

By Kirsten Weir

HARD KNOCKS

Young athletes lack lifesaving knowledge about head traumas.



Willie Baun will never forget seventh grade, which is ironic because he spent most of the year with amnesia.

It all began when he collided with another player during a football game. The hit left him feeling woozy, and his doctor diagnosed his condition as a concussion.

After three weeks on the sidelines, Willie returned to football and soon took another hit. Dazed again, he also felt a stinging sensation in his neck and a knifelike stabbing pain in his head. Told at a hospital he had a second concussion, he headed home and went to bed.

The next morning, Willie didn't recognize his dog or even his parents. At school, he could do math and read at only a second-grade level. "I forgot all my friends, so I would go to school, and I wouldn't know anybody," Willie told *Current Science*. Dizziness, balance problems, and constant headaches also bothered him.

Willie regained his memory and caught up at school, but his recovery took eight months. Still, he was lucky. Concussions can take a far more serious toll on athletes.

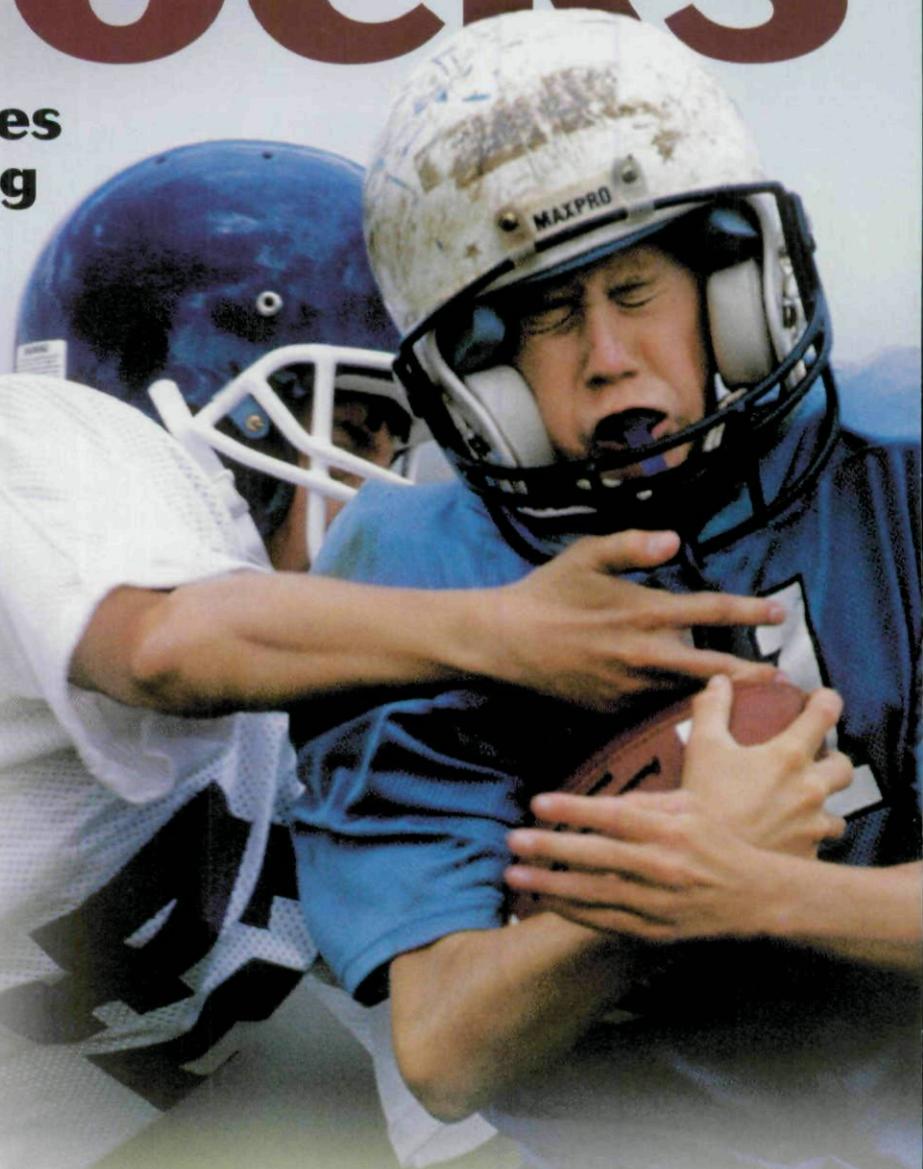
CONCUSSION A PROCESS

Before that experience, Willie and his teammates never worried about concussions. Like many other young athletes, they were only vaguely aware of what a concussion was.

Ninety percent of concussions go undiagnosed because athletes and coaches from pee-wee football to the National Football League (NFL) are

ill-informed about the seriousness of head injuries, according to Chris Nowinski, the author of *Head Games: Football's Concussion Crisis*. "Kids don't realize the symptoms they are experiencing are actually concussions," says Nowinski.

