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Coming to a head

By Peter Keating
ESPN The Magazine

"I'm sorry for your loss."

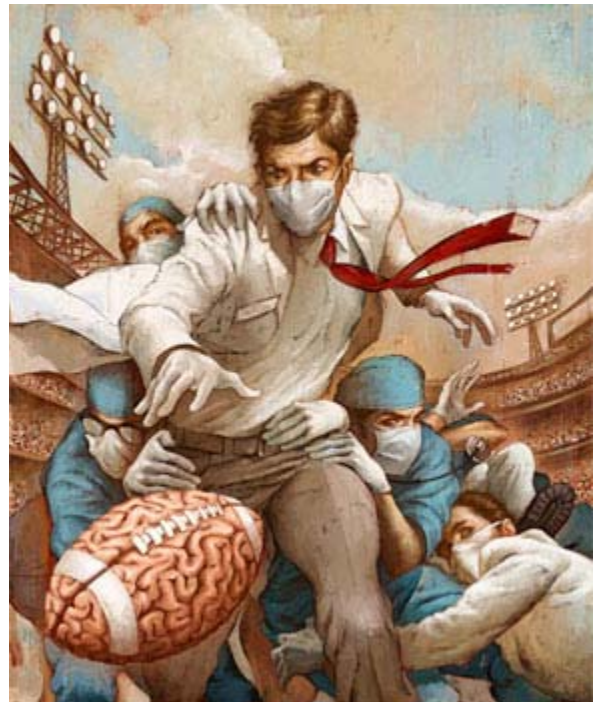
The future of sports concussions is in that sentence. It's the expert's opening gambit to the mourner, sympathetic and nonjudgmental but introductory, too, a polite way of saying, "There's a dead body here I need to ask you about." Ken McKinley heard those words on Tuesday, Sept. 21, 2010, the day after his son Kenny, a 23-year-old wide receiver for the Broncos, took his own life. The doctor on the other end of the line wanted a sample of Kenny's brain.

With his son lying on an autopsy table 1,400 miles away, the father had not begun to cobble together an answer to the brutal question welling inside him: What made Kenny so depressed that he fired a .45-caliber Taurus handgun through a pillow into his own skull? But now the doctor on the phone was talking about a disease called chronic traumatic encephalopathy (CTE), a brain syndrome caused by repeated blows to the head. CTE, he said, can wreck its victims' control of emotions and impulses and cause memory loss, depression and eventually dementia.

Researchers had already found it in some NFL players who died under unusual circumstances, familiar names like Justin Strzelczyk, Andre Waters and Chris Henry. They wanted to know if Kenny McKinley, who'd played football since he was 5, also held CTE's toxic threads in his brain.

The doctor's request, while macabre, held hope of an answer, comfort even, for the senior McKinley. He had, of course, read about the effects of concussions. Maybe some good could be made of his son's death. He agreed to donate Kenny's brain to science.

The next 72 hours were a blur of funeral arrangements and unending calls from family, friends and reporters. But McKinley made time to fill out a consent form that had been sent to him and to take yet another call, this one from a researcher who gave him a fax number to which he could forward the paperwork. When the scientists called to ask about the form, McKinley assured them he would send it. Then they called again and again. After they began to send e-mails McKinley realized what was happening. He wasn't dealing with one group of researchers, but with two: one from West Virginia University, the other from Boston University. The proceedings were so confusing that even today he says he isn't quite sure which group initially got his consent form. "I was bombarded by phone calls," he says. "As I was trying to fax it to one group, the other one said, 'Send it to this number.' I hadn't buried my son yet, but I finally realized what was going



When the NFL reversed field on concussions, it spawned a medical gold rush that pits scientist against scientist in a quest for cures, treatments and dead men's brains.

on: There was a competition for his brain."

THE FIRST THOUGHT most people have after they see damaged, discolored brain cells under a microscope is the same one they have after they see a young player laid out by a helmet-to-helmet hit: This is horrible. The second thought is usually the same too: How can we stop this from happening? As public awareness of concussions grows, more and more doctors, engineers and scientists are taking the responsibility of tackling that question, developing devices and substances that prevent, diagnose and treat brain injury. What was once a niche industry is now an all-out gold rush.

The NFL's previous commissioner, Paul Tagliabue, ran out the clock on concussions, appointing a committee that used shoddy statistics to churn out study after study that found "no evidence" of concussions' widespread impact among pro football players. And then he retired. But almost from the moment Roger Goodell took over the job, just prior to the 2006 regular season, the league has faced ever-increasing pressures from many directions. From medical examiners, who discovered CTE in players' brains. From doctors who were willing to criticize the league (neurosurgeon Robert Cantu, for one, said the NFL's research was so substandard that no valid conclusions could be drawn from it). From news reports that highlighted the sad stories of brain-damaged players, many of which ended in suicide. From a resurgent players union (NFLPA), whose new boss, DeMaurice Smith, campaigned on promises to protect his constituents' health. And from Congress, after NFL reps looked foolish defending the status quo in October 2009 hearings.

