



## **Understanding Mild to Moderate Traumatic Brain Injuries**

Center for Pediatric Rehabilitation  
at Gillette Children's Specialty Healthcare

## **Our Mission**

Gillette Children's Specialty Healthcare provides specialized health care for people who have short-term or long-term disabilities that began during childhood. We help children, adults and their families improve their health, achieve greater well-being and enjoy life.

*On the cover: Kalyan loves snowboarding, and she stays safe by always wearing a helmet. Sports and recreational injuries are the most common causes of mild to moderate TBIs in children and teens.*



## **Understanding Mild to Moderate Traumatic Brain Injuries**

Gillette's Minor Neurotrauma Clinic cares for children and teens who've experienced mild to moderate traumatic brain injuries (TBIs). These patients need an experienced medical team to assess their injuries and recommend treatments. For example, if an injury affects daily activities, patients might need the expertise of Gillette's doctors, nurse practitioners, rehabilitation therapists, psychologists and social workers. Working together, our team of experts can help each patient achieve the best possible recovery.

## About TBIs

Mild to moderate TBIs occur when a blow to the head or body causes the brain to move rapidly inside the skull (the bones around the brain). The impact and movement can injure brain cells, nerves and blood vessels. People who experience such injuries can have short- and long-term problems with physical, mental, social and emotional abilities. A mild TBI is the same thing as a concussion. Health-care providers often will use the terms interchangeably.



*Approximately 5 percent of soccer players sustain brain injuries caused by head-to-head contact, falls or being struck in the head by a ball.*

*Source: Brain Injury Association of America*

## Common Causes

TBIs can happen in many ways. For children and teens, activities that most commonly cause mild to moderate TBIs include:

- High-impact team sports, such as football, hockey and soccer (remember: TBIs can occur during any sport)
- High-speed recreational activities, such as biking, in-line skating, skiing and skateboarding (remember: TBIs can occur during any recreational activity)
- High-risk behaviors and “stunts,” such as car surfing (riding or jumping on top of a moving vehicle) and skitching (riding on a skateboard while being pulled behind a motor vehicle)
- Motor-vehicle accidents
- Physical violence and abuse

The Centers for Disease Control estimate that as many as 3.8 million TBIs result from sports and recreation activities in the U.S. each year.

# Symptoms

TBIs can injure cells, blood vessels and nerves in the brain, causing a wide variety of symptoms. A person can experience a mild to moderate TBI without losing consciousness (blacking out).

## Common Symptoms of a TBI

Physical	Cognitive	Emotional	Sleep and Energy
Headaches	Feeling foggy, slowed down, dazed or stunned	Irritability	Fatigue
Nausea and vomiting	Difficulty concentrating	Sadness	Drowsiness
Dizziness and/or trouble with balance	Difficulty remembering	Nervousness	Sleeping more or less than usual
Visual problems and/or sensitivity to light	Forgetting or feeling confused about recent events	Feeling more emotional than usual	Having trouble falling asleep and/or staying asleep
Sensitivity to noise	Repeating questions and/or answering them more slowly than usual	Showing less interest in favorite activities	
Numbness and/or tingling	Changes in school performance		

## Recognizing Symptoms in Infants and Toddlers

It can be difficult to recognize symptoms in infants and toddlers, because young children might not be able to tell you how they feel. In addition to the symptoms listed above, look for:

- Swelling of the scalp or soft spot
- Refusal to eat or nurse
- Listlessness (child feels “floppy” in your arms and doesn’t play or grab objects)
- Changes in play or loss of interest in favorite activities
- Excessive crying (child cries more than usual and can’t be consoled)
- Loss of new skills, such as walking or toilet training

Report any unusual changes in mood or behavior to your doctor.



*Most children who experience mild TBIs can eventually return to their regular activities.*

## Seriousness

All brain injuries are serious. TBIs classified as “mild” are no exception. People who experience TBIs should undergo complete medical evaluations and receive follow-up care. In addition, preventing future injuries is vitally important. Damage to an already-injured brain can lead to lifelong or even life-threatening complications.

### Repeated Injuries

People who have more than one TBI — even months or years apart — can experience serious problems. For example, a child who has one mild TBI might have concentration problems for a short time after the injury. But if that child has another mild TBI years later,

concentration problems can be much more serious and long-lasting. The reason is that brain damage — no matter how “mild” — can add up over time. That’s why it’s important to protect children and teens from brain injuries by following safety guidelines and activity restrictions.

### Second-Impact Syndrome

A child who experiences a second TBI before the first has healed can develop life-threatening complications (what health-care providers call “second-impact syndrome”). That’s why providers impose activity restrictions while the brain is healing. Always follow your provider’s recommendations and safety guidelines.

## Treatment

Emergency-room providers often are the first to assess and treat people with mild to moderate TBIs. Gillette's Minor Neurotrauma Clinic is designed to provide follow-up care.

When we evaluate patients who have TBIs, we ask about any changes they or their families have noticed following the injury. When necessary, we also perform physical examinations and order tests, such as computed tomography (CT) scans. ImPACT neurocognitive software can help us measure a patient's attention, memory, processing speed and reaction time — providing valuable information about an injury's effects on the brain. Testing takes about 30 minutes.

