

# Bennet Omalu, Concussions, and the NFL: How One Doctor Changed Football Forever

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Let's say you run a multibillion-dollar football league. And let's say the scientific community—starting with one young pathologist in Pittsburgh and growing into a chorus of neuroscientists across the country—comes to you and says concussions are making your players crazy, crazy enough to kill themselves, and here, in these slices of brain tissue, is the proof. Do you join these scientists and try to solve the problem, or do you use your power to discredit them?

On a foggy, steel gray Saturday in September 2002, Bennet Omalu arrived at the Allegheny County coroner's office and got his assignment for the day: Perform an autopsy on the body of Mike Webster, a professional football player. Omalu did not, unlike most 34-year-old men living in a place like Pittsburgh, have an appreciation for American football. He was born in the jungles of Biafra during a Nigerian air raid, and certain aspects of American life puzzled him. From what he could tell, football was rather a pointless game, a lot of big fat guys bashing into each other. In fact, had he not been watching the news that morning, he may not have suspected anything unusual at all about the body on the slab.

The coverage that week had been bracing and disturbing and exciting. Dead at 50. Mike Webster! Nine-time Pro Bowler. Hall of Famer. "Iron Mike," legendary Steelers center for fifteen seasons. His life after football had been mysterious and tragic, and on the news they were going on and on about it. What had happened to him? How does a guy go from four Super Bowl rings to...pissing in his own oven and squirting Super Glue on his rotting teeth? Mike Webster bought himself a Taser gun, used that on himself to treat his back pain, would zap himself into unconsciousness just to get some sleep. Mike Webster lost all his money, or maybe gave it away. He forgot. A lot of lawsuits. Mike Webster forgot how to eat, too. Soon Mike Webster was homeless, living in a truck, one of its windows replaced with a garbage bag and tape.



From left, Bennet Omalu, the pathologist; and Julian Bailes, the neurosurgeon. (Photo: Mark Heithoff)

It bothered Omalu to hear this kind of chatter—especially about a dead guy. But Omalu had always fancied himself an advocate for the dead. That's how he viewed his job: a calling. A forensic pathologist was charged with defending and speaking for the departed—a translator for those still here. A corpse held a story, told in tissue, patterns of trauma, and secrets in cells.

In the autopsy room, Omalu snapped on his gloves and approached the slab. He noted that Mike Webster's body was sixty-nine inches long and weighed 244 pounds. He propped up the head and picked up his scalpel and sliced open the chest and cracked open the ribs. He took out the heart and found everything he expected of a man who was believed to have died of a heart attack, as was the case with Webster. Then he made a cut from behind the right ear, across the forehead, to the other ear and around. He peeled the scalp away from the skull in two flaps. With the electric saw he carefully cut a cap out of the skull, pulled off the cap, and gently, like approaching a baby in the birth canal, he reached for the brain.

Omalu loved the brain. Of all the organs in the body, it was easily his favorite. He thought of it sort of like Miss America. Such a *diva*! So high-maintenance: It requires more energy to operate than any other organ. The brain! That was his love and that was his joy, and that's why his specialty was neuropathology.

Omalu stared at Mike Webster's brain. He kept thinking, *How did this big athletic man end up so crazy in the head?* He was thinking about football and brain trauma. The leap in logic was hardly extreme. He was thinking, *Dementia pugilistica?* "Punch-drunk syndrome," they called it in boxers. The clinical picture was somewhat like Mike Webster's: severe dementia—delusion, paranoia, explosive behavior, loss of memory—caused by repeated blows to the head. Omalu figured if chronic bashing of the head could destroy a boxer's brain, couldn't it also destroy a football player's brain? Could that be what made Mike Webster crazy?

Of course, football players wear helmets, good protection for the skull. But the brain? Floating around inside that skull and, upon impact, sloshing into its walls. Omalu thought: I've seen so many cases of people like motorcyclists wearing helmets. On the surface is nothing, but you open the skull and the brain is mush.

So Omalu carried Mike Webster's brain to the cutting board and turned it upside down and on its side and then over again. It appeared utterly normal. Regular folds of gray matter. No mush. No obvious contusions, like in dementia pugilistica. No shrinkage like you would see in Alzheimer's disease. He reviewed the CT and MRI scans. Normal. That might have been the end of it. He already had a cause of death. But Omalu couldn't let it go. He wanted to know more about the brain. There had to be an answer. People don't go crazy for no reason.

He went to his boss, pathologist Cyril Wecht, and asked if he could study the brain, run special tests, a microscopic analysis of the brain tissue, where there might be a hidden story.

There was nothing routine about this request. Another boss might have said, "Stick with the protocol," especially to a rookie such as Omalu, who had not yet earned a track record, who was acting only on a hunch. But Wecht was famously never one to shy away from a high-profile case—he had examined JFK, Elvis, JonBenét Ramsey—and he said, "Fine." He said, "Do what you need to do."

A deeply religious man, Omalu regarded Wecht's permission as a kind of blessing.

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It was late, maybe midnight, when Bob Fitzsimmons, a lawyer working in a renovated firehouse in Wheeling, West Virginia, got a call from the Pittsburgh coroner's office. It was not unusual for him to be at the office that late; he was having a bad week. He struggled to understand the man's accent on the phone, jutted his head forward. "Excuse me? You need *what?*"

The brain. Permission from the Webster family to process Mike Webster's brain for microscopic examination.

