Brain Waves

Volume 6, 2008

What is a TBI Model System

Phil Klebine, Editor

The Traumatic Brain Injury Model System (TBIMS) program is sponsored by the National Institute on Disability and Rehabilitation Research (NIDRR), Office of Special Education and Rehabilitative Services, U.S. Department of Education. NIDRR awards TBIMS grants to institutions that are national leaders in medical research and patient care and provide the highest level of comprehensive TBI specialty services, from the point of injury through rehabilitation and re-entry into full community life.

NIDRR awards TBIMS funding in five-year cycles. Once funded, each TBIMS conducts independent and collaborative research as well as provides information and resources to individuals with TBI, their families and caregivers, health care professionals and the general public.

There are 16 TBIMS programs currently funded along with the Traumatic Brain Injury Model Systems National Data and Statistical Center. The Statistical Center directs the collection, management and analysis of an ongoing national TBI database, and each TBIMS must also contribute data to the national database.

The University of Alabama at Birmingham (UAB) has been funded as a TBIMS since 1998. The UAB-TBIMS works to maintain and improve a cost-effective, comprehensive service delivery system of outstanding care to individuals with TBI from emergency medical services to acute care in the hospital, to rehabilitation. The UAB-TBIMS operates within the UAB Department of Physical Medicine and Rehabilitation, which is located at Spain Rehabilitation Center in the UAB Hospital complex. Activities of the UAB-TBIMS reflect an active partnership between UAB and the community. Partners include state emergency medical service agencies, the Alabama Department of Rehabilitation Services, the Alabama Head Injury Foundation, and the Lakeshore Foundation.

Research at the UAB TBI Model System

Tom Novack, PhD
Director, UAB TBI Model System

In addition to the effects of traumatic brain injury (TBI), depression negatively impacts recovery following TBI. Many of the challenges faced in the course of recovery can put TBI surivors at risk for depression. Symptoms of depression may include withdrawal, lethargy , poor appetite, and excessive sleep.

Serotonin is a neurotransmitter that guides messages passing across neurons in the brain. It is believed that the level of serotonin in the brain decreases after TBI, and this decrease puts individuals with TBI at risk for depression.

During the 2002 - 2007 TBIMS funding period, UAB conducted research to determine if Sertraline (Zoloft®) was effective in preventing depression from developing. Sertraline is an antidepressant medication that increases the availability of serotonin. The idea was to intervene early by administering Sertraline within 2 months of injury, even before depression develops. It was hoped that this would prevent the occurrence of depression within the first year following moderate to severe TBI.

Ninety-nine people enrolled in the study with half of them receiving sertraline for 3 months and the other half a placebo (inactive substance). Neither the study participants nor the researchers knew who

continued on page 2

received the drug or the placebo until the end of the study. Participants were asked regularly if they were experiencing symptoms of depression. They were also briefly tested regarding thinking skills at 3, 6, and 12 months following injury.

The results support the effectiveness of anti-depressant medication in decreasing feelings of depression early in recovery following TBI, but there is no lasting impact after the medication is stopped. Although we cannot explain this interesting result, the level of depressive symptoms do not appear to be as high in Alabama as reported in other studies done at different sites. Also, the study demonstrated that sertraline has no impact on thinking skills while the sertraline is being taken, and there is no lasting effect on thinking after the drug is stopped.

These study results are important to people with TBI because sertraline and other anti-depressant medications are commonly administered early in recovery from TBI. It may sometimes be better to wait until depressive symptoms are reported by the person before anti-depressant medication is prescribed.

Benefiting from PT and OT At-Home Services

Laney Gernenz, PT
Erin Garmany, OTR/L

Most individuals with traumatic brain injury (TBI) first become familiar with physical therapy (PT) and occupational therapy (OT) in the early weeks following injury. Therapy probably began in the hospital and intensified during rehabilitation. If you thought PT and OT ended there, think again.

