

CONTACTS: Alzheimer's Association: +1 312.335.4078, media@alz.org
AAIC 2026 Press Office: aaicmedia@alz.org
PCI PR: +1 630.344.2009, aaic2026@pci-pr.com

FROM THE ALZHEIMER'S ASSOCIATION INTERNATIONAL CONFERENCE 2026

FORMER ELITE SOCCER PLAYERS SHOW EVIDENCE OF BRAIN HEALTH CHANGES IN MID-LIFE

Key Takeaways

- **New research provides insights into brain health among former elite professional soccer players during midlife.**
- **Former players reported high levels of depression, anxiety, and subjective difficulties with thinking and decision-making.**
- **Researchers found brain differences that warrant further study. The findings highlight the need for long-term monitoring and further research into the effects of repetitive head impacts in sports.**
- **Additional studies presented at AAIC 2026 link greater heading exposure and longer soccer careers with biomarkers of neural injury, tau accumulation and chronic traumatic encephalopathy (CTE) risk.**

LONDON, July 12, 2026 — A new study of former elite soccer players provides important insights into brain health and player-reported neurological symptoms compared to people without a history of repetitive head impacts, according to the first and largest study of its kind in retired professional soccer players, presented today at the [Alzheimer's Association International Conference](#)[®] (AAIC[®]) 2026 in London and online.

The former players reported higher levels of depression and anxiety and had subjective difficulties with thinking and decision-making skills. MRI scans identified differences in brain structure between some former players and a comparison group of healthy people with no history of contact sports or head injuries. The findings add to a growing body of research, including additional studies reported at AAIC 2026, exploring how soccer play may influence brain health over time.

“These findings suggest there may be measurable effects on brain health in former elite soccer players even in mid-life, before clinically apparent neurodegenerative disease would typically emerge,” said Caleigh Grace Lynch, M.Sc., lead author of the study and a research technician at Imperial College London and the UK Dementia Research Institute Centre for Care Research & Technology. “While we did not find significant differences in objective cognitive testing between the groups, we did observe important differences in symptoms and brain structure.”

“Research like this helps us better understand brain health factors across the lifespan and reinforces the importance of injury prevention and monitoring,” said [Maria C. Carrillo, Ph.D.](#), Alzheimer's Association chief science officer and medical affairs lead. “These findings can help players, physicians and sports organizations better understand the risks of contact sports and how to participate safely.”

The study included 142 former professional soccer players, ages 30-60: 126 males who held a full-time professional contract for a minimum of three years, and 16 females who competed at the top two tiers of the women's professional game in the UK. They were compared to a control group of 56 healthy people (43 male) of the same age who have not played contact sports, served in the military and had no history of repetitive head impacts, concussion or other neurological issues.

Interim analyses of this dataset revealed that former elite professional soccer players reported significantly higher symptoms of depression and anxiety, as well as worse self-rated ability to plan, focus on and solve problems and manage daily tasks, compared to the control group. Nearly one-third of former players (31%) scored in the range indicating clinically significant depression symptoms, compared with 9% of controls, while 42% scored in the range indicating clinically significant anxiety symptoms, compared with 25% of controls.

Brain imaging of 124 former players revealed lower gray matter volume in several brain regions, including frontal, cingulate and thalamic areas that play important roles in memory, attention, decision-making and emotional regulation, compared to controls. At the group level, there was evidence of reduced brain volume in footballers compared with controls. Researchers report clinical review of the scans by a neuroradiologist found that a small proportion of the scans (~2%) had clinically significant atrophy suggestive of neurodegeneration. Further investigation is required to fully understand this result.

Researchers said the combination of elevated symptoms and altered brain volume patterns may suggest trauma-related neurodegeneration, but more research is needed to definitively prove this. Future work is planned to further investigate these findings, including the use of an expanded dataset, integration of additional biomarkers such as advanced diffusion imaging and blood-based biomarkers of neurodegeneration, and longitudinal follow-up.

“By following participants over time, we hope to better understand how repetitive head impacts may influence long-term brain health and neurodegenerative disease, and help inform strategies to make sports safer for future generations,” said Thomas D. Parker, B.M., B.M.Ch., M.R.C.P., Ph.D., senior author of the study and clinical lecturer and consultant neurologist at Imperial College London and the UK Dementia Research Institute Centre for Care Research & Technology.

The study is part of the Advanced BRAIN Health Clinic Research Programme based at the Institute of Sport, Exercise & Health, an integrated clinical care and research initiative investigating the long-term effects of repetitive head impacts in retired elite soccer and rugby players.

The Alzheimer's Association offers guidance on brain health and brain injury risk reduction. One of its [10 Healthy Habits for Your Brain](#) is “Protect your head: Help prevent an injury to your head. Wear a helmet for activities like biking and wear a seatbelt. Protect yourself while playing sports. Do what you can to prevent falls, especially for older adults.”