Nowinski speaks from firsthand knowledge. He played football in



high school and college. Afterward, he wrestled professionally until his career was put on hold by a series of concussions.

Experts define a concussion as an alteration in brain function caused by trauma. Although a single blow to the head causes a concussion, the injury is actually a series of chemical changes that alters the brain for days or even weeks (see "Sudden Impact"). "A concussion is not an event," Nowinski explains. "It's a process."

Loss of consciousness—being knocked out—is not the main symptom of a concussion. Headaches, confusion, and dizziness are more common. A variety of other symptoms may emerge in the following hours and days (see "Danger Signs").

SECOND IMPACT

An athlete who suffers one concussion is three to six times as likely to have a second—and the second is often more severe. Returning to sports before the brain has recovered from a concussion can have drastic consequences. Willie now admits that the headaches from his first concussion hadn't cleared up before he returned to playing football. Athletes should never resume playing until all symptoms of a concussion have disappeared and they have their doctor's permission.

The consequences of returning to play too soon could have been much worse for Willie. Some young athletes are struck down by *second-impact syndrome*. The brain swells, and breathing stops. One of two victims dies. Those who survive often sustain permanent brain damage.

Doctors aren't sure why, but people between the ages of 12 and 18 are especially vulnerable to second-impact syndrome. "It's well understood that returning to play before the brain is healed causes more damage for younger athletes than it does for adult athletes," Nowinski says. "Most athletes that die from second-impact syndrome are teens."

FOOTBALL CULTURE

Second-impact syndrome isn't the only serious effect of multiple concussions. The injuries can also inflict damage that builds up quietly over time. Repeated concussions increase the risk of memory problems, poor concentration, fatigue, depression, and *dementia* (loss of intellectual function).

Last year, after struggling with depression, 44-year-old former NFL player Andre Waters killed himself. An expert who examined Waters's brain said it resembled that of an 85-year-old Alzheimer's patient. The expert



concluded that the damage was caused or expedited by repeated concussions. Former NFL player Mike Webster, who became mentally impaired before dying of heart failure in 2002, also sustained brain damage from repeated head traumas.

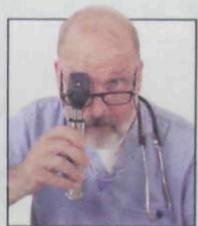
Nearly four years after retiring from wrestling, Nowinski still struggles with headaches, disturbed sleep, and sluggishness. He is now on a mission to raise awareness about the dangers of concussions, especially among football players. Football coaches often urge team members to ignore pain, he says. And players often keep quiet about head injuries, not wanting to appear weak or let down their teammates.



Danger Signs

See a doctor if you experience any of these symptoms in the hours and days after a blow to the head:

- amnesia
- confusion
- *disequilibrium* (balance problems)
- disorientation
- dizziness
- fatigue
- headache
- *hyperacusis* (sensitivity to sound)
- irritability
- loss of consciousness
- memory problems
- nausea or vomiting
- neck pain
- personality change
- *photophobia* (sensitivity to light)
- sleepiness
- sleep disturbances
- *tinnitus* (ringing in the ears)
- visual disturbances (such as blurred or double vision, seeing stars)



But playing with a concussion, says Nowinski, is not the same as toughing out a twisted knee. "Injuries above the shoulders should be treated differently than injuries below the shoulders," he says. "People need to understand the risks."

Willie Baun agrees. Now 16, he has recovered his memory but still suffers from terrible headaches every few months. "I'm done with playing football," he says.

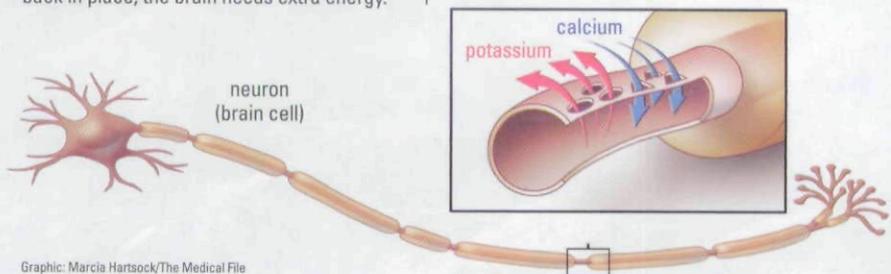
"Even people who know my story think it can't happen to them," he says. "They have to be honest with doctors and parents that maybe they're having symptoms. Maybe they're not all right." **CS**

Sudden Impact

How the brain responds to a blow to the head

When the brain suffers a concussion, all its cells fire at once, releasing a flood of *neurotransmitters* (chemicals that send messages between brain cells). That flood causes potassium ions to rush out of the cells and calcium ions to rush in. To put the ions back in place, the brain needs extra energy.

However, the calcium buildup inside the cells makes the brain less efficient at processing energy. Running low on energy, some brain cells go quiet, and the brain stops functioning properly. No treatment for concussion exists. Only time helps the brain cells recover.



Graphic: Marclia Hartsock/The Medical File

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