We also help patients and families make decisions about returning to school and recreational activities. We've included some helpful information about both in the following sections.



*After mild TBIs, doctors check patients' eye-hand coordination and perform eye exams to check for neurological impairment.*

## Recovery

Recovery time varies after mild to moderate TBIs. It depends on a person's age, health history and injuries. Typically:

- 40 percent of people recover in one week
- 60 percent of people recover in two weeks
- 80 percent of people recover in three weeks
- One in five people take longer than one month to recover

Risk factors for a longer recovery include:

- Age (the younger the person, the longer the recovery)
- History of repeated TBIs
- History of migraines
- Exerting oneself during healing
- Duration of amnesia (loss of memory)
- Feelings of "fogginess"



*After mild TBIs, children and teens can experience difficulty at school. Notify teachers of symptoms that might affect school performance.*

### Returning to School

After a mild to moderate TBI, children and teens might experience symptoms — such as irritability, impulsiveness and difficulty with concentration — that interfere with schoolwork and friendships. That's why it's important to tell teachers and other school professionals about a brain injury. Teachers, school counselors, psychologists and social workers can help children and teens manage their schoolwork and learn coping skills.

Some of the following modifications can help when a child returns to school:

- Assign a teacher or other appropriate staff person to monitor school performance.
- Check assignments, and keep in touch with teachers and staff regarding school performance.

- Modify the length and complexity of assignments.
- Postpone major tests.
- Follow routines and schedules.
- Help with organization.
- Modify the length of the school day or provide rest times.

Parents should contact their child’s primary-care provider if the recommendations above don’t help or if symptoms persist for more than 30 days.

### Returning to Activity

The best way to recover from a brain injury is to rest both the body and the brain. That means avoiding exercise, sports, video games, computers and reading (beyond what’s required for school). Everyday activities — such as bathing, dressing and attending school — are usually OK.

To avoid life-threatening complications, it’s important to heal fully before returning to sports and recreational activities. Before becoming active again, patients must be symptom-free. Patients also must be able to think and learn as they did before the injury. ImPACT neurocognitive software can help us assess a patient’s readiness for activity. Patients who have skull fractures or brain hemorrhages typically can’t return to activity for at least six to eight weeks, regardless of their symptoms or ImPACT results.

**What Should I Do If a Child Experiences a TBI?**

If someone experiences a blow to the head during a recreational or sporting event, immediately remove that person from the activity and seek medical attention. Do not allow a participant to return to the activity without first seeking medical attention. Follow all instructions and restrictions the health-care provider gives.

## Prevention

Families can help prevent mild and moderate TBIs by following basic safety guidelines:

- Wear helmets and protective gear when riding bicycles, in-line skating, skiing, skateboarding or participating in other sports. (Remember that helmets don't fully prevent TBIs, but they can help decrease their severity.)

*Using bicycle helmets could prevent 85 percent of cycling-related head injuries.*

*Source: Brain Injury Association of America*



*Infants and children under 12 should always sit in the back seat of motor vehicles, using appropriate car seats and safety restraints.*

- Use seat belts and place children in the back seat of motor vehicles, using the appropriate car seat or booster seat for their size and age.
- Practice safety in the home by checking for possible dangers and using safety products — such as gates, cabinet locks and window guards — to prevent accidents.
- Allow children to play only where they will be safe and supervised.

## Appointments/Referrals

To schedule an appointment for a new patient, call 651-290-8707. For more information, call 651-229-3915 or visit our Web site at [www.gillettechildrens.org](http://www.gillettechildrens.org).

### Additional Resources

- Brain Injury Association  
800-444-6443 (toll-free)  
[www.biausa.org](http://www.biausa.org)
- Brain Injury Association of Minnesota  
800-669-6442 (toll-free)  
[www.braininjurymn.org](http://www.braininjurymn.org)

## Centers of Excellence at Gillette

Treating people who have disabilities and complex medical conditions requires a team approach. At Gillette, our doctors, surgeons, nurses, therapists, psychologists, social workers and other specialists work together to care for patients. Throughout our centers of excellence, we offer leading-edge medical treatments tailored to the unique needs of each patient.

Gillette's centers of excellence:

- Center for Cerebral Palsy
- Center for Craniofacial Services
- Center for Gait and Motion Analysis
- Center for Pediatric Neurosciences
- Center for Pediatric Orthopaedics
- Center for Pediatric Rehabilitation
- Center for Pediatric Rheumatology
- Center for Spina Bifida



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Maple Grove Clinic  
9550 Upland Ln. N.  
Maple Grove, MN 55369  
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888-218-0642 (toll-free)

Burnsville Clinic  
305 East Nicollet Blvd.  
Burnsville, MN 55337  
952-223-3400  
866-881-7386 (toll-free)

Minnetonka Clinic  
6060 Clearwater Dr.  
Minnetonka, MN 55343  
952-936-0977  
800-277-1250 (toll-free)

Duluth Clinic  
Lakewalk Center  
1420 London Rd.  
Duluth, MN 55805  
218-728-6160  
800-903-7111 (toll-free)

Mobile Outreach Clinic  
For locations and schedules:  
651-634-1938  
800-578-4266 (toll-free)  
[www.gillettechildrens.org](http://www.gillettechildrens.org)



**Gillette Lifetime**  
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