatment team should be developed. Families should expect educators to bring test results and recommendations for class placement, academic accommodations, and ideas of appropriate instructional strategies to the team meeting. Families should prepare for these meetings in advance by preparing to discuss the following four key topics: 1) the nature of the child or adolescent’s TBI, 2) the family’s expectation and goals for their
child, 3) resources for helping the child reach their maximal potential, and 4) considerations regarding the structure of the local school district (Rosenthal, 1999).
CHAPTER IV

PRODUCTS

Although traumatic brain injuries are common, many medical and education professionals may not be aware of all the difficulties that can result from a childhood brain injury. As a result, children and adolescents post-TBI may not receive the type of educational help and support they really need.

When children or adolescents with TBI return to school, their educational and emotional needs are often very different than before the injury. Their disability happened suddenly and traumatically. The child’s family, friends, and teachers recall what the child was like before the injury. This can bring on many emotional and social challenges for the child and adolescent post-TBI and those in their social network. People in the child’s life may have trouble changing or adjusting their expectations of the child or adolescent.

Therefore, it is extremely important to plan carefully for the student’s return to school. Appendix A will focus on information for families, teachers, and what occupational therapy can do to address these areas of concern and ease this school transition.
CHAPTER V

SUMMARY

Through an extensive review of professional literature, this scholarly project addressed the array of effects of traumatic brain injury among school aged children including the impact upon performance in areas of occupation. It also focused on the occupational therapist’s role in treating a child or adolescent between the age of 5-18 years, with a traumatic brain injury in a school setting.

The review of literature led to the development of an informational packet for parents and teachers of children or adolescents with a TBI. The informational packet can be found in Appendix A and includes the OT’s role, helpful hints for teachers and parents, as well as possible interventions to use in the classroom setting. In an effort to provide comprehensive, current, and practical information to educators and parents of children and adolescents post-TBI, guidelines for facilitating the transition for rehabilitation to school reentry are presented. The occupational therapist is a key member of the transition planning team because of their educational background and clinical expertise to assist the transitional process.

A limitation to this scholarly project is the lack of research completed on this topic. It was difficult to find research with results documenting the school reentry process. Future descriptive and developmental research is needed to study the implications of a school reentry program for students post-TBI.

It is hoped that this informational packet will be used by occupational therapists, teachers, and parents of children and adolescents post-TBI to facilitate a smoother transition throughout the school reentry process. Also, it is intended that the occupational
therapist will be involved in the transition from the rehabilitation phase to the school reentry phase in order to ensure the continuum of services provided to the student post-TBI. This may include assessments, teaching of compensatory strategies and education to parents and educators.
APPENDIX A

Information for Teachers who have Students with a TBI in their Classroom

The following information will focus on possible long-term cognitive effects of a traumatic brain injury on classroom functioning, as well as possible interventions that teachers could utilize to address these deficits and increase the student’s ability to function within the classroom.

Possible Long-Term Cognitive Effects of TBI on Classroom Functioning

Memory:
- The student may be unable to recall previously learned information that serves as the foundation for new learning
- The student may not be able to remember a series of two- to three-step directions
- The student may be unable to grasp new concepts without repeated exposure
- The student may have difficulty recalling the day’s schedule, what was assigned for homework or what materials to bring to class.

Attention & Concentration:
- The student may be distracted by normal classroom activity
- The student may have difficulty staying on topic during a class discussion
- The student may be unable to complete a task without prompting
- The student may blurt out answers in the middle of a class session
- The student may become fatigued by mid-afternoon and appears to be uninterested in activities

Higher-Level Problem Solving
- The student may have difficulty organizing and completing long-term projects
- The student may lack the ability to sequence the steps necessary to plan and complete an activity
- The student may be unable to come up with solutions to problem situations (e.g., lost lunch money)
- The student may have difficulty drawing conclusions from facts presented