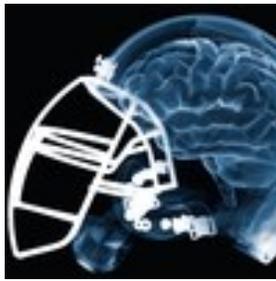
*Oh brother* was Fitzsimmons's initial thought. As if the Webster case wasn't already complicated enough.

Fitzsimmons had first met Webster back in 1997, when he showed up at his office asking for help untangling his messed-up life. Webster was a hulk of a man with oak-tree arms and hands the size of ham hocks. Fitzsimmons shook his hand and got lost in it, mangled fingers going every which way, hitting his palm in creepy places that made him flinch. It seemed like every one of those fingers had been broken many times over. Mike Webster sat down and told Fitzsimmons what he could remember about his life. He had been to perhaps dozens of lawyers and dozens of doctors. He really couldn't remember whom he'd seen or when. He couldn't remember if he was married or not. He had a vague memory of divorce court. And Ritalin. Lots of Ritalin.

"With all due respect, you're losing your train of thought, sir," Fitzsimmons said to Webster. "You appear to have a serious illness, sir." Not a pleasant thing to tell anyone, and here was a hero, a famous football player Fitzsimmons once bowed to, as did all young guys worth the Terrible Towels they proudly waved in the 1970s. The Dynasty! The black and the gold! It fueled optimism here, up and down the rivers, mill towns held tight in the folds of the Allegheny Mountains. And here was Iron Mike himself.

As a personal-injury lawyer, Fitzsimmons thought what he saw in Webster was an obvious case of a man suffering a closed-head injury—the kind he'd seen plenty of times in people who had suffered through car crashes and industrial accidents. No fracture, no signs of physical damage to the skull, but sometimes severe psychiatric problems, memory loss, personality changes, aggressive behavior.

EDITOR'S PICK



### [UPDATE: Bennet Omalu, Concussions, and the NFL](#)

"Please help me," Mike Webster said.

It took Fitzsimmons a year and a half to hunt down all of Webster's medical records, scattered in doctors' offices throughout western Pennsylvania and West Virginia. He sent Webster for four separate medical evaluations, and all four doctors confirmed Fitzsimmons's suspicion: closed-head injury as a result of multiple concussions.

Fitzsimmons filed the disability claim with the NFL. There are several levels of disability with the NFL, and Mike Webster was awarded the lowest one: partial, about \$3,000 a month.

Fitzsimmons said, "Oh, please." He said if ever there was a guy who qualified for the highest, it was Mike Webster. The highest level was "total disability, football-related," reserved for those who were disabled as a result of playing the game. It would yield Webster as much as \$12,000 a month. Fitzsimmons said to the NFL, "Four doctors—all with the same diagnosis!"

The NFL said no. Four doctors were not enough. They wanted Webster seen by their own doctor. So their own doctor examined Webster...and concurred with the other four: closed-head injury. Football-related.

The NFL pension board voted unanimously for partial disability anyway.

Fitzsimmons said, "You have got to be kidding me." He filed an appeal with the U.S. District Court in Baltimore, where the pension board is headquartered. The judge reversed the decision of the NFL pension board—the first time in history any such action had been taken against the NFL.

And yet still the NFL fought. They took the case to federal court. They said Mike Webster—who had endured probably 25,000 violent collisions during his career and now was living on Pringles and Little Debbie pecan rolls, who was occasionally catatonic, in a fetal position for days—they said Mike Webster didn't qualify for full disability.\* \*\*\*\*

Mike Webster and Bob Fitzsimmons grew close during those days. In fact, Mike Webster clung to Fitzsimmons like a baby to his mamma. He took to sleeping in the parking lot, waiting for Fitzsimmons to show up for work. He would stay there all day, just watching, waiting, and when Fitzsimmons would go home, Mike Webster would go back to his truck and write him letters. Hundreds and hundreds of letters. "Dear Bob, Thank you for helping me. We've got to keep up the fight. We have to see this thing

through." And then he would start talking about wars. And blood splattering. The letters would inevitably trail off into the mutterings of a madman.

And now he was dead.

Bob Fitzsimmons did not know what in the world to say, in 2002, to the man with the thick accent who called from the Pittsburgh coroner's office, four days after Mike Webster died of a heart attack, asking to study Webster's brain. Fitzsimmons was, in truth, grieving his client's death deeply; Mike Webster had been living for nothing but the case, the appeal, the last victory against a multibillion-dollar entertainment industry that seemed to have used him, allowed him to become destroyed, and then threw him away like a rotten piece of meat.

And now he was dead.

"Yes," Fitzsimmons said. And he gave Omalu the brain.

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Days and nights went by. Weekends. Slicing, staining, ordering slides. It got so Omalu was embarrassed in front of his co-workers at the morgue. "He's gone mad!" he imagined them reasonably thinking. "He won't stop looking at that brain! He's here at 2 a.m.!"

So Omalu put Mike Webster's brain in a plastic tub and took it home to his condo in the Churchill section of Pittsburgh. He put it in the corner of his living room, where he set up a table, a cutting board, some knives, and a microscope, where he could work without shame as long as he wanted and as hard as he wanted, no one looking over his shoulder except Prema, his sympathetic wife. "What the mind does not know, the eye cannot see," he would say to her, explaining the piles of books and journal articles cluttering the house, the sheer volume of research on trauma, on football, on helmets, on Alzheimer's disease, on concussions, on impact, on g-force, on protein accumulation, on dementia pugilistica. He had to learn more so he could see more so he could learn more so he could see. For months it's all he thought about. It became for him a calling. He was after all a spiritual man, and he came to know Mike Webster in the most personal way. "Help me" is what he heard Mike Webster say.

