

Brain lesions in former football players linked to vascular, brain changes

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Signs of injury to the brain's white matter called white matter hyperintensities, as seen on brain scans, may be tied more strongly to vascular risk factors, brain shrinkage, and other markers of dementia in

former tackle football players than in those who did not play football, according to a study published in *Neurology*.

"Studies have shown that athletes exposed to repetitive head impacts can have increased white matter hyperintensity burden in their brains," said study author Michael L. Alosco, Ph.D., of Boston University Chobanian & Avedisian School of Medicine. "White matter hyperintensities are easily seen on MRI as markers of injury of various causes. We know these markers are more common as people age and with [medical conditions](#) such as [high blood pressure](#), but these results provide initial insight that they may be related to multiple aspects of brain damage from repetitive head impacts."

Alosco said looking at white matter hyperintensities on [brain scans](#) may be a promising tool to study the long-term effects of repetitive head impacts. Repetitive head impacts have also been associated with [chronic traumatic encephalopathy](#) (CTE), a neurodegenerative disease that can result in dementia.

The study does not prove that repetitive head impacts and white matter hyperintensities cause other brain changes. It only shows an association.

The study involved 120 former professional football players and 60 former college football players with an average age of 57. They were compared to 60 men with an average age of 59 who had no symptoms, did not play football, and had no history of repetitive head impacts or concussion.

The participants had brain scans and lumbar punctures to look for biomarkers of neurodegenerative disease and white matter changes, along with other assessments.

In the former football players, a higher burden of white matter

hyperintensities was associated with greater [vascular risk factors](#); increased concentrations of p-tau proteins found in Alzheimer's disease, CTE, and other neurodegenerative diseases; more brain shrinkage and a decrease in the integrity of the white matter pathways in the brain.

The relationship between [white matter hyperintensities](#) and stroke risk was more than 11 times stronger in former football players than in those who did not play football. For p-tau, the relationship was 2.5 times stronger in the football players. For a measure of white matter integrity, the relationship was nearly 4 times stronger in the former football players.

"While our research previously showed that former football players still have elevated white matter hyperintensity burden after controlling for [sleep apnea](#), alcohol use and high cholesterol, it is still important to consider working on modifying these [risk factors](#) due to their effects on cognitive problems and other symptoms," Alosco said.

A limitation of the study was that participants volunteered to take part, so they may not represent all former football players. In addition, since only elite football players were included, the results cannot be easily translated to other populations.

More information: Monica T. Ly et al, Association of Vascular Risk Factors and CSF and Imaging Biomarkers With White Matter Hyperintensities in Former American Football Players, *Neurology* (2023). DOI: 10.1212/WNL.0000000000208030

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