

# Recognizing the patterns of truth

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Photo courtesy Getty Images

The beauty of a healthy brain cell viewed under a microscope never ceases to amaze. It is hard for Bennet I. Omalu, MD, MBA, MPH, to put into words how lovely the sight can be.

It “resembles a bright, full moon rising above the horizon on a cool, clear October night,” he has written.

But there was nothing gorgeous in sight when Dr. Omalu, an AMA member and forensic neuropathologist, began to examine the brain cells of Pittsburgh Steelers Pro Football Hall of Famer Mike Webster under his microscope. Rather, he was taken aback by what he found.

Dr. Omalu saw the horror of a lifetime of high-impact head trauma that Webster himself said was equivalent to being in “about 25,000” car wrecks.

The terrible truth of the grotesque pattern that Dr. Omalu recognized in Webster’s brain, as magnified under the scope, would be crystal clear to any neuropathologist.

His discovery—chronic traumatic encephalopathy (CTE)—would dramatically change medicine’s understanding of the danger posed to human brains by repeated high-impact athletic collisions and prompt everyone to think deliberately about the true nature of the beautiful games they love.

Dr. Omalu’s story also would inspire a major motion picture, “Concussion,” and his groundbreaking research later earned him the AMA’s most prestigious honor, the Distinguished Service Award.

Most recently, the AMA adopted comprehensive policy that encourages physicians to “counsel young patients and their parents or caregivers about the risks and potential consequences of sports-related injuries, including concussion and recurrent concussions” and “promote measures to prevent or reduce the consequences of concussions, repetitive head impacts and other injuries in youth sports.”

But before all that, Dr. Omalu had to summon within himself the courage to move medicine forward. He had a restless, gnawing feeling that told him this work could arouse passions that he had trouble fully grasping.

## **Case No. A02-5214**

After years of physician training in Nigeria, then in the U.S., Dr. Omalu was just a few months removed from having completed his neuropathology fellowship when case A02-5214 came to him at the medical examiner’s office in Allegheny County, Pennsylvania.

That was the case number assigned to Webster, the Steelers center who died at 50. Since retiring from the National Football League (NFL), he had divorced and developed a substance-use disorder and mental illness. His loved ones said he had become a different man.

The autopsy was unremarkable. The cause of death was plainly a massive heart attack. But Dr. Omalu wondered about this game of football—which seemed so forcefully alien to him—and what impact it might have had on the symptoms Webster increasingly exhibited when his playing days ended.

Examination of the brain revealed nothing grossly abnormal. Nevertheless, Dr. Omalu ordered the brain fixed in formalin so he could view it in detail under the microscope.

And when the slides arrived, he set the box aside—for months. Life as a forensic pathologist in a big-city medical examiner's office is never slow.

The Webster death investigation was officially closed. Looking more closely would have to be done on Dr. Omalu's own time, and on his own dime. And that was not all.

Dr. Omalu's mind flashed back to that most American of traditions he had recently been invited to partake in—the football Sunday party. As the beer flowed, and the game ebbed, the shouts, groans and moans from the fans attired in black and gold rose and struck Dr. Omalu like the outpourings of some ancient ritual carried out at the feet of the gridiron gods.

“I had a feeling that if I pulled out those slides and dug deeper into Mike Webster's brain, whatever I might discover was going to put me in direct conflict with the passion for football that consumes Pittsburgh and most of America,” Dr. Omalu explained in his 2017 memoir, *Truth Doesn't Have a Side*, written with Mark Tabb.

Yet more profound than any fear was a driving compulsion to look, to seek the truth and report it so others would know.

## Under the microscope

When Dr. Omalu examined Webster's brain cells under the scope, he found “diffuse amyloid plaques everywhere, and there were no neuritic plaques,” he said in an interview. He recognized a grotesque pattern—“tau randomly situated, and not reminiscent of any other dementia” with which he was familiar. He saw a large number of cells that looked shrunken, “as if in the midst of the throes of death,” Dr. Omalu later wrote.

He glimpsed spongiosis and the skeins of brain scars that looked to him, he wrote, “like a partially demolished building stripped of its windows ... leaving behind just the main frames, pillars and broken-down walls.”

For months, Dr. Omalu reviewed slide after slide, noticing something new with virtually every sitting. Surely, Dr. Omalu thought, there would be plenty of other recorded examples of athletes in high-impact sports with similar neuropathological findings.

Dr. Omalu looked high and low, doing his research through the University of Pittsburgh medical library. He ordered so many journals and research papers that one day he got a call from one of the librarians checking in to verify that he had a real need for the materials and was not abusing his privileges.

The search for a predecessor case of Webster’s kind had been fruitless, but now Dr. Omalu knew he had discovered something not yet described in the medical literature.

With the help of more senior colleagues, Dr. Omalu pursued publication in a journal, *Neurosurgery*, describing this sentinel case of what he termed CTE. The journal had previously published several articles by researchers affiliated with the NFL who discounted the game’s concussion problem—which first earned scrutiny in the mid-1990s—as “mild traumatic brain injury.” They had even written in support of returning players with concussions to the field the same day.

The Webster article underwent extensive reviews, nearly 20 by Dr. Omalu’s count, with many voicing the view that the paper should not be published at all. Dr. Omalu’s responses to the comments and reviews ran five times longer than the submitted manuscript. Then, when it was published, NFL-linked researchers—none of them having the requisite expertise in neuropathology or forensic pathology—called for the article to be retracted. They argued that its “description of chronic traumatic encephalopathy is completely wrong.”

The article was never retracted, and Dr. Omalu and his colleagues replied in full in the pages of the journal.