One day he started on a new set of slides, prepared for him by a lab at the University of Pittsburgh where he had ordered specialized staining. He was ordering so many slides, he had to start paying for this out of his own pocket. He put the first slide from the new set under his microscope and looked in.

#### EDITOR'S PICK



[The People V. Football](#)

"What is this?" he said out loud. "Geez. Gee! *What is this?*"

Brown and red splotches. All over the place. Large accumulations of tau proteins. Tau was kind of like sludge, clogging up the works, killing cells in regions responsible for mood, emotions, and executive functioning.

This was why Mike Webster was crazy.

Omalu showed the slides to Wecht and to scientists at the University of Pittsburgh. Everyone agreed: This was a disease, or a form of it, that no one had ever seen before. Omalu wondered what to call it. He wanted a good acronym. Eventually, he came up with CTE, chronic traumatic encephalopathy. He wrote a paper detailing his findings. He titled it "Chronic Traumatic Encephalopathy in a National Football League Player" and put it in an envelope and sent it to the prestigious peer-reviewed journal *Neurosurgery*. He thought NFL doctors would be pleased when they read it. He really did. He thought they would welcome a finding as important as this: scientific evidence that the kind of repeated blows to the head sustained in football could cause severe, debilitating brain damage. He thought they could use his research to try and fix the problem.

"I was naive," he says now. "There are times I wish I never looked at Mike Webster's brain. It has dragged me into worldly affairs I do not want to be associated with. Human meanness, wickedness, and selfishness. People trying to cover up, to control how information is released. I started this not knowing I was walking into a minefield. That is my only regret."

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Nothing was welcoming, nothing was collegial, about the NFL's reaction to Omalu's article that appeared in the July 2005 edition of *Neurosurgery*. In a lengthy letter to the editor, three scientists, all of whom were on the NFL payroll, said they wanted Omalu's article retracted.

"We disagree," they said.

"Serious flaws."

"Complete misunderstanding."

The scientists, Ira Casson, Elliot Pellman, and David Viano, were all members of the NFL's Mild Traumatic Brain Injury committee. In tone their letter to the editor struggled to remain calm, but everyone could read the subtext: *We own this field. We are not going to bow to some no-name Nigerian with some bullshit theory.*

The attack against Omalu was that he had misinterpreted his own neuropathological findings. In his calmer moments, Omalu considered the fact that neither Casson, Pellman, nor Viano were

neuropathologists. He wondered, *How can doctors who are not neuropathologists interpret neuropathological findings better than neuropathologists?*

But mostly Omalu did not remain calm. In fact, he sweated profusely when he heard that the NFL had written demanding a retraction. It took a couple of shots of Johnnie Walker Red before he could even summon the courage to read their letter, after which he tore it up in disgust.

Omalu began to question the integrity of the MTBI committee. It was one thing to not even put a neuropathologist on the committee, quite another to have the committee headed by...a rheumatologist, as was the case with Pellman.

*A rheumatologist? You picked a joint guy to lead your brain study?*

What the NFL couldn't have known then, of course, is that by the time Omalu's article was published, he had already gotten a second brain, that of former Steelers guard Terry Long, who died at 45 after drinking antifreeze.

Same morgue. Same slab. Same story. Terry Long had a clinical history similar to Webster's. Depression. Memory loss. Crazy behavior. In and out of psych wards. He was bankrupt, living destitute and alone. He tried rat poison. He tried other cocktails. Nothing worked until finally he got it right.

Omalu took Terry Long's brain home, sliced it, sent it in for stains, ran the same tests, found the same splotches, the same tau proteins. "This stuff should not be in the brain of a 45-year-old man," he said. "This looks more like a 90-year-old brain with advanced Alzheimer's."

So Omalu wrote another paper. He called it "Chronic Traumatic Encephalopathy in a National Football League Player: Part II" and put it in an envelope and sent it to *Neurosurgery*, the prestigious peer-reviewed journal that did not, in the end, accept the NFL's request to retract the first one and went ahead and published the second.

The news of CTE, of retired athletes possibly suffering debilitating brain damage, was now hitting the mainstream press. The NFL responded with denial and attack against the young pathologist in Pittsburgh, who surely had no idea what he was talking about.

"Preposterous," they said to reporters.

"It's not appropriate science."

"Purely speculative."

Omalu did not like the education he was receiving. He felt he was learning something very ugly about America, about how an \$8 billion industry could attempt to silence even the most well-intentioned scientist and in the most insidious ways. He was becoming afraid. Friends were warning him. They were

saying, "You are challenging one of the most powerful organizations in the world. There may be other things going on that you're not aware of. Be careful!"

Then came a bright spot. Maybe the best day of his life. Omalu got a phone call from Julian Bailes, a neurosurgeon of considerable renown who had for a decade worked as a Steelers team doctor. Bailes, chairman of neurosurgery at West Virginia University Hospitals, had known Mike Webster well, was friends with the family. And he knew Terry Long. He knew brains. He knew concussions. In his lab in West Virginia he was concussing rats, examining the resulting damage to brain tissue. He knew retired football players, was co-chairing a study at the University of North Carolina's Center for the Study of Retired Athletes, suggesting a link between concussions and clinical depression. Bailes had experience that touched and intersected and paralleled Omalu's research in the way of all fascinating coincidences.

