Lasting Impact

New research suggests that even small hits to the head may lead to brain deterioration over time. So what can be done?

By Luna Shyr

Football draws as much attention lately for the knocks that players take as it does for their drives down the field. The emergence of research linking head collisions with behavioral and cognitive changes similar to those seen in Alzheimer’s patients puts the pummeling in a new context. Whether ramming opponents head-on or butting helmets, athletes may face the risk of long-term brain injury from hits accumulated over time.

Brain degeneration from repeated blows to the head has been known in boxers since the 1920s as dementia pugilistica, or punch-drunk syndrome. "Football is the current poster child for that," says H. Hunt Batjer, a Northwestern University neurosurgeon who co-chairs the National Football League Head, Neck, and Spine Committee. "What’s come to the fore is the risk of repetitive minor hit injuries." Recent research indicates that small impacts can cause damage as much as big ones, widening the field of concern to young athletes, hockey players—and soldiers subject to head-rattling blasts.

At the University of North Carolina, where football players receive an average of 950 hits to the head each season, neuroscientist Kevin Guskiewicz and colleagues have spent six years analyzing impact data from video recordings and helmets equipped with accelerometers. He and Batjer note that there are plans to test similar technologies on various NFL teams starting this year. "Are you better with five higher-end impacts or 50 lower-end ones? We don’t know," says Guskiewicz. "We’re trying to see what the real issues are in the concussion puzzle."

Guskiewicz believes that on-field monitoring and education are paths to progress. Already the spotlight on football-related brain trauma has resulted in new NFL practices, state laws, and congressional hearings on ways to protect young athletes. Batjer adds that military experts working on better helmets for soldiers are collaborating with the NFL. New helmet materials, and technology for on- and off-field testing, were the focus of a recent NFL conference in New York City.

On the medical side, there is hope for advanced brain-imaging techniques, experimental blood or spinal fluid tests, and even a genetic marker that would enable doctors to identify chronic traumatic encephalopathy (the same as punch-drunk syndrome, but not limited to boxers) early on. At the moment, the definitive mark of the disease—clumps of abnormal tau protein in the brain—can be seen only when the brain is sliced, stained, and studied under a microscope. CTE typically appears years after head traumas, and "we don’t want to diagnose a disease after death," says Ann McKee, co-director of Boston University’s Center for the Study of Traumatic Encephalopathy.

Guskiewicz envisions databases that track all the hits athletes take throughout their playing years to help explain neurologic changes later in life. But, he says, "it’ll probably be my grandchildren who are analyzing that data."