On the Rise

After Week 15, the NFL was on pace for **269** reported concussions this season. That's a 21-percent rise from 2009 and a 34-percent jump from 2008. What it's not, necessarily, is bad news. The league says it speaks to players' increased willingness to at least acknowledge the injury. But we won't know for sure until better testing takes the guesswork out of diagnosis and eliminates the possibility of injuries going unreported.

In the face of all that, the league couldn't continue to deny that concussions can lead to lasting brain injury. A league spokesman finally admitted as much in December 2009. But the league also can't admit that it knows, or has ever known, the extent of its concussions problem, because it cannot risk provoking lawsuits from athletes who suffered brain trauma yet kept on playing.

So Goodell has walked a tightrope from the day he became commissioner. As he leads his league through this age of discovery, he has chosen to attack the issue by looking toward future research rather than past inadequacies. Sacking the NFL's long-standing concussions committee, he convened a new Head, Neck, and Spine Committee to study the long-term effects of hits to the head while developing equipment standards for the league. Some of the country's best neurosurgeons sit on the panel.

Suddenly, outsiders are insiders. "I was a critic of the old committee, and now I'm on the new committee," says Kevin Guskiewicz, chairman of Exercise and Sports Science at the University of North Carolina, with a touch of disbelief. The league no longer controls its consultants and what they might say.

On Dec. 8, the new group held a ground-breaking meeting in New York, at which members openly displayed their independence. During one press session, Hunt Batjer, a Northwestern neurosurgeon who is one of the group's co-chairs, said the NFL shouldn't have an official provider of safety equipment. (Currently, the league enjoys a lucrative licensing deal with helmet maker Riddell.) At another, Colonel Geoffrey Ling of DARPA, the Department of Defense's research and development office, talked about

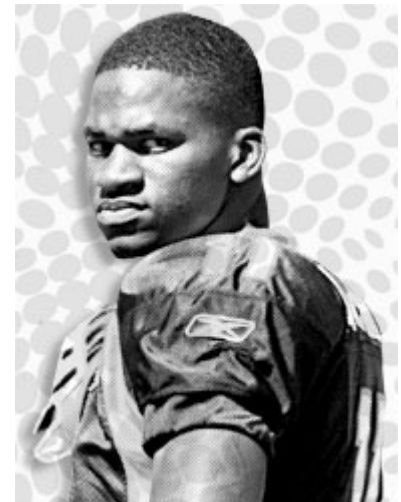
what the military has in stock. "We've developed helmets that offer improved force protection, including one where a 9-millimeter point-blank shot won't penetrate it," Ling said. "That's pretty good, but I wouldn't want to play football in it. The Taliban don't head-butt!"

These days, if you're a chemist developing shock-absorbing materials or a radiologist with a new kind of MRI, the NFL can't wait to meet you. At that December meeting, the committee heard from five helmet manufacturers and four makers of sensor systems that measure on-field impacts. Experts ranging from the director of MIT's Institute for Soldier Nanotechnologies to the chief medical technician for the open-wheel racing league CART took the opportunity to weigh in.

As the NFL moves beyond fighting outside research and toward active engagement, it is unleashing new marketplace competition. Companies and universities everywhere are jockeying to solve problems all along the concussion spectrum. From genotyping and blood tests and imaging techniques to helmets and drug cocktails, all kinds of new brain-injury products are gaining notice. The potential rewards are huge: Imagine being the first to earn approval for a concussion test or pill. And so the race is on. "There are so many factors involved in what leads to injuries that we shouldn't look for any single method to decipher all the complications of the brain," says Gerard Gioia, a pediatric neuropsychologist at the Children's National Medical Center in Washington, D.C. "But I don't think it's so complex that we can't do 90 percent of what we need to do to protect athletes. We're light-years ahead of where we were just a few years ago."

But to study the long-term effects of head blows, you have to get your hands on the brains of dead athletes; for the moment, scientists can only definitively diagnose CTE postmortem. Can it be a shock, then, that the chase for this most precious resource has turned nasty?

IN 2002, Bennet Omalu, a forensic neuropathologist working as a medical examiner in the Allegheny County, Pa., coroner's office, found massive deposits of abnormal tau protein in the brain of Mike Webster, a Hall of Fame center who spent 15 years with the Steelers before spiraling into destitution, disorientation and homelessness, finally dying at age 50. Webster's brain cells appeared corrupted by head trauma, with the tau protein becoming toxic and producing neural tangles. Omalu had discovered a link between hits to the head and long-term brain damage, in the skull of an NFL player.



Kenny McKinley committed suicide, but doctors are looking into underlying reasons for his death.

