NASP
NATIONAL ASSOCIATION OF School Psychologists

School Psychology Forum:
RESEARCH IN PRACTICE

VOLUME 9 · ISSUE 3 · PAGES 184–198 · Fall 2015

Returning to School After a Concussion: Facilitating Problem Solving Through Effective Communication

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ABSTRACT: Concussions are a major public health concern in the United States, especially among children and adolescents. Although there is a growing body of literature regarding the underlying physiologic processes that occur after a concussion, there is no consensus regarding the risk factors for a concussion or the reasons for significant differences in recovery. There is a paucity of research on the educational outcomes of students who sustain concussions because much of the current literature is based on adults and/or athletes. Researchers and practitioners are beginning to focus on youth with concussions with the goal of reducing incidence through prevention and facilitating recovery through accurate assessment and effective treatment. School psychologists can play a key role in prevention, assessment, and intervention through the implementation of a school-based concussion protocol. Effective communication between stakeholders is an essential component to this protocol, and is critical to the support and management of students who have sustained a concussion. The purpose of this article is to provide a review of the current literature on concussions in youth and present a school-based protocol that includes a stepwise progression for assisting a student to "return to learn" (Baker et al., 2014), integrated within a problem-solving model. The importance of effective interdisciplinary communication is emphasized throughout, and suggestions to enhance communication across stakeholders are presented.

Concussion or mild traumatic brain injury (mTBI) represents approximately 70–90% of all traumatic brain injuries (Cassidy et al., 2004), which is a significant proportion as it is estimated that 1.7–3.8 million traumatic brain injuries (TBI) occur in the United States annually (Langlois, Rutland-Brown, & Wald, 2006). This annual estimate should be considered conservative as many concussions suffered by individuals are not treated and therefore go undocumented (Reddy, Collins, & Gioia, 2008). When compared to adults, children and adolescents appear to be more susceptible and slower to recover from a concussion possibly due to differences in brain tissue maturation (Foley, Gregory, & Solomon, 2014; Mayer et al., 2012). The high nationwide prevalence of concussion, coupled with evidence that youth are disproportionately affected, positions school professionals in the critical role of supporting students who have sustained a concussion.

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One way to support these students is through the implementation of a multitiered system of support. After discussing concussion-related terminology, symptoms, and risk factors, we present a tiered system that utilizes a "return-to-learn" (Baker et al., 2014) protocol consisting of prevention, assessment, intervention development, and progress monitoring. This framework not only focuses on the steps to take once a student has incurred a concussion, but also highlights preventative measures. An important aspect of this multitiered system of support is communication. For students who have experienced a concussion, communication of information across stakeholders (e.g., student, caregivers, educators, medical professionals) is critical. This article will discuss the importance of communication and ways to enhance partnerships across systems. The article concludes with a case study illustrating the recommended procedures to provide services to a student who sustained a concussion.

CONCUSSION DEFINITION AND LANGUAGE

One of the major barriers in applied practice and concussion research is the current lack of agreement on how to define a concussion, with some researchers arguing that concussion should be completely differentiated from other forms of mTBI (Bodin, Yeates, & Klamar, 2012). Despite the absence of diagnostic consensus, concussion is widely considered a significant public health concern about which we know very little (Graham, Rivara, Ford, & Spicer, 2014; Virji-Babul et al., 2013). For the purpose of this article, concussion will be referred to as a subset of mTBI defined by movement of the brain inside of the skull resulting in a disturbance of brain function (McCrory et al., 2013). In the concussion literature researchers often use the terms concussion and mTBI interchangeably. When we reference the literature, we will utilize the original authors' verbiage if a single term is used consistently. If the researchers use the terms interchangeably, then we will use the term concussion.

OVERVIEW OF POSTCONCUSSION SYMPTOMS

The disruption of brain function after sustaining a concussion is thought to result in a constellation of cognitive, somatic, physical, affective, and sleep symptomatology known as postconcussion symptoms (Centers for Disease Control, 2014; McCrory et al., 2013). Although symptom presentation, onset, and duration are variable, familiarity with typical symptoms and their progression can help guide school personnel in their assessment and monitoring of children who have suffered a concussion.