“I said the truth,” Dr. Omalu says. “I don’t attack anybody. I said, ‘If you don’t agree with me that this is the truth, then come forth and tell me.’ What I’m discovering—which is very sad in today’s world—is that people would rather serve alternative truths that serve their own interests and purposes, and that alternative truth will change depending on the scenario or the challenges.”

## Six inches from a brick wall



Just as the vigorous back and forth on the first case of CTE played out in the medical literature, Dr. Omalu was looking through his microscope at the second. He found the tell-tale traces of CTE in the brain of Terry Long, another Steelers offensive lineman.

Long played in more than 100 games at the NFL level and once told a *Pittsburgh Post-Gazette* reporter that playing on Sunday was like lining up “about six inches from a brick wall and you ram your head into it about 75 to 100 times.”

He died of suicide after drinking a gallon of antifreeze.

AMA member Jennifer L. Hammers, DO, remembers the case well. Now an independent consultant in Pittsburgh, at the time she was an anatomic and clinical pathology resident eager to get her feet wet in what she knew would be her subspecialty of forensic pathology. While in residency, she signed on to help with projects in the Allegheny County ME’s office.

“He had just submitted his first paper about Mike Webster to the journal,” Dr. Hammers says. “We started to do this exam on Terry Long and I remember sitting down to look at the slides.”

Dr. Omalu took the resident to another forensic pathologist’s office, which had a multiheaded microscope. The pathologists reviewed the slides and Dr. Omalu noted CTE’s distinguishing features, the same ones he had seen in the Webster case.

“Jenn,” Dr. Omalu said, “I know this is something. This is another case of CTE.”

“I am just trying to report what I found and there’s this big opposition of people who don’t want to believe what I’m seeing,” he told his young colleague. The comment arose more out of disbelief than self-doubt, Dr. Hammers says.

“He was certain in the diagnosis he was making. There was all this hubbub going on around him, but it didn’t make him question, ‘Did I make the right diagnosis?’ or ‘Maybe I overinterpreted something.’

“His response” at the time, she adds, amounted to this: “I know what I’m seeing, and I know that it’s different than other things I’ve seen before, so this is something. Maybe we don’t have all the answers right now, but I’m confident in my eyes and what I’m putting out as my findings.”

Dr. Omalu says he “never wanted to be known by anybody,” despite the otherworldly reality of seeing his life inhabited by actor Will Smith.

All Dr. Omalu desired was for others to recognize what he saw.

“I never wanted them to blatantly deny my work,” he says. “It pierced my soul.”

Dr. Omalu would go on to diagnose CTE in several other cases of former NFL players, a professional wrestler, and an Iraq war veteran, publishing his results in the peer-reviewed literature. He says he has never examined the full brain of a football player and failed to find CTE.

The link between CTE and football head trauma has since been replicated by other researchers, such as those at the Boston University School of Medicine CTE Center. In 2017, they published their findings on CTE in a convenience sample of the brains of former NFL players in *JAMA*.

The researchers examined 111 former NFL players.

They diagnosed CTE in 110 of them.

## The time to come forth

CTE and its causes may now be widely accepted, but Dr. Omalu has found himself involved in another battle on behalf of medicine.

In 2017, he joined a junior colleague, Susan J. Parson, MD, to resign in protest from San Joaquin County, California's sheriff-run coroner's office. Among other things, Dr. Omalu charged that in multiple cases of officer-involved death investigations he was pressured to change his findings.

In her resignation letter, Dr. Parson wrote that the sheriff's "intrusion into physician independence ranges from forcefully taking over physician scheduling to inserting himself into how and when Dr. Omalu and I perform our medical duties with attempts to control and influence our professional judgment and conclusions."

The California Medical Association and the San Joaquin County Medical Society lined up foursquare behind Drs. Omalu and Parson, calling for the county to separate the sheriff's and coroner's offices. The AMA has policy to work with interested states on legislation to facilitate the transition from coroner systems to medical examiner systems.

In April 2018, a report from the county administrator said "the office must be and appear to be independent of law enforcement particularly when investigating deaths in the custody of law enforcement or while in jail/prison. This requires a complete shift towards a medical examiner system."

Later that month, San Joaquin County supervisors voted unanimously to eliminate the coroner's office and replace it with a medical examiner's office run by a board-certified forensic pathologist.

In an interview, Dr. Parson says, "I only lasted as long as I did in San Joaquin County because of Dr. Omalu," who by dint of his seniority and professional achievements offered a buffer."

There is a through line in Dr. Omalu’s battle for acceptance of the link between CTE and high-impact sports and his stand for physician independence in death investigations, and it goes to the heart of what it means to be a doctor in America today. In both circumstances, he fought to advance medical science and to serve the needs of all patients—those who are living and those among the dead.

“If you’re going for heart surgery, you want to go the best heart surgeon. You wouldn’t accept if you were told that your doctor is a police officer—not a physician,” he says, in arguing for ME offices run by forensic pathologists. “So why not apply the same standards to the dead? To not do so is to consider them as less than us.”

Today, Dr. Omalu works as an independent forensic pathology consultant in Stockton, California. Now, as throughout his career, he strives to treat the men and women whose deaths he investigates “the way I would treat myself,” he says—in adherence to the Golden Rule.

Before each autopsy, he introduces himself to the patient and asks for their help in discovering why and how they died. It is a practice, he acknowledges, that draws quizzical looks from the autopsy technicians he works with.

“Hello, I’m Dr. Omalu. Bennet,” he says in greeting the decedent.

One wonders whether he ever hastens to add during the introduction that his Igbo family’s surname, Omalu, was shortened from Onyemalukwube.

In Igbo, it means: “If you know, come forth and speak.”