The league tried hard to blackball Omalu -- three doctors on its concussions committee said he should retract his study -- but other researchers made a show of supporting his work. One was Chris Nowinski, a former WWE wrestler who suffers postconcussion agonies of his own. After Waters, an All-Pro safety with the Eagles, committed suicide in 2006, Nowinski was the one who audaciously lobbied the family on behalf of Omalu for the brain. Omalu found that CTE had reduced the 44-year-old's mental acuity to that of an 85-year-old with early Alzheimer's disease.

For a while, this unlikely team of a Nigerian-born doctor and a Harvard-educated wrestler pioneered the study of brain damage in sports. Nowinski procured the brains, one after another, and Omalu made the diagnoses of CTE, one after another. Their findings generated huge news. But Nowinski, who wanted to fight what he sees as a concussions pandemic, came to doubt that Omalu was aggressive enough for the cause. And Omalu, who wanted to establish a consortium of research centers to study injured brains, came to view Nowinski as reckless. In October 2007, Nowinski told Omalu he didn't want him studying brains anymore for the organization Nowinski had founded, the Sports Legacy Institute. "Who are you

to tell me that?" a furious Omalu said. So they split, each taking one of the two SLI neurosurgeons. Nowinski stayed in Boston, along with Cantu, the chief of neurosurgery at Emerson Hospital in Concord, Mass., and began working with other pathologists. Omalu teamed with Julian Bailes, chair of neurosurgery at West Virginia University School of Medicine and a former team doctor for the Steelers.

Nowinski has been extraordinarily successful at bringing the concussion issue to the public's attention. When SLI partnered with BU to form the Center for the Study of Traumatic Encephalopathy, it freed Nowinski to leave his consulting job with a life sciences company to work full-time on brain trauma research and advocacy. He has spent the time well, generating more than a dozen stories in *The New York Times* in just the past two years, while helping to convince more than 300 athletes to pledge their brains to his organization.

Nowinski's team has grabbed the attention and support of the NFL. In October 2009, during the owners meetings in Boston, Goodell spent 90 minutes alone with Cantu. The scientist urged the commissioner to strengthen the league's return-to-play guidelines and player education efforts, and Goodell promptly agreed. "I told him these were two areas where the NFL could make immediate progress, and if it did so, the NCAA and high schools would follow," Cantu says. "His eyes lit up." In April 2010, the NFL made a no-strings-attached \$1 million donation to SLI.

Omalu and Bailes have secured an academic home for their work too. The Brain Injury Research Institute works out of the neuro-surgery department at West Virginia and has space on the first floor of a nearby \$30 million building. The battle for brains -- and headlines -- has been joined.

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In May 2008, Tom McHale, who played guard for three NFL teams from 1987 to 1995, died of a multiple-drug overdose. McHale's family agreed to split his brain between the two research groups. Each center found evidence of CTE, making McHale the sixth former NFL player to that point who had both died by the age of 50 and been found to have the disease. Nowinski went public with the information first, on Jan. 27, 2009, during the massive media run-up before Super Bowl XLIII.

"They have taken credit for our work," says Garrett Webster, Mike's son and now an executive with the West Virginia group. "Bennet examined Tom McHale and we sent them half the brain, and they released the results as if they did the work themselves. They also had Mr. McKinley fax them our consent form. And how can they be independent if they take \$1 million from the NFL?"

The Boston researchers strongly disagree with that characterization of events. "Both groups independently studied Tom McHale's brain and we went public with the blessing of his wife, Lisa," says Nowinski, who has hired Lisa McHale to help coordinate further donations. "It's our mission to work with the families to raise awareness. And in an era when athletes are returning to play without realizing the risks, and even committing suicide, we owe it to every athlete to go public with cases."

THE BU GROUP ultimately got what it wanted from Ken McKinley. By the time he left his home in Atlanta for his son's memorial service on Sept. 24, McKinley was fed up with the warring researchers. He'd just about decided not to give away Kenny's brain to anyone. But after he landed in Denver, a

member of the Broncos staff approached him at his hotel and urged him to donate it to Nowinski. "They told me the Boston group is working more closely with the NFL," McKinley says. "And Kenny was a member of the NFL. All I had to do was sign one more form, and it was taken care of."

It's a new reality of the NFL. Grieving families can expect two phone calls: one from Morgantown, the other from Boston. "There should be one process, something simple where maybe players check a box to donate their brains," McKinley says. "Then maybe others won't have to go through what I went through."

Whatever their differences, these brain collectors are on an important mission. Of course, even with new processes and procedures, football and other contact sports will surely be dealing with some form of concussions forever -- Our brains are soft and our skulls are hard. But the ideas springing forth from this messy competition can't help but summon a more hopeful future from what was a grim past. For the first time in a long time, the news on concussions isn't just ghoulish, it is exciting:

There is a brainstorm on the horizon.

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