

Contact sport

Contact sports are sports that emphasize or require physical contact between players. Some sports, such as mixed martial arts, are scored on impacting an opponent, while others, including [rugby](#) football, require tackling of players. These sports are often known as full-contact, as the sport cannot be undertaken without contact. Other sports have contact, but such events are illegal under the rules of the game or are accidental and do not form part of the sport.

The contact in contact sports can also include impact via a piece of sporting equipment, such as being struck by a hockey stick or football.

In contact sports, the [cervical spine](#) is most susceptible to [injury](#) when the mechanism involves substantial axial loading forces applied to the head while the neck is in flexion or extension ¹⁾.

If the force is great enough to compromise the integrity of the discovertebral complex or ligamentous elements, direct injury to the spinal cord may occur due to disc herniation (flexion), buckling of the ligamentum flavum posteriorly (extension), or shingling causing compression of the spinal cord between the vertebral body of the rostral level and the lamina of the caudal level (extension) ^{2) 3)}.

Acute neural element compression may be transient; however, studies with athletes involved in contact sports have shown a greater prevalence of preexisting chronic compressive pathology, such as congenital spinal stenosis, that may predispose them to this type of event ^{4) 5) 6) 7) 8) 9) 10) 11) 12) 13)}.

[Contact sports](#) athletes and [military](#) personnel who suffered a repetitive [mild traumatic brain injury](#) (rmTBI) are at high risk of [neurodegenerative diseases](#) such as advanced [dementia](#) and [chronic traumatic encephalopathy](#) (CTE). However, due to the lack of specific biological indicators in clinical practice, the diagnosis and treatment of repetitive [mild traumatic brain injury](#) are quite limited.

Zhang et al. used 2-methacryloyloxyethyl phosphorylcholine (MPC)-nanocapsules to deliver [immunoglobulins](#) (IgG), which can increase the delivery efficiency and specific target of [IgG](#) while reducing the effective therapeutic dose of the [drug](#).

The results demonstrated that MPC-capsuled immunoglobulins (MPC-n (IgG)) significantly alleviated [cognitive impairment](#), hippocampal atrophy, p-Tau deposition, and [myelin](#) injury in rmTBI mice compared with free IgG. Furthermore, MPC-n (IgG) can also effectively inhibit the activation of microglia and the release of inflammatory factors.

In the present study, Zhang et al. put forward an efficient [strategy](#) for the repetitive [mild traumatic brain injury treatment](#) of related [cognitive impairment](#) and provide evidence for the administration of low-dose [IgG](#) ¹⁴⁾

Sixteen young adult ice hockey players with a remote history of [concussion](#) but no subjective complaints were compared against 13 of their teammates with no history of concussion. Participants completed a detailed phenotypic assessment and a neuroimaging battery including diffusion kurtosis imaging and resting-state functional magnetic resonance imaging. Athletes with a history of concussion performed no differently from those without on phenotypic assessment, but showed significantly elevated fractional anisotropy (FA) in the left genu and anterior corona radiata relative to

those without. Post hoc analyses revealed that elevated FA was associated with increased microstructural complexity perpendicular to the primary axon (radial kurtosis). Athletes with concussion history also showed significant differences in the organization of the default mode network (DMN) characterized by stronger temporal coherence in posterior DMN, decreased temporal coherence in anterior DMN, and increased functional connectivity outside the DMN. In the absence of deficits on detailed phenotypic assessment, athletes with a history of concussion displayed changes to the microstructural architecture of the cerebral white matter and to the functional connectivity of the brain at rest. Some of these changes are consistent with those previously associated with persisting deficits and complaints, but we also report novel, complementary changes that possibly represent compensatory mechanisms ¹⁵⁾.

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