

# Neurodegenerative disease risk is found to be more than double among former Scottish international rugby union players

October 4 2022

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The risk of neurodegenerative disease among former Scottish international rugby union players is more than double that of the general

population, finds research published online in the *Journal of Neurology Neurosurgery & Psychiatry*.

The risk varies by condition, ranging from just over twice as high for [dementia](#) up to 15 times as high for motor neuron disease, the findings show, prompting the researchers to call for strategies to cut the risks of head impact and [traumatic brain injury](#) across all sports, including in training.

Traumatic brain injury is a major risk factor for neurodegenerative disease and is thought to account for 3% of all dementia cases.

In recent years, post-mortem studies of brain tissue have uncovered evidence of neurological disease uniquely associated with a previous history of traumatic brain injury or repetitive head impact exposure—termed [chronic traumatic encephalopathy](#) neuropathologic change (CTE-NC)—in former professional athletes from sports, including American football, soccer, and rugby union.

In this study the researchers wanted to find out if the risk of neurodegenerative disease might also be higher among former rugby players than it is among the general population. They included 412 Scottish former international male rugby players (out of an initial total of 654), for whom full health and field position data were available, and who were aged at least 30 by the end of 2020. The players were matched for age, sex, and socioeconomic status with 1236 members of the public.

National electronic health record data on hospital admissions, prescription meds, and the most common causes of death among Scottish men—circulatory system disease; respiratory disease; and cancer—were used to track the health and survival of both groups for an average of 32 years from the age of 30 onwards.

During the monitoring period, 121 (29%) of the former rugby players and 381 (31%) of the comparison group died. Former rugby players were older when they died, reaching an average of nearly 79 compared with just over 76 in the comparison group. The former rugby players had lower rates of death from any cause until they reached the age of 70, after which there was no difference between the two groups.

No differences in cause of or age at death were observed between former rugby players and the comparison group for the most common primary causes of death for Scottish men. But the chance of being diagnosed with a neurodegenerative disease was more than twice as high among the former rugby players (47; 11.5%) as it was among the comparison group (67; 5.5%), although risks varied by condition.

The risk of a dementia diagnosis was just over twice as high, while that of Parkinson's disease was three times as high, and that of [motor neuron disease](#)/amyotrophic lateral sclerosis was 15 times as high.

Additional analysis showed that field position (forward or back) of the former rugby players had no bearing on neurodegenerative disease risk.

The researchers acknowledge that 37% of former international rugby players who might have been eligible for inclusion in the study had to be excluded in the absence of matched health records, and that the study focused only on men. Nor was information available on total career length in rugby, or history of head impact and traumatic brain injury, or on other potential risk factors for dementia.

But the study was relatively large and long-term, and the findings echo those of previous studies of former professional soccer players and former American footballers, say the researchers.

"Notably, in contrast to data from the NFL [National Football League]

and soccer, our cohort of rugby players largely comprises amateur athletes, although participating at an elite, international level. In this respect, it is the first demonstration that high neurodegenerative disease risk is not a phenomenon exclusive to professional athletes," they point out.

Rugby authorities have taken steps to improve the detection of [concussion](#) injuries and to reduce the risks during match play, note the researchers. "However, head impact exposures and concussion risk are not isolated to match play. As such, measures to reduce exposures in training might also be considered a priority. In addition to these primary prevention measures, interventions targeted towards risk mitigation among former [rugby](#) players with already accumulated head impact exposures might also be considered, including the development of specialist brain health clinics," they suggest.

"These data add to our understanding of the association between contact sports and lifelong health outcomes, specifically risk of adverse brain health outcomes. There remains a need for further research exploring the relationship between [contact sports](#) and risk of neurodegenerative [disease](#). In the meantime, strategies to reduce exposure to head impacts and head injuries across all sports should continue to be developed and promoted, while measures to mitigate risk of adverse brain health in former athletes should be considered," they conclude.

**More information:** Neurodegenerative disease risk among former international rugby union players, *Journal of Neurology Neurosurgery & Psychiatry* (2022). [DOI: 10.1136/jnnp-2022-329675](https://doi.org/10.1136/jnnp-2022-329675)

Provided by British Medical Journal

Citation: Neurodegenerative disease risk is found to be more than double among former Scottish international rugby union players (2022, October 4) retrieved 1 April 2023 from <https://medicalxpress.com/news/2022-10-neurodegenerative-disease-scottish-international-rugby.html>

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