



What's the story with CTE?

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CTE - three letters that frighten all - the young and old, mums and dads, school groups and sporting codes. These three letters continue to saturate media coverage daily. However, chronic traumatic encephalopathy is not new. It has been around since 1928.

The Mayo Clinic describes CTE as a *rare* neurodegenerative disease *likely* linked to repeated head trauma from repetitive hits such as in contact sports or military combat. There has been evidence of structural brain changes due to abnormal buildup of tau proteins in CTE ([Asken et al., 2017](#)). As a result, people diagnosed with possible/probable CTE can progress to a dementia stage, where the decline in one or more cognitive functions is found to have a significant impact on their ability to perform day-to-day activities. Dementia is the umbrella term to describe various neurodegenerative conditions, such as the more well-known Alzheimer's disease, and is the second leading cause of death in Australia (Dementia Australia, 2023).

However, it is important to note that CTE can only definitively be diagnosed on autopsy and not everyone who sustains repeated head

knocks will go on to develop CTE. When high profile sports people sustain repeated head knocks over many years, CTE can become an obvious, and emotive, assumption. Studies are occurring to establish if there is there a genetic predisposition to CTE. For instance, why do some people in the same sport get CTE and others don't?

But how many head knocks can one afford? We don't know exactly. The answer is to educate the public on concussion and to identify and manage each individual appropriately. Education of the public regarding head knocks and concussion, adding safeguards to all contact sports and the appropriate advice and management of concussion should be the focus.

In comparison, **concussion** is a transient event and not a structural change. It is an injury of force – to the head or body, occurring with rotational head motion (Tierney, 2021). Concussion is an injury of signalling in the brain at a cellular level and is thought to be of greater significance in teenagers, as the teenage brain undergoes a growth spurt during adolescence (Baillargeon, Lassonde, Leclerc & Ellemberg, 2012). It is imperative that schools and sporting groups have a good understanding of the identification and management of concussion, as early intervention promotes better outcomes.

Concussion is not always obvious, and symptoms may take up to 72hrs to manifest. Public education should cover the definition of a concussion, recognising that a concussion has occurred, removal from play and seeking appropriate medical advice. The educational concussion video produced by Northern Sydney Local Health District has been adopted

for use by the Australian and New Zealand Education Departments and can be easily accessed via <https://vimeo.com/674645370>

Once a concussion has occurred, it will take less of a blow to sustain another and will take longer to recover (Gornall, Takagi, Morawakage, Liu & Anderson, 2021). Whilst a concussion can still occur despite mouthguards and helmets, the force of impact is reduced with these devices. Although they will not wholly prevent a concussion, they will absorb some of the mechanical force, as well as protecting the teeth, skull, and jaw (Allison & Tamimi, 2020).

Second impact syndrome is related to concussion, and occurs when a second head injury occurs before the previous head injury symptoms have fully resolved. This is preventable and why individuals should not return to sport until completely symptom-free.

A paper written by Kanser et al (2023) suggest that 80% of neuropsychologists (n= 325) think that the research into CTE is unreliable and weak; that concerns are dramatised by the media (96%) presenting a biased/alarmist view. They suggest that concern and debate over CTE has been around for many years and that most scientific publications do not involve actual studies, rather narrative views and commentaries (Wolfson et al., 2020).

Australia is a sporty nation. Fear should not compromise a healthy lifestyle. Public education should ensure that the threat of CTE does not overtake common sense. Already schools are seeing a move away from rugby to soccer, yet evidence shows that soccer is not necessarily 'safer', as concussions occur frequently in this sport as well. No matter what, a person having had a head or body

knock should not return to sport until completely symptom free.

The USA's National Football League studied 631 brains and found that CTE was from the cumulative force of repeated head knocks/body blows. But why do some players with a lengthy time in these contact sports suffer and others do not? Similarly, the AFL is facing concussion class actions, as players here seek compensation.

Sporting codes have introduced greater penalties for hits to the head in games. To diminish head knocks as best as possible, there are several other options to consider. The recent study by Peek et al (2023) highlighted the importance of being proactive and implementing guidelines to reduce the "volume, magnitude and injury risk" (JSportsMed p1). A framework introduced into sporting programs (at all levels) should cover –

- neck strengthening exercises – to support the head/neck
- technical proficiency
- injury reduction programs
- enforcement of rules and sportsman-like behaviour
- using lower pressure match and training balls in soccer

Training and game days should have a different approach. Training should aim to minimise the occurrence of head contact. In the UK and USA, it is suggested that heading the ball in football (soccer) should not occur until after the age of 14 years. In Australia, the age limit is not categorically specified, rather it is discouraged in the younger years. Peek et al. (2023) suggest limiting the number of headers/week and rethinking the way in which corners/goal kicks should be ap-

proached. The governing bodies should also consider implementing a rest and recovery session after a certain number of headers/week, encourage small-sided games at training that limit exposure to high balls leading to headers, inclusion of neuromuscular strengthening exercises and enforcement of the rules of the game. If a deliberate head contact occurs, the greater the penalty should be imposed. Neuropsychologists and psychologists should be affiliated with each sporting team and play an active role in supporting players.

Sport is synonymous with being Australian and should be encouraged, so should the rules of the game, sportsmanlike behaviour, and in particular, neck strengthening exercises. Encouragement to 'look after your mate' should be emphasised in schools – if your mate is injured, report it. Early injury identification, assessment and treatment produces better outcomes. Prevention of injury and safe play at all levels is under constant review and the media has a role to play in accountability and keeping the public informed. However, concussion identification and management require more media attention, and less CTE coverage.

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