In many cases symptoms are often brief in duration with 80–90% of individuals experiencing concussion symptoms for only 7–10 days (McCrory et al., 2013). Although in most cases symptoms resolve quickly, there is evidence that in some populations, including children and adolescents, these symptoms are slower to resolve (Field, Collins, Lovell, & Maroon, 2003; Pellman, Lovell, Viano, & Casson, 2006). Acute physical symptoms may be present directly after the injury and can include loss of consciousness and posttraumatic amnesia. Somatic symptoms typically occur within 7 days of the concussion and include headache, fatigue, visual/auditory impairment, dizziness, and sleep disturbance (Eisenberg, Meehan, & Mannix, 2014). Cognitive symptoms are common in the first week after a concussion and may include impairments in concentration, processing, and working memory (Lundin, de Boussard, Edman, & Borg, 2006). Affective symptoms, including irritability, depression, and anxiety are also common and tend to appear, as well as persist, later into recovery (Eisenberg et al., 2014). When examining the presence of concussion symptoms over time, Eisenberg and colleagues (2014) found that 77% of youth reported symptoms 1 week post injury, 32% at 1 month, and 15% at 3 months. Symptoms lasting longer than 3 months are not typical, but do occur, and will be discussed in the upcoming section.

Overall, the impact of concussion-related impairment (e.g., symptom, onset, duration) on student functioning can be significant (Parsons, Bay, & Valovich-McLeod, 2013; Vaughan, Gioia, & Sady, 2013). Thus, a multidisciplinary approach is needed in order to best facilitate a student's complete recovery (e.g., physical, emotional, sleep) and a successful return to the learning environment. A basic understanding of symptoms and their progression will likely be an asset for school psychologists and other personnel as it may help inform assessment procedures following a concussion.

PERSISTENT POSTCONCUSSION SYNDROME

The term persistent postconcussion syndrome (PPCS) is often used to describe the prolonged recovery experienced by a subset of individuals who report three or more symptoms 3 months after the initial injury (Krause, Hsu, Schafer, & Afifi, 2014). Krause and colleagues examined the course of PPCS experienced by patients recruited from five southern Californian emergency departments who sustained an mTBI and compared them to a control group of patients with extracranial (non head) injuries. Results indicated that 32% of mTBI patients reported PPCS at 3 months (n = 1129) and 28% at 6 months (n = 995), while controls reported rates of 19% and 17% at the same time points. In addition to higher rates of reported PPCS, patients with an mTBI also indicated more severe symptomatology, as well as higher health service utilization and social disruption when compared to controls. For example, 8.9% of patients with an mTBI received medical outpatient care at 3 months compared to only 5.8% of the comparison group, though no tests of significance were reported. In a similar study utilizing a pediatric concussion sample (n = 670) from a tertiary referral emergency department in Alberta, Canada, Barlow and colleagues (2010) observed that 13% of children were symptomatic at 3 months postinjury (0.5% reported by controls) and 2% continued to be symptomatic at 1 year postinjury (0.01% reported by controls). Individuals suffering from PPCS are of significant concern to educators, as their symptoms may have an impact on academic functioning and ability to learn for months to possibly years after the initial injury.

