



SOCIETY OF
PEDIATRIC NURSES

SPN Position Statement: Management of Concussion in the Pediatric and Adolescent Patient

INTRODUCTION/PROBLEM STATEMENT

There are numerous estimates as to the number and rate of concussions that occur in the pediatric and adolescent populations on an annual basis. Some studies estimate a total of approximately 400,000 children under the age of 18 are treated in emergency departments each year, with falls comprising more than 55% of head injuries in children 0-14 years of age and motor vehicle accidents comprising the majority of head injuries for those patients aged 15-18 years of age. Another study shows that, in 2009, nearly 250,000 children under the age of 19 were treated in emergency departments as the result of sports related head injuries alone (Gilchrist, Thomas, Xu, McGuire, & Coronado, 2011). Other studies have estimated that more than 300,000 high school athletes alone sustain concussions annually (Bakhos, Lockhart, Myers & Linakis, 2010; Marar, McIlvain, Fields, & Comstock, 2012).

As nurses working with children, it is important to consider the treatment and education related to pediatric concussions because, when compared to adults who have sustained a concussion, children and adolescents experience slower recovery times, are prone to have more severe symptoms, and show more cognitive deficits. (Halstead & Walter, 2010; Kirschen, Tsou, Nelson, Russell, & Larriviere, 2014; Van Kampen, Lovell, Pardini, Collins, & Fu 2006; Yard & Comstock, 2009). Additionally, both children and adolescents are at increased risk for severe injury and death when they are in the process of recovering from a concussion (Fay et al., 2010; Halstead & Walter, 2010; Lovell & Fazio, 2008) and all populations are at increased risk for concussion in the period up to 10 days following a concussion (American Academy of Neurology (AAN), 2013).

DEFINITION(S)

Concussion is defined as “a traumatically induced transient disturbance of brain function and involves a complex pathophysiological process. Concussion is a subset of mild traumatic brain injury (MTBI) which is generally self-limited and at the less-severe end of the brain injury spectrum” (Harmon et al., 2013, p. 184).

RATIONALE AND SUPPORTING INFORMATION

There is evidence indicating that a history of concussion is a significant risk factor for additional concussions and that multiple concussions lead to longer recovery times (Emery et al., 2010; Halstead & Walter, 2010; Harmon et al., 2013; Kirschen et al., 2014; McCrory et al., 2013). Additionally, multiple concussions have been associated with chronic neurocognitive, psychiatric, and behavioral impairments and, in the case of athletes, those with a history of multiple concussions and corresponding sequelae should be assessed by a neurologist to address the possibility for retirement from play (AAN, 2013; Halstead & Walter, 2010). Nurses should also screen for risk factors that may predict more severe neurobehavioral deficits following injury, which include the presence of pre-injury cognitive, attention, and behavioral impairments such as learning disorders and ADHD. In these cases, treatment by a pediatric neuropsychologist is supported (Halstead & Walter, 2010; Massagli et al., 2004; McCrory et al., 2013).

Nurses treating a concussed, school age patient should be aware that each of the fifty states and Washington, D.C. have enacted legislation related to how concussions are managed in athletes under the age of 18 and/or participating in school or private sports leagues:

- An athlete cannot return to play while concussion symptoms are present and must be removed from play immediately following a concussion.
- Student athletes require approval from healthcare provider in order to return to play.
- Coaches, students, and parents must receive training in concussion symptoms, treatment, and management.

In addition to these three core issues, legislation is also in place in multiple states that include the following:

- Coaches must complete an annual concussion-training course.
- Information sheets should be distributed prior to each season and signed and returned by students and parents.
- Information sheets should be distributed to coaches prior to each season.
- Following a concussion, the child can only return to play after written permission is given by physician or other healthcare provider legally authorized to make return to play decisions.
- Requirement for healthcare providers to have advanced training in concussion management.
- Requirement for the consideration of classroom accommodations for students who have sustained a concussion.
- Requirement for private sports organizations and public recreation facilities to be held to the same concussion laws as schools.
- (Children's Safety Network, 2013; Kirschen et al., 2014; National Conference of State Legislatures, 2014)

The recommendation is that an individual who is recovering from a concussion undergo a neuropsychological (NP) evaluation by the treating physician. (Halstead & Walter, 2010; McCrory et al., 2013). NP evaluation assesses concussion symptoms, verbal and visual memory, processing speed, reaction time, and provides a detailed report of results for review and analysis by the healthcare provider. These results give an indication as to a patient's current neurologic status and, through serial testing, how the patient is progressing in their neurocognitive recovery (AAN, 2013; Halstead & Walter, 2010; Giza et al., 2013; McCrory et al., 2013; Talavage et al., 2013). NP testing is an important aspect of concussion treatment because the testing allows for increased sensitivity to symptom detection when used in conjunction with symptom reporting by a patient in consultation with a healthcare provider and can show neurologic deficits when patients are reporting no symptoms (Broglia, Macciocchi, & Ferrara, 2007a; Broglia, Macciocchi, & Ferrara, 2007b; Makdissi et al., 2010; Meehan, Taylor, & Proctor, 2011).

