

Can a single concussion increase the risk of criminal behaviour?

There is growing awareness of the impact that repeated head injuries can have, particularly among professional athletes in contact sports such as boxing, American football and rugby. The Netflix documentary [Killer Inside: The Mind of Aaron Hernandez](#) underscores this impact. The documentary chronicles the life of a young NFL player whose increasingly erratic and violent behaviour culminates in him murdering his friend. After the athlete commits suicide, a post-mortem brain examination reveals a degenerative disease caused by repeated head injuries that is associated with, amongst other symptoms, a lack of impulse control and violent behaviour.

But the link between head knocks and violent behaviour is potentially a more widespread issue and not just limited to professional athletes at risk of multiple concussions. Our research, therefore, asks whether suffering just a single concussion increases the risk of criminal behaviour.

This is an important question. We are all potentially at risk of a concussion, with many occurring in the course of everyday activities. In fact, there were [almost 21,000 ACC claims for concussions in 2022](#), at a cost of over \$400million, with many more concussions likely going undiagnosed and untreated. These figures illustrate the potential scale of economic and social costs related to concussions.

Identifying an appropriate comparison group

We use accident and justice data on New Zealand's population (from Stats NZ) to study criminal behaviour outcomes of those who suffered a single concussion. To examine our research question, it is important to have a suitable comparison group. Our comparison group comprises people with orthopaedic injuries (e.g., broken legs). We chose this group for two reasons. First, it eliminates the possibility that the trauma of having an injury (of any kind) could lead to a link between having a concussion and negative outcomes (e.g., increased criminality). Second, it accounts for people's tendencies towards risky behaviour. Someone who is a risk taker has a higher chance both of being injured and of being involved in criminal behaviour. This link could lead us to mistakenly conclude that a concussion *causes* criminal behaviour when the two are, in fact, only correlated. To further reduce the risk of drawing false links between injury and behaviour, we make our two groups (orthopaedic injuries and concussions) as similar as possible in terms of socioeconomic characteristics and criminal history – so that we are truly comparing like with like.

What our research reveals

We find that those who suffer from one concussion have more criminal convictions and court charges for violent offences than our comparison group. In contrast, we find no evidence that one concussion increases subsequent involvement in non-violent crimes such as fraud, drug or traffic offences.

Why is concussion linked to an increase in subsequent criminal activity?

While the mechanisms are complex, one possible explanation is that a person who has had a concussion can experience cognitive and emotional challenges. These include difficulty in processing information and making decisions quickly, and irritability, all of which can increase the risk of a violent (and potentially criminal) response to a situation. It is also likely that a mild brain injury exacerbates other risk factors that can contribute to criminal activities. These include mental health struggles, drug and alcohol use, and an inability to manage emotional reactions to events.

Additional factors that play a role in this relationship

Results from our research show clear gender differences. The increase in violent offending following a concussion is greater for men than for women. Furthermore, those who suffer multiple concussions have an even higher risk of being charged and convicted for violent offending.

Implications of these findings

While there has been increased awareness of the impact of concussions among professional athletes, this research highlights that it can impact a much wider range of people. The potential cost of even one concussion is significant in terms of direct and indirect health effects, particularly those that involve wellbeing and justice outcomes. While progress has been made, we still need to improve the diagnosis and treatment of concussions. We need to ditch the “she’ll be right” attitude. If you or someone you know takes a knock to the head, watch out for signs of concussion. These can include a glazed look, decreased mobility, poor coordination, head or neck ache, or sensitivity to light. Don’t ignore these signs - seek medical advice promptly. As the research shows, failure to accurately diagnose, treat, and manage concussion can have wide-reaching impacts on New Zealand’s health sector, justice system, and economy.