



Concussion Part 2...

QUESTION | Why has there been so much discussion about concussion in sport in the last few years? Can you update on any new changes in assessment and management?

ANSWER | The last 10-15 years has been a time of greater understanding on the issues around head injury in sport and specifically concussion. There has also been discussion about the consequences of sports related concussion (SRC) with a focus on mental health disorders, cognitive disorders and the possibility of degenerative brain pathology such as encephalopathy.

What is concussion?

To recap from Dr Paul Annett's comments (Part 1, last edition), concussion is a neurological injury, the most common neurological injury in sport, where there has been disturbance of cerebral equilibrium. This usually involves a direct blow or contact to the head.

If you work with sports teams, the presentation and features vary. In it's more dramatic forms this may present with loss of consciousness or seizures. In it's more subtle form it may be post activity headache, mood change and with memory loss. It appears that recovery takes longer in school-age athletes and susceptibility may increase with episodes. It is unclear if there is a pre-disposition to concussion injury.

What is the best way to assess concussion?

Observation at the time of injury is extremely valuable. In any history taking it is always good to observe any video evidence if this is available at the time of the injury. A careful neurological examination is required which would include equilibrium testing and a careful visual examination. The greatest progress has occurred with cognitive assessment. There are many cognitive assessment tools available, which objectively assess aspects of cognition including memory, recall and speed of thinking. Most professional sports require mandatory baseline preseason cognitive screening to offer a baseline score. In particular, the Sports Concussion Assessment Tool (SCAT) is easy to access and also has a child version for 5-12 year olds. There is now version 5 (SCAT 5) which can be accessed easily online (see reference 1).

The implementation of the 2017 Berlin Concussion in Sport Group Consensus Statement (which has input from 11 national and international sporting organisations) is most helpful. There is strong Australian representation on this group. (See reference 2)

After the initial management, how do you decide on return to play?

All concussion episodes should be assessed by a doctor. Preferably a doctor who is involved with the players team or knows the player well. Once the diagnosis is made apply should not return to contact sport situation. And assessment by medical practitioner is essential, and if nothing else this also serves as a medicolegal support. A period of inactivity is required. This is at least until the symptoms have subsided. Various sports have return to play guidelines based on the severity of symptoms, repeat physical examination and further cognitive testing.

In the community, as opposed to professional or elite sports levels, there are good reporting documents available. I would commend the National Rugby League (NRL) and its community Head Injury Assessment (HIA) from which is freely available. (Reference 2).

Once the symptoms have resolved and cognitive testing has returned to normal, a “ Graduated Return to Play“ schedule may be introduced (GRTP).

The fundamentals of a GRTP program requires a minimum of 6 days of non-contact training, with 6 separate stages. The player graduates through these stages if they are well, with at least 24 hours apart. It should be noted that it is not unreasonable in a school age athlete to have a mandatory 2-3 week light exercise and non-contact periods prior to implementing the GRTP guidelines. This is my personal recommendation.

An example of this for contact sports could be as follows:

Stage	Activity	Comment
1	Rest; ensure good sleep	Clinically normal and cognitively normal to progress to stage 2
2	Light cardiovascular exercise: Light jogging for 10-15 minutes, swimming or stationary cycling at low to moderate intensity.	Progress to stage 3 if no symptoms.
3	Sports specific exercise Individual running drills and skills without contact. No weights training If no increased symptoms, start Stage 4 after minimum of 24 hours.	If symptoms reoccur or worsen, rest 24 hours & repeat Stage 2, then progress
4	Sports specific non-contact training. More complex training drills e.g. passing drills May start progressive (low level) weights training	If no increased symptoms, progress. If symptoms reoccur or worsen, rest 24 hours & repeat Stage 3, then progress
5	Sports practice with full contact. Player, coach, parent to report any symptoms to medical doctor. If symptoms reoccur or worsen, then medical doctor to review	If symptoms reoccur or worsen, rest 24 hours & repeat Stage 3, then progress.
6	Rugby game Full contact game Monitor for recurring symptoms or signs The management (i.e., clinical decision-making) of a concussion is the responsibility of the medical doctor who ideally has experience in the management of concussion.	Only the medical doctor can sign off on the commencement and conclusion of the GRTP process

It should be stressed that the management (i.e. clinical decision-making) of a concussion is the responsibility of a medical doctor who ideally has experience in the management of concussion. Only the medical doctor can sign off on the commencement and conclusion of the GRTP process. A sports physiotherapist, parent/guardian, team trainer, or any other responsible adult may conduct the day-to-day oversight of the player during the GRTP. It is essential that the individual taking responsibility checks whether the athlete has experienced any return of signs and/or symptoms before progressing through the GRTP.

Are there individuals who are 'prone' to concussion? Can this be screened? Are there long-term effects?

At this stage this is unclear. It is also unclear if there are long-term effects. Neurological biomarkers such as glial fibrillary Acid Protein (GFAP) and ubiquitin C-terminal hydrolase L1 (UCH-L1) have been detected late (within 7 days) and early (within 24 hours) of an injury. It may be that there will be validated testing to assess recovery to assist return to play.

It is likely that mental health conditions such, as depression is more common with increased concussion episodes. The issue of chronic brain conditions remains controversial and unclear. Brain biopsy studies are underway of deceased former contact athletes, which may shed light.

Summary

Sports related concussion is better understood. Serious medical assessment is required in all cases. It is not a benign injury with studies suggesting that mental health conditions such as depression are more common in patient to suffered concussion and maybe dose-related. It remains unclear whether chronic traumatic encephalopathy, a degenerative brain disorder, is associated with concussion episodes. There is an acceptance that once players have suffered a concussion injury they may be more likely to suffer repeat injury with a dose-related causal association with the development of depression. Genetic factors and biochemical factors (bioactive markers) may be involved and are being researched.

1. <http://www.rugbyaustralia.com.au/runningrugby/PolicyRegister/ConcussionProcedureManagement.aspx>
2. The Implementation of the 2017 Berlin Concussion in Sport Group Consensus Statement in contact and collision sports. *Patricios JS et al., Br J Sports Med 2018;0:1-7*
3. <https://playnrl.com/media/2651/nrl-community-hia-form-version-9.pdf>

Dr John Best is a Sports and Exercise Physician at Orthosports Randwick. He has been involved in International Rugby (The Wallabies, three rugby world cups and the International Rugby Board) , Professional Soccer and Rugby League. He currently serves on the National Rugby League's Medical Advisory Panel).