On the phone, Bailes introduced himself. He said, "Dr. Omalu, I'm calling to tell you I believe you."

It was the first time anyone who ever had anything to do with the NFL had validated Omalu's work. He ran home and told his wife. She said, "How do you know? It could be a trick!" They were becoming increasingly fearful. From his village in Nigeria, Omalu's father would call. "Stop doing this work, Bennet. I have heard not nice things about the NFL; they are very powerful, and some of them not nice!" It didn't much help that one day Omalu got a visit from a sports reporter who had come for some quotes, who saw Webster's and Long's brains sitting in tubs in the living room and had said, "Get these out of your house! Someone could come in and kill you and steal these brains! Do you know what you're dealing with?"

In the end, Omalu sent all his brain tissue to Bailes to store in his lab in West Virginia. Bailes met Fitzsimmons, and that became the team, a kind of brotherhood with a mission: to learn more about the disease, to understand the NFL's obstinate, perilous denial, and to break them of it.

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The third case was Andre Waters—hard-hitting safety for the Philadelphia Eagles—who was denied disability under the NFL retirement plan despite numerous concussions, constant pain, and crippling depression. On November 20, 2006, at 44, he shot himself in the mouth.

Omalu got the brain, examined it, and found CTE.

The fourth case was Justin Strzelczyk, the youngest of all, just 36 when he died a most dramatic death. Offensive lineman for the Steelers through most of the 1990s, Strzelczyk was popular in the locker room, a big mountain man of a guy with a banjo at the ready. Just a few years after his retirement, the downward spiral began. He started hearing voices from "the evil ones," who he believed were in constant pursuit. He stopped at a gas station on a highway outside Buffalo, New York. He tried to give some guy 3,000 bucks, told him to head for the hills! *The evil ones are coming!* Then he got in his truck and sped away, ninety miles an hour, eventually with the cops chasing him for forty miles. The cops threw metal spikes, blew out his tires, but he kept going and kept going, until finally he swerved into opposing traffic and smashed into a tanker carrying corrosive acid, and everything, everything, exploded.

Omalu got the brain, examined it, and found CTE.

\_Why these guys? \_Omalu and Bailes wondered. *Why not other guys?* Not every retired NFL player, after all, goes crazy and kills himself. How many had died young and had never been diagnosed? Why were so many retired players suffering from depression and signs of Alzheimer's? Omalu and Bailes would sit and think and talk and think. Head trauma, sure. But what else? Did these guys take steroids? Other drugs? Were there genetic markers? Did it matter when the head injuries occurred? It was a fascinating puzzle from a medical point of view—and they thought it would have been fascinating from the NFL's point of view, too. Omalu had, in fact, asked. Way back after diagnosing Webster, he'd sent a letter to the Hall of Fame proposing a comprehensive, longitudinal study—take every Hall of Famer, get his genetic profile, get a baseline, monitor him every six months for depression and other neuropsychiatric symptoms, and look at his brain when he died.



Bob Fitzsimmons, the lawyer. (Photo: Mark Heithoff)

Omalu did not get a response to that letter. So he sent a follow-up six months later. No answer.

Omalu, Fitzsimmons, and Bailes formed an organization, the Sports Legacy Institute, with the intention of studying CTE, furthering the science. They were joined by a fourth, Chris Nowinski, who had been

helping broker brain deals with families—getting brains for Omalu to study. Nowinski was not like the others. He seemed to be on a different mission. It was hard to put your finger on it, exactly. "We must not go running to the press with every new case!" Omalu would tell him. "We need to study, we need to learn." Nowinski had bigger ideas. He said CTE was a public-health issue and the public had a right to know. He believed the Sports Legacy Institute—SLI—could and should make headlines.

No one could blame Nowinski, really, if he was on some sort of crusade. He was not a scientist. He was a former WWE wrestler who had fought under the stage name Chris Harvard—the only Harvard-educated wrestler in the WWE. He had played football in college, but it was the head bashing as a wrestler that did him in, especially that last one, at the Pepsi Center in Albany, when a Dudley Death Drop ("3D") engineered by the Dudley Boyz sent poor Chris Harvard's head smashing through a table to the cheers of thousands.

Vision loss, ferocious migraines, loss of balance, memory problems; he was 24 years old and feeling some days like a feeble old man. He went to eight doctors before anyone took the time to tell him what was going on. Those were *concussions*. All those times. Not just the times he had become unconscious. But all those times, perhaps one hundred times, that he saw stars, suffered a "ding"—any loss of brain function induced by trauma was a concussion, and all of them were serious, all of them were brain injuries, all of them required attention, not the least of which was the time to heal before suffering another one. No one had ever told him that. No one had ever told him that the job he returned to each day was potentially brain damaging. No one until Nowinski met a world-renowned concussion expert who explained it all, and so Nowinski quit the WWE.

He wrote a meticulously researched book, *Head Games: Football's Concussion Crisis*, got himself on a lot of TV shows, and took the Chris Nowinski CTE show on the road.

Omalu did not understand what was happening. Bailes and Fitzsimmons did. They would look at each other and say, "Uh-oh."

In the summer of 2007, Roger Goodell, the new NFL commissioner, convened a meeting in Chicago for the first league-wide concussion summit. All thirty-two teams were ordered to send doctors and trainers to the meeting. It would be a chance for the NFL to talk about this and hear from independent scientists, many of whom they also invited to the meeting—300 participants in all.

They asked Bailes to come. They did not ask Omalu.

"Why did they not invite me?" Omalu said to Bailes. "Why does the NFL not want to speak to Dr. Omalu?"

