

[Knockin' Your Noggin](#)

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It is football season in the United States. That means Friday night lights for families with high school kids, and weekends filled with games from the 5-year-old MightyMites to collegiate and professional rivalries that now don't finish until late Monday evening. With growing awareness of head trauma in recent years, this season is also characterized by more conversation about concussions.



[Photo Credit](#)

Professional football players are at high risk for concussion, and football is the most common sport in which kids experience concussions. But it is not the only one. All contact sports are high risk, but so are the elementary school playground, car and bicycle accidents, and falls. Anytime we abruptly hit or whiplash our heads, concussion may follow.

1. What is a concussion? When we experience a blow or jolt to the head, we are at risk for a concussion, which is considered a mild traumatic brain injury. Our brains sit inside our skulls with room to move. This is mostly a good thing, but sudden movement - either a direct blow to the head or a jolt to the body that causes the head to jerk, will cause the brain to bounce, slosh around or twist inside the skull. This leads to stretching and damaging of brain cells and chemical changes in the brain. [Typical symptoms of concussion](#) are headache, dizziness, fatigue, irritability, problems with memory and concentration, depression, sensitivity to light and/or noise, blurred vision, sleep troubles, and restlessness. Because these symptoms usually resolve in 1-2 weeks and are not life-threatening, concussions are typically considered "mild" traumatic brain injuries. However, the effects can be serious and last for many weeks, or even longer.

2. Concussions are common and underreported. In the US, about [one in five adolescent athletes](#) has had one diagnosed concussion. The odds are greater for kids playing competitive, contact sports. Football is the most common cause of concussion but ice hockey, soccer, cycling and skateboarding all contribute to the count. With more careful monitoring these days, we are discovering that many concussions are not reported at the time of the injury. This is of particular concern because a [past history of an untreated concussion](#) is associated with more serious symptoms and higher loss of consciousness rates when subsequent concussions occur.

3. Sometimes the effects linger. Most individuals who experience a concussion will fully recover from the insult to the brain. [It can take a few days, a few weeks or even a few months.](#) A significant minority of individuals do not experience improvement within this window of time and may even experience a worsening of symptoms. This protracted condition is called [Post-concussion Syndrome](#), which is notably not correlated with the severity of the injury. Individuals who experience repeated concussions are at risk for developing what [Dr. Bennet Omalu](#), forensic pathologist, identified in 2002 as [Chronic Traumatic Encephalopathy \(CTE\)](#). Dr. Omalu examined the post-mortem brain of Mike Webster, former center for the Pittsburgh Steelers and Kansas City Chiefs, and other professional football players who died prematurely following careers as world-class athletes that gave way to profound states of cognitive and behavioral decline and premature death. In doing so, Dr. Omalu identified CTE as an irreversible neurodegenerative condition that shows the kind of brain damage seen in the brains of individuals with dementia, as well as in some retired boxers. Dramatically captured in the real-life movie, [Concussion \(starring Will Smith as Dr. Omalu\)](#), the NFL first dismissed and discredited Dr. Omalu. When those strategies failed, they fought to silence him. But ultimately, the truth won out.

4. Concussion and mental disorders. It's no surprise that an injury to the brain can worsen existing mental health issues or bring about new mental health problems affecting mood, concentration, memory and personality. Pre-existing mental health problems predict worse outcome following a concussion, and a concussion increases risk for mental health problems. People who develop Post-concussion Syndrome are more likely to have had a history of depression, anxiety, post-traumatic stress disorder, significant life stressors, poor social support and impaired coping skills. And a large 2013 population-based study from Denmark suggests [individuals with traumatic brain injuries, including concussions, are four times more likely to develop a mental illness.](#) At the most severe end of the continuum, those who develop Chronic Traumatic Encephalopathy as described above, suffer with cognitive impairment, dementia, and profound mood disturbances that [increase risk for suicide.](#)

5. Concussion care is rapidly evolving. When my daughter accidentally slammed her head against a cinderblock wall last year, she developed classic signs of concussion and was instructed to follow the classic, evidence-based recommendations as described above, and like the majority of individuals, she recovered within a few weeks. For those whose symptoms endure, [new evidence-based recommendations to treat Post-concussion Syndrome](#) include moderate exercise, rehabilitative physical therapy, nutritional supplements, vestibular and visual rehab, and integration of education and psychotherapy as needed.

Of course, prevention would be even better. And now, from the NFL on down to the MightyMites, many football organizations are leading the charge to develop new rules, policies and equipment designed to prevent head injuries. [Helmet innovation and design ideas](#) are coming from the most unlikely of places, including woodpeckers! A woodpecker sustains a steady succession of blows to its head – pecking at a force equivalent to going from 26,000 miles per hour to a complete stop every second – without brain damage. [Equipment designers are now looking to these wondrous birds to inspire protective collars and better helmets.](#) One of the most promising high-tech strategies is a helmet with sensors embedded in the interior lining to detect forces exerted upon the wearer so that the degree of insult to the brain can be carefully monitored, minimized and addressed.

I don't know much about football, and my kids were not allowed to play for fear of concussions (so they played basketball and broke ankles, dislocated shoulders and collided under the hoop to endure concussions without

helmets instead). The truth is that we are all vulnerable to concussions, with some sports and activities increasing the risk. The bottom line: from concussion to mental illness, it's in our heads and we need to mind.