Language Skills
- The student may have difficulty taking turns in a conversation
- The student may be unable to summarize and articulate thoughts
- The student may talk around subjects or uses indefinite words
- The student may not understand the meaning of a conversation when figures of speech or metaphors are used
Attentional Processes
- The student may demonstrate reduced arousal, sleepiness, and/or fatigue
- The student may have difficulty focusing attention and filtering out distractions
- The student may experience difficulty maintaining attention
- The student may have difficulty transitioning from topic to topic or class to class
- The student may experience difficulty dividing attention between two or more topics or activities

Perceptual Processes
- The student may have visual field deficits and experience difficulty seeing objects in part of a visual field (i.e. may not be able to see right upper portion of the chalk board or his or her paper)
- The student may have difficulty perceiving the spatial orientation of objects (i.e. not knowing where an object is in relation to another)
- The student may not be able to easily separate the object of perception from background stimuli (i.e. may have difficulty locating an object on a cluttered surface or busy background)
- The student may experience difficulty recognizing objects if too much is presented at once or too rapidly
- The student may be unable to scan and visually search in an organized manner

Memory / Learning Processes
- The student may have trouble recalling events from earlier in the day or from a previous day
- The student may have difficulty staying oriented to a schedule or to activities and may become easily distracted
- The student may have a hard time registering new information or words that have been learned, particularly when under stress
- The student may not be able to search memory in an organized way and retrieve stored information and words.

Organizing Processes
- The student may not be able to analyze a task into component parts (i.e. may have difficulty breaking down an activity into steps)
- The student may not be able to see relationships among things
- The student may have a difficult time organizing objects into appropriate groups or events into appropriate sequences
- The student may have trouble organizing information into larger units
- The student may have a hard time grasping the major concept from detailed information
Reasoning/ Abstract Thinking Processes
- The student may have difficulty understanding abstract levels of meaning
- The student may have trouble drawing conclusions from facts presented
- The student may be unable to consider hypothetical explanations for events

Problem Solving Processes
- The student may not be able to perceive the exact nature of the problem
- The student may not be able to select information relevant to solving the problems
- The student may have difficulty considering a variety of possible solutions (i.e. think in black and white)
- The student may have trouble weighing the relative merits of alternative solutions

Working Memory
- The student may not be able to hold several words or thoughts or intentions in mind at one time

Knowledge Base
- The student may have difficulty recalling pre-traumatically acquired information, academic skills, social rules, etc.

Executive System
- The student may have a hard time setting goals
- The student may have difficulty perceiving strengths and needs in an objective manner
- The student may have trouble planning activities
- The student may find it difficult to initiate and/or inhibit behavior
- The student may have trouble monitoring one’s own behavior
- The student may find that evaluating one’s own behavior may be difficult

Possible Instructional and Compensatory Strategies

Attentional Processes
- Gain student’s attention by connecting new learning to prior knowledge
- Utilize clearly defined objectives that are meaningful to the student
- Provide short and concise directions and assignments
- Reward on-task behavior; avoid punishing behavior that results from extreme distractibility
- Utilize new, unusual, relevant or stimulating activities in order to obtain attention
- Implement well-placed rest periods, breaks, or physical activity throughout the day in order to minimize the effects of mental fatigue or stamina problems
- Assess student for attentional drifts and redirect them to the task when necessary
• Use a variety of cueing systems with the student; (e.g., verbal cues, gestural cues or signs at the study site that remind the student to stay on task);
• Remove unnecessary distractions in the classroom by removing extra materials or providing the student with a study carrel.
• Gain student’s attention by asking questions within a lesson, to direct their attention to the task and topic
• Establish nonverbal cueing system (i.e., eye contact, touch, etc.) to remind student to pay attention