The nurse who initially treats a patient diagnosed with a concussion should be prepared to provide education related to the process of returning to physical activity. The standard management protocol is that a concussed individual should not return to recreational or organized play on the same day as receiving a concussion. Along with restriction from activity, younger children who are prone to falls should be watched closely to avoid additional risk for head injury. Those participating in school sports cannot legally return to play until medically cleared by a health-care professional authorized by the state to make return to play decisions (Children's Safety Network, 2013; Kirschen et al., 2014). The standard for guiding this process in athletics is the Graduated Return to Play protocol (see Attachment A), a process that should subsequently be adopted for all patients recovering from a concussion, regardless of whether caused by athletic injury. The Graduated Return to Play protocol recommends progression to the next stage of activity only when the individual is asymptomatic during the previous stage, allowing at least 24 hours between stages (Centers for Disease Control (CDC), 2016; Halstead & Walter, 2010; McCrory et al., 2013). The AAN (2013) and American Academy of Pediatrics (2010) further recommend a more conservative treatment for children and adolescents as compared to that of an adult.

When recovering from concussion, a period of cognitive rest should accompany the limitation in physical activity as described in the Graduated Return to Play protocol. Cognitive rest involves reduction and management of activities that stimulate cognitive activity, including reduced time using cellular phones and computers, reading, socializing, and watching television. While still symptomatic at rest, these

activities should be limited if not avoided and a progression in the return to cognitive activity managed based on how symptoms are exacerbated by those activities. Once the child can conduct cognitive activities for up to 45 minutes without symptoms, the recommendation is that they can return to school (Brown et al., 2014; Halstead et al., 2013; Harvey, 2012; Majerske, Mihalik, & Wagner, 2008; McCrory et al., 2013; Sroufe, Fuller, West, Singal, Warschausky, & Maio, 2010).

Upon return to school, the student should be monitored in a way that allows them to balance learning with an absence of symptoms. Accommodations may include a reduction in the length of the school day, reduction in workload, and more time to complete tests or assignments. Additionally, standardized testing should be delayed due to a potential for altered cognition during recovery from concussion (Davies, n.d.; Halstead et al., 2013; Halstead & Walter, 2010; Harvey, 2012; McCrory et al., 2013; McGrath, 2010). NP evaluation can provide valuable information for educators in terms of the return to learning process and academic accommodations needed (Halstead & Walter, 2010; Meehan, Taylor, & Proctor, 2011). The patient and parents should be educated as to the potential impact that a concussion may have on academic performance (Davies, n.d.).

POSITION and/or RECOMMENDATIONS

In an effort to address issues related to how nurses care, educate, and advocate for the child or adolescent with a concussion, the Society of Pediatric Nurses recommends:

1. Perform a detailed screening of health history of children and adolescents with head injuries for the purpose of identifying modifiable risk factors related to the severity and length of concussion recovery, including an accurate record of a patient's past concussion history, the number of injuries, dates, and the timing of the most recent concussion.
2. Educate the patient and family regarding the nature of the injury and the importance of following discharge instructions to ensure a low-risk recovery process, and the cognitive aspects of concussion recovery. It is imperative that the patient and family understand that the recovery process is one that needs to be actively managed and that the prognosis for recovery depends on their full participation in the process.
3. Recommend formal neurologic and cognitive assessments by a specialist for those patients that have sustained multiple concussions to determine their ability to return to play and risk for further injury.
4. Recommend the use of a neuropsychological assessment protocol as a supplement to a healthcare provider's assessment and injury management.
5. Support the Graduated Return to Play Protocol established by the Consensus Statement on Concussion in Sport (see Attachment A) and ensure the protocol is followed in an individualized, developmentally appropriate manner.
6. Promote cognitive rest as part of the care plan and recovery process.
7. Advocate for the multi-disciplinary management of a child returning to school after suffering from a concussion.
8. Promote the awareness and continued advancement of state laws that improve the management and monitoring of concussions in school age athletes, including the need for laws to extend to private sports organizations.
9. Promote the continued education of parents, coaches, and athletes regarding the full range of concussion symptoms and the risks associated with playing while recovering from a concussion.

ATTACHMENT(S)

Attachment A:

Table 1 Graduated return to play protocol

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Symptom limited physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity <70% maximum permitted heart rate No resistance training	Increase HR
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities	Add movement
4. Non-contact training drills	Progression to more complex training drills, eg, passing drills in football and ice hockey May start progressive resistance training	Exercise, coordination and cognitive load
5. Full-contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

(McCroory et al., 2013)

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