As a U.S. Centers for Disease Control Public Health Center of Excellence on Dementia Risk Reduction, the Alzheimer's Association is committed to making brain health a central part of public health. The Alzheimer's Association leads the way in raising awareness about brain health through initiatives that

cover the entire spectrum of public health engagement, including the recently launched [Brain Health Advancement Institute](#), a destination for researchers, health care professionals, public health practitioners and policymakers working to reduce the risk of cognitive decline and dementia across all communities.

Additional research on this topic at AAIC 2026 includes:

- Real-life amateur soccer heading and acute elevations in blood-based p-tau217 and S100B. #13279 (Wednesday, July 15 poster). Marloes Ilse Hoppen, Ph.D. student, Emma Children's Hospital and Alzheimer Center of Amsterdam University Medical Center. m.i.hoppen@amsterdamumc.nl
- Early tau and amyloid pathology following repetitive head impacts in former collegiate athletes: a care consortium study. #13523 (Sunday, July 12 poster). Yomna Takieldeem, MBBCH, Indiana University. yotaki@iu.edu
- Duration of soccer play and chronic traumatic encephalopathy. #9837 (Wednesday, July 15 poster). Bobak Abdolmohammadi, B.A., Boston University. babdolmo@bu.edu

About AAIC

AAIC is the world's largest gathering of researchers from around the world focused on Alzheimer's and other diseases that cause dementia. As a part of the Alzheimer's Association's research program, AAIC serves as a catalyst for generating new knowledge about dementia and fostering a vital, collegial research community.

- AAIC 2026: alz.org/aaic
- AAIC 2026 online pressroom: alz.org/aaic/pressroom.asp
- AAIC 2026 hashtag: #AAIC26

About the Alzheimer's Association

The Alzheimer's Association is a worldwide voluntary health organization dedicated to Alzheimer's care, support and research. Our mission is to lead the way to end Alzheimer's and all other dementia — by accelerating global research, driving risk reduction and early detection, and maximizing quality care and support. Our vision is a world without Alzheimer's and all other dementia®. Visit alz.org or call +1 800.272.3900.

###

- Caleigh Grace Lynch, et al. Mid-life brain health in former elite soccer players. (Funding: The Football Association and Players Football Association)

***** AAIC 2026 news releases may contain updated data that does not match what is reported in the following abstract.**

.....
Proposal ID: 974

Poster: Sunday, July 12, 2026, Public Health: Population Health Prevention Strategies

Mid-life brain health in former elite soccer players

Background: Former elite soccer players are at increased risk of neurodegenerative disease, but detailed *in vivo* study of this population has been limited. We hypothesised that mid-life former soccer players would show measurable differences in symptom burden, cognitive function, and brain structure compared to matched controls.

Methods: Group comparisons between 142 former elite soccer players (median age 44 years, 88.73% male) and 56 healthy controls (median age 47.5 years, 76.79% male) using validated symptom questionnaires and standardised neuropsychology were performed. Voxel-based morphometry (VBM) analysis of structural MRI was used to assess differences in regional brain volume.

Results: Former players reported significantly higher symptom burden in several domains (Figure 1). Cognitive testing showed players did not score significantly worse on measures of cognition when correcting for age, sex, education, and premorbid intelligence (Figure 2). VBM revealed evidence of lower grey matter volume in frontal, cingulate, and thalamic regions of players, adjusting for age, sex, and total intracranial volume (Figure 3a).

Conclusions: These findings provide insights into the mid-life brain health of former elite soccer players, showing elevated symptoms and altered brain volume on MRI in a pattern suggestive of trauma-related neurodegeneration, which is consistent with our previously published findings in former elite rugby players (Figure 3b). These results support the need for longitudinal monitoring and targeted study to better understand neurodegenerative disease risk in this population.

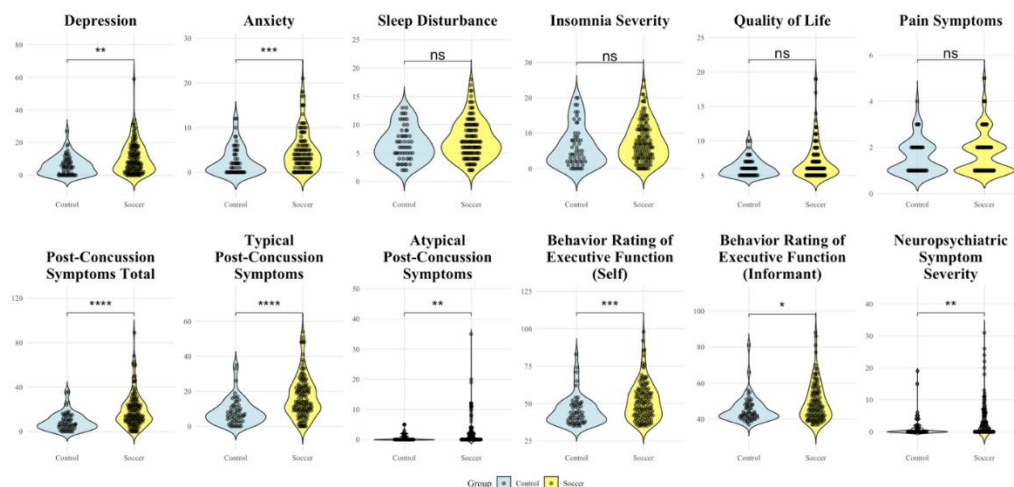


Figure 1: Violin plots comparing symptom burden using clinically validated symptom questionnaires in elite ex-soccer players and controls. Analysis was completed using univariate Wilcoxon rank sum tests.

