

Five questions: What parents should know about concussions

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Stanford pediatric emergency medicine physician Angela Lumba-Brown, MD, explains what families should know about new CDC guidelines on the management of children's brain injuries.

Lumba-Brown first learned about concussions from personal experience. "I had two concussions playing high school basketball," she said. "I had great doctors who were able to explain to me what I was feeling, which added to my rapidly developing interest in how the [brain](#) works."

Knowledge of brain injuries has advanced a lot since those conversations, in part thanks to Lumba-Brown's own work. Now a clinical assistant professor of emergency medicine and of pediatrics at the School of Medicine, Lumba-Brown conducts research on brain injury and treats patients at Stanford Health Care's pediatric [emergency department](#). She is also the lead author of a new set of guidelines from the U.S. Centers for Disease Control and Prevention advising physicians on the diagnosis and treatment of mild traumatic brain injuries, including concussion, in children and teenagers. Published Sept. 4 in *JAMA Pediatrics*, the new guidelines are based on evidence from over 35,000 scientific studies of brain injury that came out between 1990 and 2015. Lumba-Brown spoke with science writer Erin Digitale about what parents and other family members should know about concussions.

1. What are the warning signs that a child who has bumped their head should be taken to the emergency department or their pediatrician?

Lumba-Brown: If a child is not acting like their usual self, or if they have any worsening in their symptoms after an injury, they should come in. If they have a headache that becomes severe, or are feeling excessively sleepy, dizzy, confused or unable to remember things, they should come in. Other warning signs include unsteadiness or difficulty walking, changes in their speech, seizures or blackouts. If the mechanism of injury was severe—a bad car accident or fall from a height, for example—they should also be checked out by a clinician. In general, parents should exercise caution and come to the emergency department

or their pediatrician if they feel something is not right with their child; that is why we are there.

2. The new CDC guidelines recommend changing the terminology we use for concussions. Why?

Lumba-Brown: Traditionally, concussion has been considered a type of mild traumatic brain injury in which there is no evidence of hemorrhage on standard neuroimaging. However, other "mild" brain injuries, including those with small amounts of bleeding or bruising of the brain, are treated exactly the same way as concussion. Studies have also shown that there is a different perception about the terms "concussion" and "mild traumatic brain injury" among patients, caregivers and coaches. We want to ensure that we are describing the most medically correct process possible when advising our patients, and hence we are now talking about "mild traumatic brain injury."

3. What should parents expect if their child is being evaluated for a mild traumatic brain injury?

Lumba-Brown: The main test we use to evaluate a child for this type of injury is our physical exam, which includes assessment of neurologic function. This exam includes assessing the child's speech and flow of thoughts and emotions, how they move and walk, their coordination, their strength and muscle tone, and the action of facial muscles that can reflect potential problems with cranial nerves, as well as neck injuries or other injuries. Parents sometimes expect an imaging test, but the physical exam performed by the doctor is actually the most important test. The physician may also want to watch the child for a couple of hours to monitor for any change in symptoms that might reflect a more serious process, such as significant bleeding on the brain, which could take time to develop. Since we want to avoid exposing children to

unnecessary radiation when a clinician diagnoses a mild traumatic brain injury, the new guideline does not recommend obtaining head CT imaging or X-rays in such cases.

Parents should tell the doctor about any previous head injuries their child has had, as well as any bleeding disorders or other neurologic issues, such as seizure disorders, ventriculo-peritoneal shunts, brain surgeries or neck injuries. The doctor needs to know if the child has any history of attention deficit hyperactivity disorder, mood or anxiety disorders, prior issues with their balance, problems with their eyesight, sleep disorders, or a history of migraines. That's important because children with these medical histories may have longer recoveries.

It's important for families to know that many pediatricians will manage a child's mild traumatic brain injury. However, in some instances, a pediatrician may recommend follow up with specialists.

4. What should parents know about the recovery from mild traumatic brain injuries?

Lumba-Brown: In most cases, we can tell families to go home but return to their pediatrician or emergency department if they see any worsening symptoms. We advise families that their child should take it easy the next day. The child may have a headache, nausea, dizziness, or amnesia about the day of the injury. They may have problems focusing and changes in sleep patterns over the next weeks. They could be more emotional or get headaches more easily. The symptoms will change as the child is recovering.

The brain needs some stimulation to get blood flow back to the injured areas, so we don't want a child in a dark room, sleeping all day. It's better to try to stick to the usual routine, maybe with longer naps but also some

walking and playing. Kids should avoid activities that carry risk for re-injury—no jumping off couches, playing soccer, riding a mountain bike downhill, or jumping on trampolines. Cognitive activities like reading, watching TV, or playing on an iPad are OK if they aren't worsening the child's symptoms significantly.

Re-injury is the major risk for a child or teenager going home with a mild [traumatic brain injury](#), just as the knee is weaker as it recovers from an injury, and a fall or misstep could much more easily re-injure it than the other knee. The brain is similar: With another blow to the head, a second injury can occur at a lower threshold of impact. That's why clinicians recommend no contact sports during recovery from a [mild traumatic brain injury](#). This can be difficult advice for children who thrive on play; we need to ensure the child understands to the best of their ability why they can't climb trees, head their soccer ball or participate in other activities that could result in re-injury.

Children should see their pediatrician for a second visit within a week of their [injury](#) to assess how they are improving. Their pediatrician can guide the family about a return to full activity, including contact activity. If a child is not recovering at the rate we expect as the month progresses, a brain-imaging test, such as an MRI, may be warranted.

Mild traumatic brain injuries need time to heal, and children need emotional and physical support from their families, teachers and sports coaches to help their recovery and ensure that they aren't overexerted or re-injured.

5. What are the big unanswered questions about concussion and other forms of mild traumatic brain injury?

Lumba-Brown: Most children's symptoms begin to improve by about 10 days, but 20 to 30 percent recover much more slowly. The doctor's clinical exam, including evaluation of the [child](#)'s medical history and current symptoms, flags who may be at risk for slower recovery: For example, more symptoms and more severe symptoms are warning signs. We're now studying how to effectively treat these symptoms.

Research I've been conducting at the Stanford Concussion and Brain Performance Center with my colleague Jamshid Ghajar, MD, Ph.D., has identified five main groups of symptoms following concussion: headache or migraine; cognitive symptoms, such as slowed reaction time and difficulty processing information; anxiety and mood symptoms; ocular-motor symptoms, such as blurry vision and trouble with eye tracking; and vestibular or balance symptoms. But we are just starting to understand how these different groups of symptoms may benefit from specific types of treatment.

More information: Michael McCrea et al. State of the Science on Pediatric Mild Traumatic Brain Injury: Progress Toward Clinical Translation. *JAMA Pediatr*. Published online September 4, 2018. [DOI: 10.1001/jamapediatrics.2018.2846](#)

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