Visual-Perceptual Processes
• Describe the visual instructional material in concrete terms; limit the amount of visual information on a page, this can be distracting to the student
• Students post-TBI have difficulty processing visual information, therefore provide longer viewing times or repeat viewing when using visual instructional materials
• Facilitate a systematic approach to reading by covering parts of the page, this will assist the student in focusing his or her attention
• Students post-TBI may have difficulty with visual neglect and/or scanning, therefore place arrows or cue words, left to right, on the page to orient the student to space: Teach the student to use the cues systematically to scan left to right
• Provide the student with large print books or use books on tape
• Move the student closer to visual materials or have the materials enlarged
• Place materials within the student’s best visual field. Consult with an ophthalmologist, optometrist or occupational therapist about possible visual-perceptual problems

Auditory-Perceptual Processes
• Limit the amount of information presented: Give the student instructions or other verbal information in appropriately small units
• Present verbal information at a relatively slow pace, with appropriate pauses for processing time and with repetition if necessary
• Have the student sit close to the teacher, with an unobstructed view,
• Teach the student to ask questions about the instructions or materials presented, to ensure comprehension, or have the student repeat the instructions back to you.

Memory / Learning Processes
• Try to make the new material significant and relevant to the student
• Match the student’s learning style (e.g., visual learner) with the instructional method you use
• Provide regular summaries for information as it is being taught
• Provide written instructions along with verbal instructions/assignments
• Reinforce information presented with pictures or other visual images
• Limit the amount of information presented at one time
Use repetition and rehearsal to enhance the student’s learning of new material
Combine new information with previously learned information
Teach the student note-taking strategies
Teach the student to use a planner, sticky notes, and/or calendars for appointments, assignments, and other important information

Organizing Processes
- Limit the number of steps in each given task
- Provide part of a sequence and have the student finish it
- Give cues, such as “Good, now what would you do?”
- Structure thinking processes graphically (i.e., with time lines, outlines, flow charts, graphs)
- Utilize categories to focus on one topic at a time
- Identify the main idea and supporting details. Categorize the details (i.e., using who, what, when, where and why questions). Teach the student to do the same when reading, studying, or listening to lecture material
- Teach the student to practice organizational skills both at school and at home (i.e., an organizational system for school material and daily routine)
- Provide the student with additional time for review
- Utilize written checklists or steps for complex tasks
- Utilize visual schedules containing words or pictures

Problem Solving Processes
- Develop a problem-solving guide to assist students in problem solving (i.e., identify the problem; acquire relevant information for solving the problem; generate several possible solutions; list pros and cons for each solution; identify the best solution; create a plan of action; evaluate the effectiveness of the plan)
- Raise questions about alternatives and consequences
- Encourage the student to bring up relevant real-life problems that are appropriate for group discussion. Promote brain-storming about alternative solutions and their usefulness
- Introduce roadblocks and complications to enhance the use of alternative skills and to encourage flexibility (i.e., if this doesn’t work, what can you do differently?)
- Provide ongoing positive feedback
- Break large tasks into smaller tasks; provide the student with a checklist to keep him/herself on task

Following Directions:
- Provide oral as well as written instructions
- Underline or highlight significant part of directions on written assignments
- Ask student to repeat instructions back to teacher or a peer
The above information was adapted from Tyler, J., & Grandinette, S. Effective Teaching Strategies. In Brain Injury Source 6(3) Winter 2002/Spring 2003.

Quick Tips for Teachers

- Find out as much as you can about the child’s injury and his or her present needs. Find out more about TBI. See the list of resources and organizations at the end of this publication.
- Give the student more time to finish schoolwork and tests.
- Show the student how to perform new tasks. Give examples to go with new ideas and concepts.
- Have consistent routines. This helps the student know what to expect. If the routine is going to change, let the student know ahead of time.
- Check to make sure that the student has actually learned the new skill. Give the student lots of opportunities to practice the new skill.
- Realize that the student may get tired quickly. Let the student rest as needed.
- Keep in touch with the student’s parents. Share information about how the student is doing at home and at school.
- Be flexible about expectations. Be patient. Maximize the student’s chances for success.