Bailes had no easy answer. He knew those guys. He knew who was in and who was out and how dirty the politics could get. "They were trying to blackball him, lock him out, marginalize him," Bailes says. "He was the whistle-blower."

"You will present my work, then," Omalu said to Bailes. "You will take my slides. You will take my research. You will show them what Dr. Omalu has found!" Not that it was news. He had already published the papers. Why weren't they listening?

So that's what Bailes did. Packed up Omalu's slides and downloaded his PowerPoint presentation and headed to Chicago.

By this point, the NFL had made some progress in admitting to a concussion problem. For one thing, Pellman, the rheumatologist, had stepped down as chair of the committee. Also, the committee announced a new concussion study that would blow everyone else's out of the water. (It involved a battery of clinical testing on 120 retired NFL players and would take at least until 2012 to finish. Bailes, in fact, was already working on a similar study, due out next year.)

But there was real, actual progress. The NFL instituted standards for concussion management: "Medical decisions must always override competitive considerations." They would do neuropsychological baseline testing on all NFL players—use that as a tool to assist in determining when, after a head injury, a player could return to the field.

(On hearing of the NFL's concussion guidelines, Omalu said: "You mean they never had any concussion guidelines before now? Geez.")

Perhaps most encouraging was the 88 Plan, a display of humanity on the part of the NFL and its treatment of retired players suffering dementia. The 88 Plan grew out of a letter written by Sylvia Mackey, wife of Hall of Famer John Mackey, who wore number 88 for the Colts. His existence, she said, had become a "deteriorating, ugly, caregiver-killing, degenerative, brain-destroying tragic horror," and the \$2,450 per month pension he was receiving from the NFL could not begin to cover the institutionalization he needed. And so the 88 Plan, which offered up to \$88,000 per year to former players with dementia.

Not that the NFL accepted any actual responsibility for this mess. Its MTBI committee published scientific studies claiming that repeated head bashing did not cause brain damage. On a 2007 HBO special, co-chair Casson was asked six different ways if repeated football-related concussions could result in brain damage, dementia, or depression. Six times he said no.

In Chicago, Bailes stood up there with evidence to the contrary. Scientific proof. Tissue damage in the brain. He saw guys rolling their eyes. He heard the exasperated sighs. He thought about Omalu and why he was doing this—how he had nothing against the NFL, how he had barely known what the NFL was before he looked at Webster's brain. He thought about how Omalu was about as pure a scientist as anyone could bring into this equation, and how he had spent \$100,000 of his own money to get to the bottom of this.

So Bailes stood up there and he showed slides of Webster's seemingly perfect brain on the cutting board. He showed the slices. He showed the tau, that sludge that did him in. He showed Long, and he showed Waters, and he showed Strzelczyk. He showed that he believed in Omalu's work.

The meeting was closed to media, but Bailes remembers it well. "They didn't say, 'Thanks, Doc, that's great.' They got mad at me. We got into it. And I'm thinking, 'This is a new disease in America's most popular sport, and how are its leaders responding? Alienate the scientist who found it? Refuse to accept the science coming from him?' "

At a press briefing afterward, Omalu's name kept coming up, and so Casson responded: "The only scientifically valid evidence of chronic encephalopathy in athletes is in boxers and in some steeplechase jockeys. It's never been scientifically, validly documented in any other athletes."

A total dismissal of Omalu's work.

And what about the other studies? What about Bailes's report in 2003 out of the University of North Carolina with Kevin Guskiewicz, a leading expert in sports medicine, which, based on surveys of thousands of retired players, found that players who had suffered multiple concussions were three times more likely to suffer clinical depression?

The NFL concluded that that study was "flawed."

And what about the UNC follow-up study in 2005 that showed that repeatedly concussed NFL players had five times the rate of "mild cognitive impairment," or pre-Alzheimer's disease. That study showed retired NFL players suffering Alzheimer's disease at an alarming 37 percent higher rate than the average guy walking down the street.

"Flawed."

The only experiments that were not flawed, then, were the studies conducted by the scientists paid by the NFL, which just happened to disagree with a growing number of researchers. "That's just unprecedented in science," says Bailes. "That would be like the American Heart Association saying, 'Hey, if it's not our sponsored research, we don't acknowledge it or comment on it. Only we can figure out heart disease!'"

Or it would be like the tobacco industry in the 1980s—everyone saying cigarettes caused cancer except for the people making money off cigarettes.

It would have been laughable, if it weren't so irresponsible.

At stake, after all, were people's lives. Athletes suffering head injuries, pressured anyway by a culture of machismo that says: *Get back in the game!* Man up! Don't ever show it hurts. To say nothing of the college football players, the high school football players, the Pee Wee leaguers, who dreamt of going pro.

On this point alone Bailes goes ballistic:

"Here we have a multi-billion-dollar industry. Where does their responsibility begin? Say you're a kid and you sign up to play football. You realize you can blow out your knee, you can even break your neck and become paralyzed. Those are all known risks. But you don't sign up to become a brain-damaged young adult. The NFL should be leading the world in figuring this out, acknowledging the risk. They should be thanking us for bringing them this research. Where does their responsibility begin?"

"Look, there was a seminal study published by the University of Oklahoma two years ago. They put accelerometers, which measure acceleration, in the helmets of University of Oklahoma players. And they documented the g-force. So we know the g-force for a football player being knocked out is about sixty to ninety g's. To compare, a fighter pilot will pass out at five or six g's, but that's over a long period of time. These football g-forces are just a few milliseconds, very brief—*boom!* And they found that in the open field, the dramatic cases of a receiver getting blindsided is about one hundred g's. It knocks them out. Very dramatic, everybody sees it. But the linemen? They were actually getting twenty to thirty g's on *every play*. Because they start out and they bang heads. Every play.

