

Helmets raise risk of brain injury

October 20 2015, by David Thorpe

The "tough-guy" image of the rugby codes is apparently admired in the NFL: no helmets and body armour in rugby. As former rugby league player Jarryd Hayne makes his transition to rookie running back for the San Francisco 49ers, he at least has the rugby reputation going for him.

However, there is a terrible irony here – and it is one that rugby converts to the National Football League should keep in mind, especially if, unlike Hayne, they are young and expect a long football career in the United States.

Chronic traumatic encephalopathy (CTE) – brain damage caused by multiple concussions, the effects of which include dementia, Alzheimer's disease and depression – is linked in part to the wearing of helmets in the NFL game.

Protected by a helmet, the NFL player bangs his head into an opponent without a care, as does his opponent to him. So does "she", for that matter, as women now play American football. The player feels little, if anything, yet with every helmet clash the brain moves around in its fluid, striking the inflexible walls of the skull and damaging delicate cerebral structures. At times, the face mask of the helmet is struck, rotating the head violently. Over time, multiple contacts and sudden head rotations are thought to lead to CTE.

Mike Webster, who died of a heart attack when he was 50, was the first NFL player to be diagnosed with CTE. The diagnosis was made during his autopsy, because the disease is not, so far, detectable in life. Webster

was a lineman – one of the NFL "forwards" selected for weight, power and agility to compete head to head, in a line of scrimmage, against opposition linemen.

In attack, the linemen protect their quarterback, the ball thrower, by shoving the opposition linemen backwards or outwards using shoulders, arms and helmet. The defending lineman tries to penetrate his opposite number by force, driving forward and upward from a crouching start so that in every scrimmage the linemen butt helmets.

When Webster's family sued the NFL, it was claimed in testimony that he probably suffered 25,000 violent head clashes in a professional career of 17 years.

Post-mortem examinations of other former NFL players who suffered symptoms of CTE revealed a protein, tau, entangling the cerebral connections, which is thought to block the proper functioning of the brain. Tau is found in all brains but seems to reconfigure with repeated trauma. Whether other factors, such as genetics, a particular predisposition or steroids, are a necessary co-agent is yet to be proved. "Causation", a necessary element of any successful civil claim, is notoriously difficult to prove by raw statistics alone.

Several Australians playing contact sport have expressed an interest in crossing the Pacific to play in the NFL. With Hayne on an estimated weekly salary of almost \$40,000, who can blame them? One commentator has observed that if Hayne can make it, others can, too.

Many would-be entrants have the large physique of a lineman. Others identify with the elusive Hayne and see themselves as running backs. Although running backs do not suffer head clashes with each scrimmage, helmet-to-helmet contact looms large and for much the same reasons: there seems to be a preference or at least a habit for leading with the

head in attack and defence.

US neurosurgeon Julian Bailes, an expert on brain injury in professional sport, says some "blindsides" tackles in the NFL generate a g-force of up to 100 – 60 to 90 is enough to knock a player out.

Hayne made three runs in his pre-season game against the Dallas Cowboys; in each tackle there was helmet-to-helmet contact and helmet grabbing. In his first competition match, against the Minnesota Vikings, Hayne fumbled the ball and in scrambling to recover was contacted on the helmet by two opponents.

These facts indicate a type of contact common to NFL but one should not draw too much from them. Certainly most former NFL players have not reported symptoms associated with CTE. That the 27-year-old Hayne didn't play the sport as a junior, picking up his new career later than most, is also in his favour.

The NFL has recently received judicial approval of a settlement fund of almost \$US1 billion to assist more than 5,000 past and present players who claim, or will claim in the future, to be suffering from the effects of CTE. In doing so, the NFL avoided addressing allegations of a cover-up that might have prevented properly informed players abandoning the game. The relief for the NFL may be short lived, however, as a number of players have indicated they will pursue individual legal action.

Today, concussion posters hang from the walls of NFL change rooms, exhorting athletes to "take care of your brain". All players now know the risk – on a legal level they will be taken to have accepted a form of harm recognised as perhaps inherent in the NFL.

Provided by University of Technology, Sydney

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