

## Pediatric Traumatic Brain Injury

**Condition:** Traumatic brain injury (or TBI) results from head trauma that causes injury to the brain tissues. This condition may affect daily tasks, such as communication, swallowing, cognition, self-care, walking, and behavior.

**Background:** Brain injury can be caused from direct physical blows to the head or indirectly from brain swelling, seizures, or blood in the brain. In babies, the most common cause of brain injury is assault, while in toddlers, it is falls. In older children, the most common causes are bicycle accidents, motor vehicle collisions, and sports, and in adolescents, the most common cause is motor vehicle accidents.

**Risk Factors:** Children with learning disorders and attention deficit hyperactivity disorder (ADHD) are at greater risk, and TBI is more common in the spring and summer, in males than females. Appropriate use of helmets and transportation seats with safety belts is important in prevention.

**History and Symptoms:** Brain injury may initially be accompanied by changes in breathing and circulation affecting oxygen levels and blood pressure. In the acute phase, treatments aim to stabilize the patient and prevent secondary complications such as brain swelling, seizures, and brain bleeding. During the hospitalization, medical care focuses on mood, sleep, vision and feeding problems, muscle weakness, headaches, dizziness, and balance impairment. More long-term complications, such as fluid build-up, hearing loss, joint or muscle rigidity, scoliosis, speech impairment, hormonal imbalance and urinary and/or bowel incontinence, can also develop and need to be monitored closely.

**Physical Exam:** Physicians will record a detailed history of the event as well as perform an extensive physical examination, including a neurological and a musculoskeletal exam. Assessment of alertness, ability to smell, see, talk and move is important. Detailed neurologic exam will check for muscle strength and tone, reflexes, and motion. If the cause is abuse or a severe trauma like a vehicle collision, spine and extremities will be examined for additional injuries.

**Diagnostic Process:** A computed tomography (CT) scan is commonly performed acutely to evaluate bleeding or swelling in the brain. Magnetic resonance imaging (MRI) may be used to further assess brain injuries that may not be visible on the CT scan. X-rays may be used to rule out additional injuries to the neck or extremities. An electroencephalogram (EEG) may be used for detection of seizures, and specific assessments of hearing, vision, and swallowing may be necessary. Neuropsychological testing can fully elucidate cognitive and emotional issues a child may have after injury.

**Rehab Management:** An interdisciplinary approach led by a physical medicine and rehabilitation (PM&R) physician is essential. When stable, transfer to inpatient rehabilitation is important to improve outcomes. The PM&R physician may prescribe medications to manage behavior and enhance participation in therapies. After stabilization and prevention of secondary complications, patients may receive physical therapy, occupational therapy, speech therapy, and neuropsychological testing. Rehabilitation will include teaching of strategies to compensate for impaired or lost functions and for optimization of the use of abilities as they return. Partnering with a child's school is paramount to

making sure the child receives the services needed to achieve academically in a safe and appropriate manner. PM&R physicians also provide recommendations about return to school/sports.

**Other Resources for Patients and Families:** Following brain injury, patient and family education and support are important, and community support groups may be available.

## Frequently Asked Questions

### What is PM&R?

Physical medicine and rehabilitation (PM&R), also known as physiatry, is a primary medical specialty that aims to enhance and restore functional ability and improve quality of life to those with injuries, physical impairments or disabilities affecting the brain, spinal cord, nerves, bones, joints, ligaments, muscles and tendons. PM&R physicians, known as physiatrists, evaluate and treat the whole body, maximize patients' independence in their daily life and are experts in designing comprehensive, patient-centered treatment plans to empower patients to achieve their goals. By taking the whole body into account, they can accurately pin-point problems, decrease pain, assist in recovery from devastating injuries and maximize overall outcomes and performance with non-surgical and peri-surgical options. To learn more, visit [www.aapmr.org/aboutpmr](http://www.aapmr.org/aboutpmr).

### What makes PM&R physicians unique?

PM&R physicians' training focuses not just on treating medical conditions, but on enhancing the patient's performance and quality of life in the context of those medical conditions. They focus not only on one part of the body, but instead on the development of a comprehensive program for putting the pieces of a person's life back together – medically, socially, emotionally and vocationally – after injury or disease. PM&R physicians make and manage medical diagnoses, design a treatment plan and prescribe the therapies that physical therapists or other allied therapists perform or that are carried out by the patients themselves. By providing an appropriate treatment plan, PM&R physicians help patients stay as active as possible at any age. Their broad medical expertise allows them to treat disabling conditions throughout a person's lifetime.

### Why see a PM&R physician?

A PM&R physician will thoroughly assess your condition, needs, and expectations and rule out any serious medical illnesses to develop a treatment plan. By understanding your condition and goals, you and your PM&R physician can develop a treatment plan suited to your unique needs.

### How do I find a PM&R physician near me?

Visit [www.aapmr.org/findapmphysician](http://www.aapmr.org/findapmphysician) or contact your primary care physician for a referral.