Quick Tips for Teachers was adapted from Tips for Teachers & Educators www.kidneeks.com/diagnostic_categories/articles/genbraininjury.htm Retrieved on April 5, 2003
APPENDIX B

Information for Parents of Children or Adolescents with TBI

Tips for Parents

• Learn about TBI. The more you know, the more you can help yourself and your child or adolescent. For more information regarding TBI refer to the list of resources and organizations at the end of this chapter.

• Work with the health care and/or educational team to understand your child’s injury and treatment plan. Don’t be shy about asking questions. Tell them what you know or think. Make suggestions.

• Keep track of your child’s treatment. A 3-ring binder or a box can help you store this history. As your child recovers, you may meet with many doctors, nurses, therapists, and others. Write down what they say. Put any paperwork they give you in the notebook or throw it in the box. You can’t remember all this! Also, if you need to share any of this paperwork with someone else, make a copy. Don’t give away your original!

• Talk to other parents whose children have TBI. There are parent groups all over the U.S. Parents can share practical advice and emotional support. Call NICHCY (The National Information Center For Children and Youth With Disabilities) at 1-800-695-0285 to find out how to find parent groups near you.

• If your child was in school before the injury, plan for his or her school reentry. Get in touch with the school. Ask the principal about special education services. Ask the health care team to share information with the school.

• When your child returns to school, ask the school to test your child as soon as possible to identify his or her special education needs. Meet with the school and help develop a plan for your child called an Individualized Education Program (IEP).

• Keep in touch with your child’s teacher. Tell the teacher about how your child is doing at home. Ask how your child is doing in school.

Helpful Hints

• Communicate regularly with your child’s teacher about any academic or behavior concerns.

• If needed, schedule a meeting to discuss any concerns and develop a plan.

• Make arrangements for child care so you can participate fully.

• Bring a trusted friend, support person, adult family member or professional who knows your child.

• Ask questions.

• Communicate with other parents and professionals.

• Put all the paperwork you receive in one folder.

• Become knowledgeable about your child’s rights, the evaluation process and various exceptional abilities.

Tips for Parents was adapted from Tips for Teachers & Educators www.kidneeds.com/diagnostic_categories/articles/genbraininjury.htm Retrieved on April 5, 2003
What is an Individual Educational Plan (IEP)?

The IEP supports the entire educational program planning for students with special needs. It is the educational map that guides what is provided for the student and the contract between the family and school for the delivery of educational services to the child. The IEP team consists of the child, family, educational representatives, and health related clinicians (Rosenthal, 1999).

What is an Individualized Transitional Plan (ITP)?

The ITP is a plan for transition to and from school for individuals with disabilities. It includes information about how the school and other agencies plan to assist the child with the transitioning process including transitioning the child or adolescent into the community, a new job or to independent living. The ITP can be incorporated into the IEP or written as a separate document (Rosenthal, 1999).
APPENDIX C

*Occupational Therapy's Role*

Occupational therapy (OT) is one of the major team members involved in the rehabilitation process for children with TBI. Occupational therapy for children and adolescents post-TBI focuses on understanding how their ability to function has changed as a result of the injury, and how to best promote ongoing development and maximal independence in activities of daily living (Wilkins, N., Steinwender, S., & Hill, S. 2000).

In conjunction with ongoing remediation training, the occupational therapist teaches the child compensatory strategies that will assist him or her in performing ADL’s easier. For example, teaching the child how to use a daily planner is one intervention to remember schedules of appointments, homework assignments and friends’ phone numbers. The OT can also facilitate the child’s awareness of their strengths and impairments following the brain injury, as well as their ability to adjust to new life roles and participate in both new and old meaningful activities (Wilkins, 2000).