The Difference in PT and OT

The primary focus of PT is on improving or restoring functional movement lost after illness or injury. PT services begin with an evaluation of a patient's functional abilities, which includes independence with bed mobility, transfers, and walking. A treatment plan is then developed to specifically address issues such as pain, range of motion (ROM), and balance. Various PT techniques are then utilized to improve overall health and restore functional independence.

The focus of OT is mainly on improving a patient's activities of daily living (ADL). OT services begin with an evaluation of a patient's functional abilities at home, work, and other environments. A treatment plan is made to improve the patient's independence with ADL tasks such as dressing, bathing, grooming, and others. Adaptive equipment such as splints and braces may be used in the treatment plan. Additionly, OT addresses deficits in cognitive function such as problem solving, safety awareness, sequencing, memory, and executive functions such as money management.

Home Life

For individuals with TBI, transitioning from inpatient rehabilitation to home life can be stressful. Changing environments can bring about increased confusion, inappropriate behavior, and overall cognitive decline. Of course, changes in daily routines are also common throughout life and can occur at anytime. Changes may include returning to school, modifying the work environment for returning to employment, or finding new employment.

PT and OT can be very helpful with most at-home problems. They can help in implementing new daily schedules, using a memory book, and teaching behavioral management skills to family to restore balance and order at home. PT and OT can also be consulted for adaptive equipment needs to maximize home and community independence.

Secondary Conditions

Secondary complications are a life-long concern for many individuals with TBI. A doctor should lead the medical treatment of secondary conditions and prescribe PT and OT helpful in preventing and treating other common secondary conditions when needed. Initially following injury, swelling and bleeding due to injury usually affect one's ability to think and reason. There may be confusion, difficulties with simple tasks such as brushing one's teeth, and memory problems. PT and OT are essential in those early days following injury to maximize recovery as the brain heals.

Pressure sores are a risk factor that can negatively impact an individual's life in many ways. For example, people who develop a pressure sore are

treated with bed rest. Although the time needed for bed rest varies depending on the severity of the pressure sore, the decrease in activity usually leads to some level of decline in the person's strength and ROM. Loss in strength and ROM limits a person's mobility and ability to perform ADL once the sore is healed.

PT and OT are usually needed by people who develop pressure sores. An evaluation may be needed to assess the patient's current wheelchair seating and positioning, provide education about positioning and pressure relief, and make adaptations to the environment to promote independence. If a surgical skin flap is done, the therapist can also provide education and treatment for alternate methods of transferring to reduce shearing and maintain skin integrity. Finally, physical and occupational therapy can help patients regain ROM, strength and conditioning lost as a result of prolonged bed rest.

A decrease in ROM may cause muscle spasms, contractures, heterotrophic ossification (HO), pain or other conditions to develop. Muscle spasticity is resistance to passive movement. For example, arms or legs may appear to jump or move in an odd pattern. If there is too much spasticity. It can lead to contractures, or limitations in joint ROM. HO is an abnormal build-up of calcium in and around joints, which limits ROM and cause contractures.

PT and OT evaluations are usually prescribed by the doctor to provide ways to maximize function following any decrease in ROM. For example, therapy can address joint contractures with splinting, serial casting, and/or orthotics to maintain ROM and protect the joints. These interventions can be used in conjunction with spasticity medications and/or botox injections that will be monitored by a physician. If spasticity or HO become severe, PT and OT may be needed to reevaluate mobility and determine appropriate techniques for safe and independent functional mobility.

Chronic pain is another common problem for individuals with TBI. They often lack the coping mechanisms to handle the pain, so they may respond inappropriately, becoming agitated or frustrated more easily when in pain. People also tend to avoid activities if they are in pain, so they avoid ADL, which limits independence.

PT and OT can be helpful in managing pain. Treatment options might include electrical nerve stimulation, traction, ultrasound, moist heat, interferential current, iontophoresis, stretching, manual therapy, and exercise programs.