"Helmets are not the answer. The brain has a certain amount of play inside the skull. It's buoyed up in the cerebral spinal fluid. It sits in this fluid, floats. When the head suddenly stops, the brain continues, reverberates back. So when I hit, *boom*, my skull stops, but my brain continues forward for about a centimeter. *Boom, boom*, it reverberates back. So you could have padding that's a foot thick. It's not going to change the acceleration/deceleration phenomenon. And a lot of these injuries are rotational. The fibers get torn with rotation. You've got a face mask that's like a fulcrum sitting out here: You get hit, your head swings around. That's when a lot of these fibers are sheared—by rotation. A helmet can't ever prevent that.

"And have you seen helmets lately? In the old days of football, you had this leather cap to protect your ears. That was it. You'd never put your head in the game. You'd be knocked out after the first play! Even in the '60s, the helmet was a light shell. The modern helmet is like a weapon.

"So I told the NFL, I said, 'Why don't you take the head out of the game? \_Just take it out of the game! \_Let the linemen start from a squatting position instead of getting down for head-to-head. Have them stand up like they do on pass protection. So there's not this obligatory head contact.'

"Nothing. They had nothing to say. Who am I? I'm only a guy who has concussed hundreds of rats in the lab, a player for ten years, and a sideline doctor for twenty years. What do I know? Some stupid neurosurgeon.

"Instead of answering anything we bring to them, the NFL is ducking and shooting arrows at us. Criticizing us. Saying our work is a bunch of bunk. They have only attacked us."

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The sixth case was Tom McHale, offensive lineman for nine seasons, most of them with the Tampa Bay Buccaneers. Depression and chronic pain in his joints had led him to discover oxycodone and cocaine. On May 25, 2008, at age 45, he died of a lethal combination of both.

Omalu got his brain, examined it, and found CTE.

He decided not to release the McHale case to the press. The NFL was already plenty pissed off. They had refused to acknowledge CTE or any of Omalu's research or, really, Omalu himself. It seemed they wanted to simply pretend Omalu did not exist, and he was sick of it, sick of insisting that \_yes, Bennet Omalu is a real person who has discovered a real disease that is really damaging real people even as

you sit there denying it. \_The public debate with the NFL was a distraction from his research. He would continue his work quietly, examining brains. He would set his sights on curing the disease. He would prepare scientific papers; the proof would be in the science.

Ideas like that caused the Nowinski connection to crumble. *Continue the work quietly?* But Nowinski was building SLI; he was making a name for himself. The split was abrupt, ugly, and to this day neither side agrees on what happened. Nowinski took SLI and teamed up with the Boston University School of Medicine to create the Center for the Study of Traumatic Encephalopathy. He started a brain bank under the direction of Ann McKee, an expert in neurodegenerative diseases, and they went on to do important work, diagnosing more cases of CTE and starting a registry of over one hundred athletes who have agreed to donate their brains for study after they die.

Indeed, the casual observer who wants to learn more about CTE will be easily led to SLI and the Boston group—there's an SLI Twitter link, an SLI awards banquet, an SLI Web site with photos of Nowinski and links to videos of him on TV and in the newspapers. Gradually, Omalu's name slips out of the stories, and Bailes slips out, and Fitzsimmons, and their good fight. As it happens in stories, the telling and retelling simplify and reduce.

History gets written. People shout and claim turf. Heroes get invented.

The Boston group wanted to see the Tom McHale brain, and at the request of the family Omalu agreed. So he sliced the brain in two and sent one half via UPS to Boston. He said please don't release the diagnosis to the press; he was preparing a scientific paper identifying CTE subtypes. Nowinski remembers this conversation very differently. He says Omalu never returned calls, and to this day he vehemently defends his decision to go ahead and announce the McHale diagnosis anyway, in Tampa, during the week of the 2009 Super Bowl. He made national headlines announcing that the Boston group, and not Omalu, had diagnosed CTE in yet another NFL player. (Nowinski says he was acting on behalf of the McHale family.)

"Geez," Omalu said, watching the CNN coverage. "That's my brain! They are lying about who diagnosed that brain!"

It was enough to tempt a man to become wicked, to lead him to thoughts of lawsuits and vengeance.

But Omalu did not become wicked. He reminded himself of who he was. "I perform autopsies on dead people every day, so every day I'm reminded of my mortality. It has made me become very religious. I know I'm going to die someday, I know I'm going to be judged by God, and I have work to do while I am here on the earth."

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Morgantown, West Virginia, is surrounded by blue firs and green hardwoods, a town tucked in the folds of the Appalachian Basin, where coal still moves sleepily in and out on barges along the slim Monongahela River. The university—and its world-class health care complex—is by far the biggest thing going.

In Bailes's office, Becky, his secretary, just accepted a package and is digging through Styrofoam peanuts. It used to disturb her to reach into a cardboard box and pull out a jar full of brains, but by now she is used to it.

In the jar is Omalu's fifteenth confirmed case of CTE—the most dramatic he's seen. He is not ready to release it to the press.

"Your brain made it," Becky says to Omalu, who has himself just arrived. He doesn't like traveling with brains. He trusts UPS. "You had a good trip?"

