

Zero tolerance: the future of head injury in sports

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Concussion is a common type of brain injury caused by impact forces to the head following intentional or unintentional collisions. All sports, whether they are team sports (eg, football, rugby and ice hockey), or individual sports (eg, horse riding, skiing or boxing) have finite risk of a concussion injury, which should be reduced as much as possible if the potential for long-term problems is to be avoided. Concussion must be recognised quickly and treated appropriately; however, the most important aspect of medical management is the timing of the return to play decision. The team physician is commonly under pressure from the team, the coach or the administration to get the athlete back in the game, particularly in high-profile sports. The physician has to take the ultimate responsibility for the decision on when the athlete can safely return to play or not.

The main objective for the 4th International Concussion Consensus Conference held in November 2012 in Zurich, Switzerland at the home of Federation International de Football Association (FIFA), was to support the physicians acting in the field by offering an expert consensus based on current and recent scientific evidence to facilitate decision-making.

WHAT HAVE THESE CONFERENCES CONTRIBUTED TO?

The first concussion symposium was held in November 2001 in Vienna as a joint venture of the International Ice Hockey Federation (IIHF), FIFA and International Olympic Committee (IOC). The second symposium was held in Prague 2004 and the third in Zurich 2008. Each conference produced a summary-and-agreement statement on concussion in sport.¹⁻³ The Prague meeting offered as a

recommendation, a simple sideline assessment tool called the Sports Concussion Assessment Tool (SCAT) later revised in Zurich to SCAT 2.³ The SCAT has been promoted by the major international sports federations within their educational courses in the respective sports and has been extremely helpful for the decision-making process for return to play. It has, indeed, become the tool used worldwide and the Consensus meetings have had a decisive impact on the diagnosis and treatment of concussion around the world.

In football and ice hockey, as in other sports such as American football, concussion is a serious issue, particularly when it comes to the discussion of potential long-term brain damage. The FIFA Medical and Research Centre initiated a series of biomechanical experiments to analyse the forces impacting on the head and brain and also video analysis of incidents leading to concussion-identifying tackles with higher propensity to cause concussion. The results were presented in a 2005 supplement of the *British Journal of Sports Medicine* entitled 'Head injuries in football'.⁴ The scientific evidence from these studies was presented to the International Football Association Board (IFAB) proposing to eliminate those incidents which lead to head-and-brain injuries (such as elbow to head contact in tackles). The IFAB decided to sanction offenders (through the red card send-off mechanism) and this rule change has resulted in a significant decrease in head injuries in FIFA World Cup 2006. This is an example of how medical science can work with game administrators and lawmakers to ensure that injury prevention is achieved.

The 3rd International Concussion Consensus Conference in Zurich 2008 was designed to follow the US National Institutes of Health consensus criteria as closely as possible. In brief, relevant topics and issues were identified in advance and individual panelists conducted reviews of the literature and provided reading material ahead of the meeting. These comprised of an open session to the public conference followed by a closed session with 27 invited experts who are well published and experienced in the field of head and brain injuries. An integrated part of the consensus paper was presentation of the SCAT2 assessment tool and 'pocket SCAT' as

an aid to sideline diagnosis as well as provide a complete medical examination for concussed athletes.³ The 2008 statement was co-published in 14 journals and has been downloaded more than 50 000 times from the *BJSM* site alone. This demonstrates that the Concussion Conferences provide an important example of 'implementation'/knowledge exchange.

FOCUS ON THE 4TH CONFERENCE – ZURICH

The 4th International Concussion Consensus Conference 2012 in the same format as above has been held with the support of the IOC, FIFA, FEI (International Equestrian Federation), IIHF and the IRB (International Rugby Board). Two full, open days where researchers from around the world were invited to present new research, were followed by a panel of 32 international experts, who after an extensive structured discussion drafted a consensus paper and edited it, until all involved authors and experts could reach full agreement. The discussion resulted in an updated version SCAT 3 to be used as recommendation for return to play. The final consensus statement is based on 12 critical review papers—which you can find in this issue of *BJSM* to complement the consensus paper.

The current supplement is the result of more than 10 years of continuous scientific collaboration of the involved partners which has raised awareness in the international sports federations, stimulated research output and outlined the possible ways where research should be guided in future to be able to present scientifically proven and sound guidelines for return to play after sustained concussion.

Competing interests None.

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