For the Family

There are many issues to be considered by family members who care for a loved one with TBI. In order to best manage negative coping characteristics and encourage more appropriate behavioral strategies, family caregivers need to be able to recognize how external stimuli and changes in the environment can affect behavior. A loved one may lack the ability to retain new information (i.e. learning), poor problem solving skills even with familiar tasks, and poor memory. They often lack insight into their deficits, which may be a safety risk. For example, they may forget that they need help to walk and fall when they stand up without help. They may wrongly believe they can drive or unable to react if caught in a fire. For this reason, it is important that some individuals with traumatic brain inury have 24 hour supervision at home until they are released back into the community by their doctor.

PT and OT can provide valuable education to families for them to best manage care for their loved ones. Plus, PT and OT can help families find support groups and locate other community resources.

Summary

Individuals who are newly injured usually rely on physical and occupational therapy services, but similar home-based services are under-used. This article offers a few circumstances in which individuals with TBI and their families can benefit from home therapuetic services. If there is an issues at home, simply ask the doctor if PT and OT can be beneficial. Services are usually prescribed by the doctor, and most services are covered by insurance. In addition, the medical team can usually assist individuals and their families in finding community resources necessary to reach their rehabilitative goals.

Educational Resources
Produced by the 2002-2007 UAB-TBIMS

Caregiver's Guide to Self-Health: Solving Problems and Reducing Stress
This interactive program is designed to offer caregivers 3 techniques (Card Sort, Problem Solving & Stress Relief) to help improve their own health and quality of life.

http://main.uab.edu/tbi/show.asp?durki=110890

Rehab Tip Sheets
These tip sheets offer rehabilitation care providers and consumer caregivers step-by-step instructions and photo illustration on performing Wheelchair Positioning, Assisted Pressure Relief, Lift Transfers of Patients, Assisted Transfers of Patients, Swallowing Strategies & Walking after Brain Injury.

http://main.uab.edu/tbi/show.asp?durki=90245

TBI Inform Newsletter
This is a series of newsletters that provides a basic understanding of the complex challenges following brain injury.

http://main.uab.edu/tbi/show.asp?durki=17116

1 Introduction to Brain Injury
2 What to Expect after Traumatic Brain Injury and Rehabilitation
3 Traumatic Brain Injury Caused by Violence
4 Hypoxic/Anoxic Brain Injury
5 Persistent Loss of Consciousness Following Brain Injury
6 Managing Behavioral Problems after a Traumatic Brain Injury
7 Spastic Hypertonia following Traumatic Brain Injury
8 Research & You

www.uab.edu/tbi
The University of Alabama at Birmingham Traumatic Brain Injury Model System (UAB-TBIMS) web site was established in 2003 and offers educational materials along with information on ongoing research and clinical services of the UAB-TBIMS. The web site also contains links to national organizations, government agencies, and educational resources related to traumatic brain injury.

Brain Waves is an annual publication of the University of Alabama at Birmingham Traumatic Brain Injury Model System (UAB-TBIMS) and supported by grant #H133A070039 from the National Institute of Disability and Rehabilitation Research, Office of Special Education and Rehabilitative Services, U.S. Department of Education, Washington, DC. Opinions expressed are not necessarily those of the granting agency.

UAB-TBIMS Director: Thomas A Novack, PhD
Professor, UAB Department of Physical Medicine & Rehabilitation.

Content information for **Brain Waves** is provided by the UAB-TBIMS, Alabama Department of Rehabilitation Services, and Alabama Head Injury Foundation. Reprints are encouraged and free for educational purposes. All other reprint inquiries are to be made to the Editor.
Alternate formats are available upon request.

Editor: Phil Klebine, MA
UAB Department of Physical Medicine & Rehabilitation
619 19th Street South - SRC 529
Birmingham, AL 35249-7330
Phone: 205-934-3283 or TDD 205-934-4642
Fax: 205-975-4691
Email: tbi@uab.edu

Alabama Head Injury Foundation
3100 Lorna Road, Suite 200
Hoover, Alabama 35216

**NONPROFIT
U.S. POSTAGE
PAID
PERMIT NO. 3246
BIRMINGHAM, AL**