"Sure, sure, sure," Omalu says. His face is walnut dark and boyishly round. His movements are smooth, calm, and efficient; the overall effect is of a nattily dressed man who might at any moment start whistling. "But my tailor was not in!" he tells Becky. Omalu moved to California two years ago—where he accepted a post as chief medical examiner of San Joaquin County—but he still buys all his suits from one tailor in Pittsburgh. Nearly all of them are wide blue pinstripe, vaguely flashy, with impeccable fit. Custom-made. Shirts, too. He does not like pockets. If you have a shirt with a pocket, you run the risk of lint collecting at the bottom of the pocket. That is his position. Do away with the pocket—no lint. This is simply logical.

Fitzsimmons arrives, slim with a broad grin and quiet attire. "How you doing, buddy?" he says to Omalu. "Got the red tie going today, huh?" The two men embrace, slap each other's backs.

Eventually, Bailes comes flying in, still in scrubs, just out of surgery, his mask hanging half off. He is carrying a Diet Coke. "You guys want nuts? Something to eat? Crackers? I haven't eaten."

They stretch out in the conference room, visit like country people, tell jokes, and forget about time.

"And so this guy, he calls from some smart-guy science magazine," Omalu is saying. "And he says, 'Dr. Omalu, you are a brilliant man! Why did you fizzle?' And I told him, I said, 'Dr. Omalu did not fizzle!' "

"Fizzle," Bailes says, shooting a grin at Fitzsimmons. The admiration the two share for Omalu is protective and fatherly. Even his vocabulary is raw innocence.

Then they get down to business, and Fitzsimmons pulls out the papers.

"Do I need to read it?" Bailes says.

"I'm your lawyer, and I say sign it," Fitzsimmons says, and all three men get out their pens and find their names, which together are "hereinafter referred to as 'The Brain Injury Group.' "

A brain bank. The Rockefeller Foundation. A brand-new \$30 million research facility. The Blanchette Rockefeller Neurosciences Institute opened a year ago across the street from Bailes's office—a slick building, 78,000 square feet of state-of-the-art laboratory space. It's the only nonprofit independent

institute in the world exclusively dedicated to the study of human memory and memory disorders, a partnership with West Virginia University and Johns Hopkins University. Senator Jay Rockefeller named it after his mom, Blanchette, who had Alzheimer's and died in 1992. And now, on the first floor, will be Webster's brain and Long's brain and all the rest—a whole laboratory dedicated to brain injuries and the study of CTE. They are gathering more brains, and more still; they would like to get Steve McNair's brain, and the boxer Roy Jones Jr. just signed on to donate his brain when he dies. The new center launches this month.

Omalu has set his sights on curing CTE. And why not? "You pop a pill before you play, a medicine that prevents the buildup of tau," he says. "Like you take an aspirin to prevent heart disease." *Why not?* "This is how we now need to talk. Not this back-and-forth of human selfishness. Not this NFL politics and meanness. Anybody still denying the disease is out of his mind. The issue now is treatment. That is my next step, now that I understand the pathology."

The Brain Injury Group is preparing seven new scientific papers. New findings. Subcategories of CTE. A possible genotype. Omalu has anything but fizzled. He took the conversation out of the public domain, got to work, and Fitzsimmons got to work on the Rockefeller deal, and Bailes on the scientific papers, and really, what they want is the NFL to join them in trying to figure this thing out.

It appears highly unlikely. The last they heard from the NFL was when the NFL called in 2008 in what seemed like a final attempt to disprove Omalu's work. *We have been speaking to a scientist. The world's leading authority on tau proteins. We would like to send him to West Virginia to look at your work.*

Bailes agreed.

Neuropathologist Peter Davies of the Albert Einstein College of Medicine in New York has been studying Alzheimer's and tau proteins for more than thirty years. He receives no money from the NFL, not even parking fare. He was more than a little doubtful about what he would find in West Virginia. He had examined thousands of brains, and he'd never seen anything even close to the degree of tau accumulation that Omalu was describing in his papers. He believed that Omalu was well-intentioned but naive and mistaken. "I was very skeptical," he says. "I didn't think there was anything there."

So when Davies got to West Virginia in October 2008, he smiled politely and walked into Bailes's lab, and Omalu handed him the first slide, and he looked in the microscope, and he said, "Whoa." He said, "Wow." He said, \_"What the hell is this?" \_

It went on like this for two days, slide after slide. It got to the point where the only doubt Davies had left was on the staining of the slides themselves. Perhaps the technicians were not using state-of-the-art equipment and solutions. He asked Omalu if he would give him tissue samples, pieces of brain to take back to his lab in New York, where he could make new slides with his own equipment, his own technicians, his own sophisticated stains.

"Sure, sure, sure," Omalu said. "You take some pieces home, talk to your guys, see what you think."

In his lab in New York, Davies ran his tests, and when he looked in the microscope, he was stunned. The tau pathology was even worse—even more pronounced—than what he'd seen in West Virginia. "Come look at this!" he said, calling in his team of researchers. "What the hell am I looking at? This will blow your socks off! And it's not just in one case. I have three separate cases here. Bucket loads of tau pathology, and the one guy wasn't even 40 years old...." It was far more severe than anything they'd ever seen in the most advanced Alzheimer's cases—and in completely different regions of the brain.

"My God, this is extraordinary," Davies said. "We have to get involved." He wrote to Bailes and Omalu. He said Omalu was right.

