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## Traumatic Brain Injury Overview

Source: Military.com

Traumatic Brain Injury (TBI), often called the signature wound of the Iraq and Afghanistan wars, occurs when a sudden trauma or head injury disrupts the function of the brain. Common causes of TBI include damage caused by explosive devices, falls and vehicle or motorcycle accidents. Most reported TBI among Operation Enduring Freedom and Operation Iraqi Freedom servicemembers and veterans has been traced back to Improvised Explosive Devices, or IEDs, used extensively against Coalition Forces.

### Range of Symptoms

**Symptoms** can appear immediately or weeks to months following the injury. Depending upon the severity of the wound, TBI injuries fall into different categories:

(MTBI), commonly referred to as a concussion, is a brief loss of consciousness or disorientation ranging up to 30 minutes. Though damage may not be visible on an MRI or CAT scan, common symptoms of MTBI include headache, confusion, lightheadedness, dizziness, blurred vision or tired eyes, ringing in the ears, bad taste in the mouth, fatigue or lethargy, a change in sleep patterns, behavioral or mood changes, and trouble with memory, concentration or attention. MTBI can have long-term effects, known as post-concussion syndrome (PCS). Those who suffer from PCS can experience significant changes in cognition and personality.

**Severe Traumatic Brain Injury** is associated with loss of consciousness for over 30 minutes, or amnesia. Symptoms of Severe TBI include all those of MTBI, as well as headaches that gets worse or do not go away, repeated vomiting or nausea, convulsions or seizures, inability to awaken from sleep, dilation of one or both pupils of the eyes (also known as anisocoria), slurred speech, weakness or numbness in the extremities, loss of coordination, and increased confusion, restlessness, or agitation.

### Effects on the Brain

Damage to the brain is often widespread and can be difficult to detect. Diffused injuries can cause insufficient blood supply to the brain following head trauma, intracranial pressure due to swelling, or vascular injury which can be fatal. Localized damage occurs as well when the brain collides with the skull, namely the brain stem (vital to attention, arousal, and consciousness), frontal and temporal lobes (the emotional control and memory skills centers). Localized damage includes bruising of the brain or bleeding (hemorrhaging), which can result in skull fracture. It is common for injuries to be both focal (localized) as well as diffuse (widespread) as the result of a single event.

### Recovery and Treatment

Recovery from brain injury varies by individual and degree of damage. Currently, little can be done to reverse the initial damage, immediate medical treatment though is essential for stabilizing, preventing further damage and physical/mental rehabilitation. Often severely TBI patients will require surgery (acute treatment) to remove or repair ruptured blood vessels (hematomas) and bruised brain tissue (contusions), as well as any other complications due to brain trauma. For many TBI sufferers, there is medication and alternative medicines which can mitigate symptoms such as headaches, chronic pain, behavioral problems, depression, seizures and chronic pain.



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## TBI: Symptoms, Diagnosis, Treatment

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Army News Service

A roadside explosion throws a Soldier against the side of his vehicle, with force that shakes his brain inside his skull. Another Soldier is in a traffic accident on the way to work, her head thrown forward into the windshield. A family member takes a hard fall during a sports game, hitting his head on the ground.

Different situations, but often the same result - a mild traumatic brain injury (TBI), better known as a concussion.

A concussion is an injury that causes an alteration of the person's mental status. You had your "bell rung." You are dazed and confused. More serious brain injuries that cause unconsciousness for 30 minutes or more are usually quickly recognized, but concussions may be dismissed and go untreated.

"It's the same as we see in a football game on TV, but no one comes out and holds up two fingers for you to count," said Lt. Col. Lynne Lowe, TBI program director in the Office of The Surgeon General of the Army.

"If you have a car accident and the EMTs come, they are likely to tend to your bleeding and not check for concussion. You are likely to be so happy you're alive, you don't think about concussion," she added.

Most people recover from concussions in a short time - as long as they do not repeat the injury.

"If someone has a concussion, we want them to be evaluated. It is very important that we protect them from getting another concussion before their brain heals," Lowe said.

Symptoms of concussion can include confusion, headaches, dizziness, ringing in the ears or nausea. These symptoms usually resolve within hours or a few days. Some people do have more persistent symptoms, which can include trouble sleeping, irritability or blurred vision.

"Providers can give medication for headaches or dizziness, and reassure them that they will be OK, because most people will be OK," Lowe said. "We teach them about what it means to have a concussion, and some of the warning signs of a worsening condition. If symptoms last longer, more formal testing can be done and, if needed, rehabilitation. It's a step care model, give them what they need, while always using our best judgment and available guidance."

"Just reassurance is very therapeutic in itself. Research proves that reassurance and education contribute to better outcomes," she said.

The military has developed two tools to help medical professionals diagnose concussions. The MACE (Mild Acute Concussive Evaluation) is part of treatment protocols used in the Department of Defense for injuries less than seven days old. A doctor or medic will ask about the subject's medical history and test memory and thinking ability. The subject may be asked to repeat a sequence of words or count backwards.

"It isn't that a bad score means you have a TBI," Lowe said. "The score means nothing by itself. It informs the decision, but doesn't form a diagnosis."

The ANAM (Automated Neuropsychological Assessment Metric) is a computer-based neurocognitive test. From the full 45-minute test battery, the military has extracted several tests associated with brain injury that take about 15 minutes to complete. Soldiers complete this test before deploying. If there is an incident that might produce a concussion, medical personnel on site can email for the baseline results and compare them to a post-injury test.

Again, ANAM is not diagnostic, it is a tool used by a trained health-care provider to help in making a diagnosis.