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Study shows thinning of brain tissue remains in college football players

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A growing body of research continues to raise concerns about the effects of head trauma sustained while participating in popular contact sports, particularly football. But this may not be confined to professional players only. A new study from researchers at the University of Cincinnati (UC) College of Medicine, show that even college-level players may be vulnerable to the effects of head trauma, and that even several years after graduation, college football players continue to show evidence of neuropathic brain changes. The findings were published online in the *Clinical Journal of Sport Medicine*.

MRI scans of 11 former collegiate football players showed evidence of significantly lower cortical thickness within portions of both the frontal and temporal cortex of the brain, versus a similar group of track-and-field athletes. In many areas of the brain, decreased cortical thickness correlated with the number of reported concussions.

"We found evidence of persistent cortical thinning in some former collegiate football players several years after the end of their active playing career. The former football players showed, on average, lower cortical thickness across prefrontal and temporal brain regions—areas of the brain involved in sustained attention, memory and executive abilities—cognitive domains critical to long-term professional and social function," says Cal Adler, MD, professor and vice chair for clinical research in the Department of Psychiatry and Behavioral Neuroscience at the UC College of Medicine and a co-principal investigator of the study.

Over 60,000 students play intercollegiate football, and according to NCAA statistics, the sport accounts for more injuries than any other at the collegiate level. Moreover, tackle football can begin at an early age in some football leagues, and by high school, players may have already participated in contact play for several years. "Although many of the functional and cognitive effects of concussion seem to resolve over the months after an event, we have seen where elite athletes from a variety of contact sports can exhibit evidence of neuropathic changes as early as young adulthood," Adler says. "In this study, we saw evidence of correlations between the number of reported concussions and the extent of persistent thinning throughout the prefrontal and temporal cortex in the scans of these former college players," Adler says.

Though the authors emphasize that this was a small, exploratory study, it adds to a growing literature around the potential impact of playing college level football on student athletes' neurological health, suggesting that at least some consequences of high-level collegiate football play may persist years after an athlete has hung up the uniform. "Larger studies following these football players as they age will be crucial to better understanding the risks of college athletics and the potential longer-term consequences of concussions in these young players," says Jon Divine, MD, co-principal investigator, professor in the Department of Orthopaedic Surgery at the UC College of Medicine and director of primary care sports medicine. Divine is also head team physician for UC Athletics.

More information: Caleb M. Adler et al, MRI Evidence of Neuropathic Changes in Former College Football Players, *Clinical Journal of Sport Medicine* (2016). DOI: 10.1097/JSM.0000000000000391