"The credit must go to Bennet Omalu," he says today, "because he first reported this and nobody believed him, nobody in the field, and I'm included in that. I did not think there was anything there. But when I looked at the stuff, he was absolutely right. I was wrong to be skeptical."

The NFL never released Davies's report, never made it public. And they never talked to Omalu, Bailes, or Fitzsimmons again.

They called another meeting, much smaller than the Chicago summit, in May 2009, to talk again about concussions and the progress of the MTBI committee's work. They invited researchers from the Boston group. They invited Davies, who told them about what he saw in West Virginia.

"There is no doubt there is something there," Davies said. But he differs on the conclusion. He does not believe the main cause of CTE is concussion or trauma. He has even designed studies, principally on rats, to test his own hypothesis that the main cause is steroid use. He admits freely, however, that he is not a trauma expert, like Bailes, that he has not spent his career, like Omalu, looking at brains that have suffered repeated trauma. He's an Alzheimer's guy who believes that there has to be some reason he's never seen brains like this, and he believes the reason is steroid use. Plenty of people, after all, suffer concussions—not just athletes. Wouldn't he have seen some evidence of CTE in brains of regular folks over all these years? But only athletes take steroids, and so that is the link he is following.

Bailes, who co-authored a book on steroids and sports, does not rule out steroids or any other contributing factor to CTE, but points out that synthetic steroids were not even invented until 1959—thirty years after brain changes were first identified in boxers in the form of dementia pugilistica.

Either way, the steroid theory is not, in itself, a cheerful hypothesis for the NFL to consider. What of its vaunted drug-testing policy? What of the way fans have been coad to blithely accept that the reason these big fast guys keep getting bigger and faster every year is...natural. Not because of performance-enhancing drugs.

Whether it's concussions or steroids or a combination of both, the NFL has a problem to solve that is becoming impossible to deny.

Ira Casson, co-director of the MTBI, was at the May meeting, and he came away from it still committed to the NFL's talking points—the ones he had first put out in 2005 when he co-authored the letter asking for the retraction of Omalu's article in *Neurosurgery*.

Has Casson's position changed, now that scientists from across the country have come to accept the research as sound?

"No," he says. "Nothing has happened that has changed any of our opinions about what we wrote in those letters. Is there a relationship between professional football, a career in the NFL, and changes in the brain? Well, we don't know. Maybe."

So why does he think so many independent scientists are saying there is?

"I think there are a lot of...gaps," he says. The main problem, as he sees it, is that all scientists have really looked at, after all, are dead people. There has been very little clinical data, he says, collected on living people—which is what the MTBI committee's study is designed to do.

"Essentially," he says, "if you look at the cases that have been reported in the medical literature—and I don't include *The New York Times* as medical literature—for the most part, the clinical data was collected posthumously: interviews with families, 'people told me this,' and so forth. You don't see any data that says, well, here's what a *doctor* found when they examined him; here's what their psychiatric evaluation showed; here's what their neurologist found. There's none of that!

"To me that creates a question of what exactly is the clinical picture? I don't think it's fair to jump from a couple cases that were suicides to assume that some of the others that, well, the guy was driving fast down the highway, it must have been a suicide. Well, we don't know that. I don't think anybody can tell you that unless you had a psychiatrist who was treating the person. I think there's a lot of people jumping to conclusions."

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"Very little clinical data."

Fitzsimmons and Bailes and Omalu are sitting in Bailes's conference room in West Virginia, contemplating what Casson has said.

"Very little clinical data?" Fitzsimmons says. But he had five doctors, including one from the NFL, who examined Mike Webster and concluded he had a closed-head injury. "I had a file *this thick* of clinical data."

"Why is he doing this?" Bailes says. "I just don't understand why the NFL is doing this. You know, pick up a textbook." He picks up a textbook, the kind you'd find in any neurosurgery department of any medical school. "Here's *The Neuropathology of Dementia*. It describes, in great detail, tau pathology. There's a whole chapter here about trauma causing dementia. That's why this is very quixotic to me that's there's

even any resistance. It's well-known that brain trauma is a risk for dementia. Why are we arguing this? Why can't we accept this and move on and try to prevent it?"

"Clinical data?" Omalu says. "\_Clinical \_data? Pardon me, but what is the gold standard for diagnosis? Autopsy! That is the gold standard for diagnosis. Only when you open up the body, look at the tissues, do you find proof of disease."

They have proof of the fifteenth case right here, sitting in a jar, a story still to tell.

And then there is the sixteenth case: Gerald Small, Dolphins cornerback in the 1980s. He was found dead at 52 in Sacramento, California, where he was unemployed, living with an aunt, drunk. The Sacramento coroner sent the brain to Omalu, who is by now well-known on the coroners' circuit.

Omalu got the brain, examined it, and found CTE.

The seventeenth case is Curtis Whitley, center for the Chargers, Panthers, Raiders, in the 1990s. He was just 39 when he was found facedown in the bathroom of a rented trailer in West Texas, shirtless, shoeless, wearing blue warm-up pants.

Omalu got his brain, examined it, and found CTE.

"You would think that sooner or later, like most things in life, you have to deal with the truth," says Bailes. "I think that was part of the NFL's intent on sending their expert to Morgantown. Maybe they're planning their strategy now, I don't know."

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\*On December 13, 2006, seven years after the initial filing and four years after Webster's death, the U.S. Court of Appeals for the Fourth Circuit upheld the ruling that Webster had been totally and permanently disabled as a result of brain injuries from playing professional football. The ruling, a 3-0 decision, resulted in an award of more than \$1.5 million to Webster's four children and former wife.

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