Although children with acquired brain injuries may develop new problems as they mature and are faced with new challenges, OT can play a key role, along with other team members, in providing periodic reassessment and consultation. Knowledge of the child’s changing status at the key transition times in the child’s life will help the OT provide useful coping strategies for daily life. The occupational therapist will work along with the teacher and other professionals in order to meet the student’s physical, emotional, psychological, and social needs.

Some examples of techniques occupational therapists utilize in therapy sessions include: tasks specifically designed to help the student focus his/her attention (e.g.,
simple maze learning tasks or letter/number cancellation tasks, emphasizing speed, accuracy, and the self-instructions that promote heightened attention to tasks); help the student to transfer this improved, self-directed attending skill into the classroom environment. The OT also addresses the students’ memory deficit by teaching the student how to utilize one or more of the following techniques: visual imagery, “chunking” techniques (organizing information into easily retrieved segments), association techniques, mnemonic devices (such as acronyms, repetition and rehearsal techniques), or adaptive devices such as appointment books, calendars, alarm watches and tape recorders.

The OT can also provide intervention for coping skills, social skills, motor skills, and activities of daily living. The following offer a few examples of each of these areas.

*Coping skills.* The OT will provide the student with appropriate outlets for releasing stress when feeling angry, frustrated, etc. Some of these outlets may include a quiet room where the students can go to relax, release energy, and remove themselves from the stressor.

*Social skills.* The OT can teach the student age appropriate social skills. Also if needed a behavior modification plan can be developed along with input from the classroom teacher and parents. These social skills will help the child learn how to control his impulses and behavior while around others.

*Motor skills.* The occupational therapist is responsible for assessing the student’s motor patterns and developing individual interventions for the student. These may include handwriting, fine motor coordination, motor planning and gross motor activities.
Activities of daily living. The OT will develop individualized treatment to address the students' personal needs. Some students post-TBI may experience difficulty with bowel and bladder. In this situation, the OT would develop a routine of regular restroom breaks in the students schedule. If the student has difficulty transitioning between classes or between subjects the OT could develop a daily schedule with the classroom teachers that includes time for transitions (i.e. providing the student with adequate amount of notice that the subject is about to change, allowing the student a 2-3 minutes to transition from subject to subject).

The OT can also help assist the student and their parents in returning to normal occupations during after school and weekend time. This can be accomplished by providing the family with information on how to ease transitions between various activities, keeping a daily routine, giving the student adequate notice if the daily routine has changed (i.e. going to the doctors, or dentist), encourage the family to allow their child to engage in age appropriate activities (i.e., going to the playground, playing softball, etc.), and encourage the child to be as independent as possible in their activities of daily living.
APPENDIX D

Organizations

Brain Injury Association (formerly the National Head Injury Foundation), 105 North Alfred Street, Alexandria, VA 22314. Telephone: (800) 444-6443 (Family Helpline); (703) 236-6000. E-mail: FamilyHelpline@biausa.org


Family Caregiver Alliance, 690 Market Street, Suite 601, San Francisco, CA 94104. Telephone: (415) 434-3388; (800) 245-6686 (CA only).

Family Voices, P.O. Box 769, Algodones, NM 87001. Telephone: (505) 867-2368. E-mail: kidshealth@familyvoices.org

Head Injury Hotline, 212 Pioneer Building, Seattle, WA 98104. Telephone: (206) 621-8558. E-mail: brain@headinjury.com

The National Information Center For Children and Youth with Disabilities (NICHCY), P.O. Box 1492, Washington, DC 20013. Telephone: (800) 695-0285, Voice/TTY: (202) 884-8200 Email: nichcy@aed.org Web Site: www.nichcy.org

Sabine Parish School District, www.sabine.k12.la.us, P. O. Box 1079 Many, Louisiana 71449, Special Education Resources on the Internet (SERI) - http://seriweb.com/ (318} 256-9228


Louisiana State Department of Education P.O. Box 94064 Baton Rouge, Louisiana 70804 (225) 342-3633 www.doe.state.la.us
REFERENCES