*p-values < 0.05, **p < 0.01, ***p < 0.001.

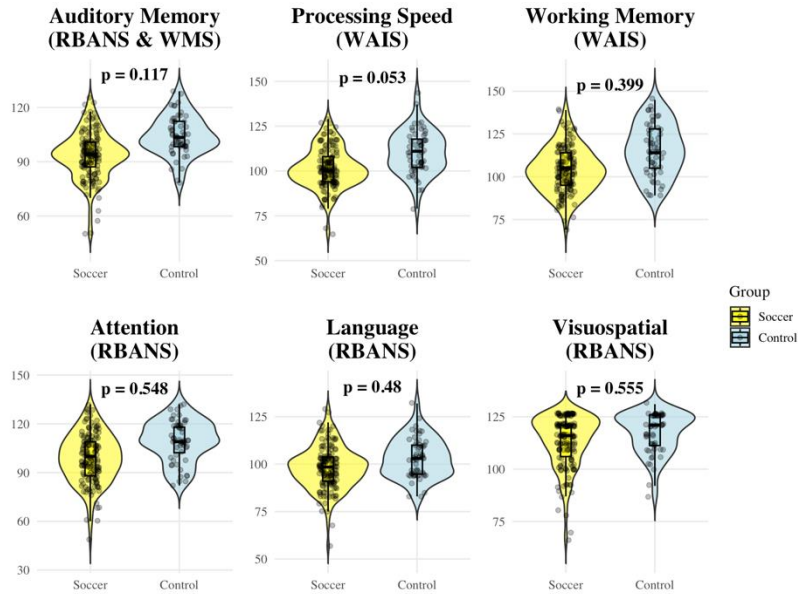


Figure 2: Violin plots comparing index scores on cognitive assessments; Group comparisons were performed using general linear model controlling for age, sex, education, and premorbid intelligence.

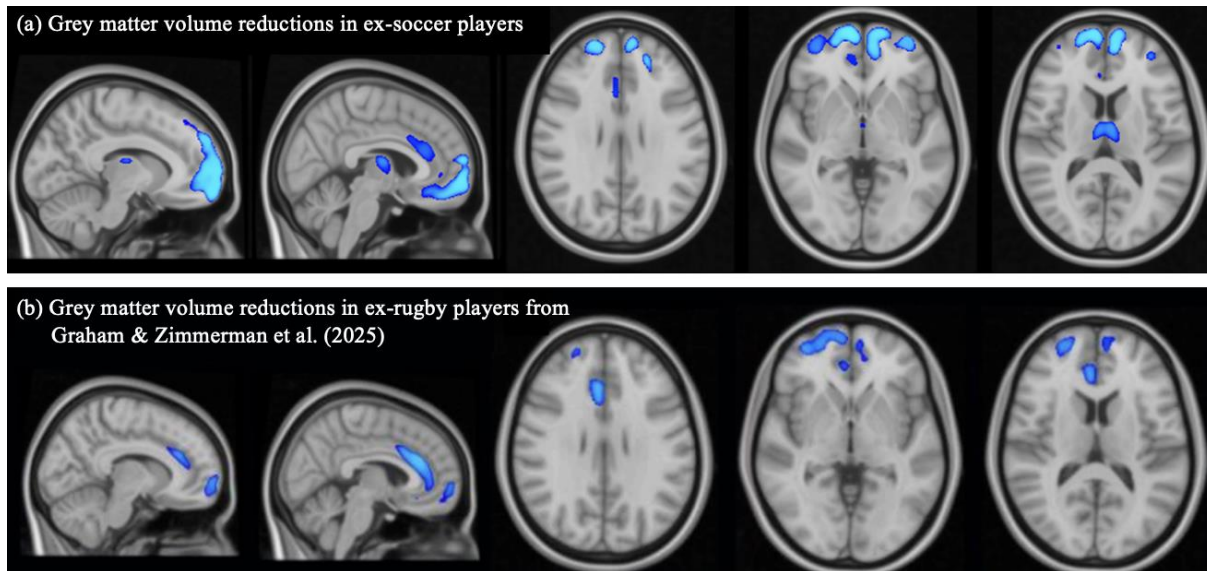


Figure 3: VBM group comparison of grey matter brain volumes. TFCE-corrected significance map shown (one-tailed *t*-test; higher significance indicated by light blue colour). (a) Comparison between ex-soccer players ($n = 124$) and controls ($n = 40$). (b) Comparison between ex-rugby players ($n = 200$) and controls ($n = 33$) from Graham & Zimmerman et al. (2025), reproduced with permission under Creative Commons license.

Presenting author

Caleigh Grace Lynch, M.Sc., Imperial College London, U.K.,
caleigh.lynch23@imperial.ac.uk