Strategies for Preventing Sport-Related Concussions and Subsequent Injury

The risks of sustaining a concussion during sports and recreational activities can be reduced by:

- Providing training to coaches and officials to help them take steps to prevent and to recognize concussions and respond appropriately when these injuries do occur
- Educating parents and young athletes to help them understand the risks and recognize the signs and symptoms of concussion
- Receiving instruction in and practicing the proper technique to use while playing a sport
- Following the rules of a sport
- Undergoing training and conditioning prior to engaging in a sport

The Consensus Statements on Concussion in Sport from the 3rd and 4th International Conferences on Concussion in Sport held in Zurich in November 2008 and in November 2012 observe that rule changes in a sport may be necessary in order to prevent certain types of impacts that contribute to head injuries. Further, rules should "allow an effective off-field medical assessment to occur without compromising the athlete's welfare, affecting the flow of the game, or unduly penalizing the player's team." (McCrory et al 2009; McCrory et al 2013). The Consensus Statements also caution that use of protective equipment can inadvertently contribute to young athletes taking additional risks during play.

The Annual Survey of Catastrophic Football Injuries 1977-2011 makes 13 recommendations for reducing disabling head and neck injuries. The recommendations address the importance of learning and practicing proper techniques for blocking and tackling, strictly enforcing rules that prohibit the use of dangerous techniques, providing athletes with proper training and conditioning, and ensuring the immediate availability of qualified medical care when an injury does occur. The authors advise that athletes who show

Other Fact Sheets:

- Overview
- Legislation on Sport-Related Concussions
- The Role of Public Health Professionals in Preventing Sport-Related Concussions
- TBI Information and Resources
- References and Suggested Readings

signs of head injury be removed from play and not return to play until cleared by a qualified health care provider. Other recommendations include making sure that protective equipment fits properly, having a physician present during practices and games, and developing a written plan that spells out what should be done in case of a catastrophic head or neck injury (Mueller and Cantu 2012).

The Centers for Disease Control and Prevention (CDC) recommends that leagues, schools, and school districts develop both policy statements and action plans establishing their commitment to safety and outlining the steps to be taken if a concussion occurs. These documents should be reviewed regularly to determine if they need to be strengthened. In addition, the CDC advises coaches to thoroughly educate parents and athletes about the dangers of concussions, to ask athletes if they have ever experienced a concussion and insist that all athletes receive a medical assessment before being allowed to play, and to reinforce with athletes the importance of immediately informing the coaching staff if they suspect that they have sustained a concussion.

The CDC also recommends that coaches and parents "determine whether your school or league would consider conducting baseline testing" of student athletes before the season begins so that if a concussion occurs or is suspected to have occurred, the results of the baseline tests can help to establish the extent of the injury. (CDC Concussion in Sports webpage. Accessed on 3/29/2013). The CDC webpage FAQs about Baseline Testing among Young Athletes at http://www.cdc.gov/concussion/sports/baseline_test.html provides more information about baseline testing.

It is also important to understand who is authorized to provide medical clearance to a student athlete who has sustained a concussion and what qualifications and training are necessary for those who are making determinations about when and if a student athlete should return to play. Because the science of concussions is continuing to evolve, it is crucial for those who are providing medical clearance to have the most current information about diagnosing and treating these injuries.

The Role of Protective Equipment in Preventing Concussions

In a review of research on the effectiveness of protective equipment in preventing sport-related concussions, Daneshvar et al find that "[f]or some sports in which contact with hard surfaces is possible, such as skiing, snowboarding, and cycling, there is evidence that helmets greatly reduce the incidence of head injuries in general" (Daneshvar, Baugh, Nowinski, McKee, Stern, and Cantu 2011). However, the Consensus Statement on Concussion in Sport: the 4th International Conference on Concussion in Sport held in Zurich in November 2012 states, "There is no good clinical evidence that currently available protective equipment will prevent concussion, although mouthguards have a definite role to play in preventing dental and orofacial injury" (McCrory et al 2013).

Navarro reviewed studies on the effectiveness of protective equipment in football, rugby, soccer, field hockey, and ice hockey. He found that most of these studies do not support the use of protective equipment for concussion prevention in these sports (Navarro 2011). However, in a three-year study conducted from 2002 through 2004 involving 2,141 high school football players in Pennsylvania, Collins et al found that athletes who wore the Revolution helmet manufactured by Riddell had a lower rate of concussion that those who wore standard helmets (5.3% versus 7.6%) (Collins, Lovell, Iverson, Ide, and Maroon 2006). Nevertheless, in a systematic review of literature from 1955 to June 2012, the Guideline Development Subcommittee of the American Academy of Neurology states, "Data are insufficient to support or refute the superiority of one type of football helmet in preventing concussions (Giza, Kutcher, and Ashwal et al 2013).

Many concussion experts also recommend that the following steps be taken to prevent concussions and to reduce the damage that these injuries cause:

- Provide concussion training to all adults who play a role in youth sports, including coaches, athletic trainers, and school nurses.
- Outline a specific step-by-step process for return to play for those young athletes who have sustained a concussion (Toporek 2011). McCrory et al recommend a Graduated Return to Play Protocol which consists of six steps taken in 24-hour increments: (1) no activity, (2) light aerobic exercise, (3) sport specific exercise with no contact, (4) non-contact training drills, (5) full contact practice, and (6) return to play (McCrory et al 2009; McCrory et al 2013). If symptoms recur at any point in the six-step process, then the athlete should return to the previous step for an additional 24 hours.

Because sport-related concussions are an evolving injury issue, public health professionals should closely monitor the peer-reviewed literature and the dialogue among concussion experts to ensure that they are aware of changing strategies and recommendations for the prevention and management of concussions.

CSN Children's Safety Network

CSN is a resource center for MCH and injury prevention professionals in State and Territorial health departments who are committed to reducing injuries and violence among children and adolescents. CSN is supported by the Maternal and Child Health Bureau, Health Resources and Services Administration, Department of Health and Human Services.

May 2013

Children's Safety Network
Education Development Center, Inc.
43 Foundry Avenue
Waltham, MA 02453-8313

Connect with the Children's Safety Network

CSN on Facebook: www.facebook.com/childrenssafetynetwork
CSN on Twitter: www.twitter.com/childrenssafety
Register for the CSN e-Newsletter: go.edc.org/csn-newsletter
Need TA? Have Questions? E-mail: csninfo@edc.org

www.ChildrensSafetyNetwork.org