In autopsy study, over 90% of former NFL players showed signs of brain disease CTE

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Many football fans fondly remember Rick Arrington as the Philadelphia

Eagles' quarterback from 1970 to 1973, but his daughter's memories are tainted by years spent watching her dad suffer from late-stage chronic traumatic encephalopathy (CTE).

A degenerative brain disease found in athletes, military veterans and others with a history of repetitive brain trauma, CTE causes depression, suicidal thoughts, aggression and mood swings. Eventually, folks have problems with thinking and memory, and may ultimately develop dementia. Repeated blows to the head—even if they don't cause concussions—are considered the main risk factor for CTE.

Speaking about her father's illness for the first time at a recent benefit for the Concussion Legacy Foundation, sportscaster Jill Arrington said she no longer enjoys watching football.

"When I see players' heads collide on the field, I see my dad's face begging me through tears to end his misery. I see the strongest man I have ever known struggle to sleep for months on end … and unable to make a simple cellphone call," she told the crowd.

Though he had no history of concussions, Arrington said her dad suffered with CTE for more than 35 years. "His life was cut short by the sport he loved," she lamented.

Researchers at the Boston University CTE Center recently announced that they have now diagnosed CTE in the brains of 345 of 376 (91.7%) of NFL players studied. Arrington was among them.

By contrast, a 2018 Boston University study of 164 donated brains found one (0.6%) with CTE. The one CTE case was in a former college football player.

The NFL player data doesn't necessarily mean that 9 of 10 current and

former NFL players have CTE. Exactly how many do is unknown since the condition can only be definitively diagnosed by brain autopsy after death.

Brains with CTE show a buildup of a protein called tau around the blood vessels. This is different from what is typically seen in brains affected by aging, Alzheimer's, or any other brain disease.

"Every 2.6 years of football at any level doubles your risk for CTE, and the longer you play and the higher level that you play, the greater your risk," said Dr. Ann McKee, director of the Boston University (BU) CTE Center and chief of neuropathology at VA Boston Healthcare System. She also directs the UNITE brain bank, the world's largest tissue repository focused on CTE and traumatic brain injury.

The new research builds on findings from a 2017 study that showed CTE in 99% of the brains of NFL players, 91% of college football players, and 21% of high school football players in the UNITE brain bank.

"Now, five years later, we have many more [brains], and we are still seeing that more than 90% of NFL players are affected," McKee said. "Even though public interest in CTE rises and wanes, this problem isn't going away."

Something needs to change, she said.

"In the brain bank population, we are seeing a lot of cases of CTE, and what this tells us is that we need to do something immediately, and we are still sitting back on our heels," McKee said.

Prevention efforts such as changing rules of the game and making sure kids start playing tackle sports at much later ages are a start, she noted.

"We also need better diagnostic techniques to diagnose this condition during life," McKee said.

The researchers are also looking for new ways to treat CTE and stave off its consequences, she added. There are ways now to address some of its symptoms, such as depression and anxiety.

"The symptoms are very disabling, and not knowing the cause makes people feel more helpless, so just being able to label what is happening can be helpful," McKee said.

She urged anyone who has played contact sports and is now experiencing potential CTE symptoms to see their doctor.

"You might be suffering from the early stages of CTE, and we can do things to make it better," she said.

McKee and her colleagues are asking former athletes to join research studies to learn how to diagnose and treat CTE.

"Come forward," she said.

Chris Nowinski has made it his life's mission to fight against concussions. He is co-founder and CEO of the Concussion Legacy Foundation in Boston.

"This [research] suggests that having success in football the way we have been playing it is likely to result in CTE," he said. "The debate about why is over: We know it's hits to the head that is the risk factor."

CTE is far more widespread than once thought, Nowinski said. Help is available, and many CTE symptoms can be treated.

On the prevention side, changing game rules needs to be considered. The Stop Hitting Kids in the Head Campaign advocates no sport tackling before age 14, Nowinski noted.

Much more remains to be learned about CTE, said Dr. Frederick Soliman, a sports medicine physician at the Orlando Health Jewett Orthopedic Institute in Florida.

"We first realized it in the biopsy of brains, and now we are backtracking to figure out the causes," he said.

Genetics, substance abuse or other factors may make a person more likely to develop CTE, Soliman noted.

"Just a small proportion of people get CTE when we think of all the people who play contact sports, so there must be other factors involved," he said.

Announcing its findings, the BU CTE Center said they are expected to be published soon. In part because of advances in CTE research, the U.S. National Institutes of Neurological Disorders and Stroke recently updated its position on the cause of CTE.

More information: The BU CTE Center and the Concussion Legacy Foundation are recruiting former football players and other contact sport athletes for five studies.