

Study casts doubt on theory that retired NFL players suffer CTE

27 January 2014

The media have widely reported that a debilitating neurological condition called chronic traumatic encephalopathy (CTE) is a well-established disease in retired athletes who played football and other contact sports. But a study by a Loyola University Medical Center neuropsychologist has found little evidence that CTE actually exists.

"There has not yet been one controlled [epidemiological study](#) looking at the risk of late-life cognitive impairment in any collision sport, including boxing, American football or other sports involving repetitive head trauma," Christopher Randolph, PhD, reports in the peer-reviewed journal *Current Sports Medicine Reports*.

CTE is said to be the cause of behavioral symptoms such as anger, aggression and suicidality, and cognitive symptoms such as impaired learning and memory problems. CTE is thought to be linked to concussions and characterized by the build-up of abnormal substances in the brain called tau proteins.

A 2005 study, co-authored by Randolph, reported that rates of [mild cognitive impairment](#) among retired NFL [players](#) seemed to be higher than that of the [general population](#). But Randolph noted there were no controls in this study, and results may have been subject to reporting bias.

A more recent study of retired NFL players found that rates of Alzheimer's disease and amyotrophic lateral sclerosis (Lou Gehrig's disease) were higher than that of the general population. But this may be due to the fact that the NFL players had lower overall mortality rates from heart disease and other causes. Since they lived longer, the players naturally would be more likely to get age-related diseases such as Alzheimer's disease.

In addition to having much lower overall mortality rates than the general population, retired NFL players are only 40 percent as likely to die of

suicide as men in the general population, according to a 2012 study. It is difficult to reconcile this finding with the high rate of suicide that is said to be a key feature of CTE.

"Overall, although retired NFL players have been the focus of more attention into the potential late-life neurological consequences of repetitive head trauma than athletes in any other sport, the risks for these retirees remains largely hypothetical," Randolph writes.

The list of symptoms that have been associated with CTE "is so broad as to be essentially meaningless in any attempt to define a clinical syndrome," Randolph writes. Some of these symptoms are found in the healthy population, while other symptoms have been observed in a variety of neurological diseases. The broad range of CTE symptoms includes attention problems, paranoia, executive impairments, suicidality, memory loss, language impairment, visuospatial impairment, apathy, gait disturbance, dysarthria (speech disorder), parkinsonism, post-traumatic stress disorder, headache, depression, impulsivity, explosivity and aggression.

Randolph concludes: "CTE has received substantial media attention and appears to have entered the American lexicon as a verifiable disease, despite a lack of clear epidemiological data on increased risk of dementia in boxers or football players, a lack of controlled pathological studies to substantiate neuropathological finding as occurring at an increased rate in these retired athletes, a lack of consistent pathological criteria and a lack of specific clinical criteria for diagnosis."

Randolph calls for a carefully controlled epidemiological study. Such a study would, for example, compare a large, randomly selected sample of retired NFL players to a sample of demographically matched men who had not played football or other collision sports. If such a study

found retired players were at higher risk of neurological problems, the players then could be followed over time, with further imaging and neuropathological investigations to characterize any identified disorders.

The study is titled "Is Chronic Traumatic Encephalopathy a Real Disease?"

Randolph is a professor in the Department of Neurology of Loyola University Chicago Stritch School of Medicine.

Provided by Loyola University Health System

APA citation: Study casts doubt on theory that retired NFL players suffer CTE (2014, January 27) retrieved 11 November 2022 from <https://medicalxpress.com/news/2014-01-theory-nfl-players-cte.html>

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