CONCUSSION PATHOPHYSIOLOGY AND OBSERVABLE SYMPTOMATOLOGY

When the brain moves inside the skull during a concussion, it is thought to result in complex brain fluctuations often referred to as a neurometabolic cascade (Giza & Hovda, 2001). These acute changes in neurochemistry include rapid increases in calcium, potassium, glucose, glutamate, and a decrease in cerebral blood flow. In the post-acute phase, cerebral blood flow continues to be depressed with a concurrent decrease in brain glucose metabolism. Acute neurometabolic changes after a concussion have been positively correlated with the severity of self-reported symptoms, thus substantiating the clinical significance of this complex process (Henry, Tremblay, Boulanger, Ellemberg, & Lassonde, 2010). In addition to neurometabolic changes, there is growing evidence indicating the occurrence of microstructural brain injury, such as diffuse axonal injury among those who have sustained a concussion (Messé et al., 2012; Yuan, Wade, & Babcock, 2014). The maturing brain is particularly susceptible to this type of injury due to differences in brain development (Bouix et al., 2013; Mayer et al., 2012). Similar to findings regarding neurometabolic changes, the degree to which brain tissue is damaged positively correlates with symptom severity (Croall et al., 2014; Smits et al., 2011; Virji-Babul et al., 2013). In sum, both neurometabolic and structural changes may contribute to the observable symptoms after a concussion.

An additional indicator of concussion severity directly related to observable changes in the brain is the presence or absence of abnormal neuroimaging. A concussion with typical neuroimaging is considered an uncomplicated concussion while the presence of abnormal neuroimaging is considered a complicated concussion and is indicative of more severe and slower-to-resolve symptoms (Iverson et al., 2012; Smits et al., 2008). Relying on diagnostic imaging can be challenging as many individuals who suffer a concussion do not present for medical evaluation (Reddy et al., 2008). When imaging is performed, about 10% of concussions are considered complicated with only 1% in need of acute neurosurgical intervention (af Geijerstam & Britton, 2003; Kuppermann et al., 2009). While neuroimaging may be restricted from a clinical standpoint due to cost, availability, risk of radiation exposure, and physician selection (e.g., physician training, availability of imaging; Atabaki, 2013; Klig & Kaplan, 2010; Kuppermann et al., 2009), much has been learned about the physiology of concussion and its associated symptomatology from research utilizing advanced imaging techniques (Jantz & Bigler, 2014).

RISK FACTORS

There is evidence supporting several risk factors that may influence the incidence, severity, and duration of postconcussion symptoms. Although the risk factors highlighted below are not exhaustive or without controversy among experts (Zemek, Farion, Sampson, & McGahern, 2013), the application of these findings in the school can help aid in the informed, targeted, and efficient delivery of a tiered return-to-learn protocol.

Risks Factors for Incurring a Concussion

McKinlay and colleagues (2010) examined the preinjury risk factors associated with pediatric TBI. Utilizing a large birth cohort ($N = 1265$), they found that high maternal punitiveness, having four or more adverse life events (e.g., change in schools, divorce of parents, death in the family) and being male were most predictive of incurring TBI. Other risk factors for suffering a TBI/concussion include history of head injury (Guskiewicz et al., 2003) and premorbid attention deficit hyperactivity disorder (ADHD; Alosco, Fedor, & Gunstad, 2014; Mautner, Sussman, Axtman, Al-Farsi, & Al-Adawi, 2014).

Risk Factors for Severe Symptoms

Symptom severity can be measured as the number of symptoms experienced, as well as the intensity of these symptoms. Taylor and colleagues (2010) compared postconcussion symptoms of children between the ages of 8 and 15 years who sustained an mTBI ($n = 186$) and those who sustained an orthopedic injury ($n = 99$). They found that higher levels of postconcussion symptoms (i.e., number and severity) were associated with motor vehicle trauma, loss of consciousness, abnormal neuroimaging, and hospitalization after controlling for age, sex, socioeconomic status, and preinjury symptoms. Other studies have also found being a female (McCrory et al., 2013; Zuckerman et al., 2014) and/or having a history of head injury to be associated with greater levels of symptom severity (Graham et al., 2014).

EDUCATIONAL IMPACT OF CONCUSSION

In order to benefit from instruction in the classroom setting, students need to both attend school and have the cognitive ability to retain and apply knowledge. Although concussion symptoms would seem to directly affect both attendance and the ability to learn, there is a paucity of research empirically exploring the impact of a concussion on educational outcomes. This is of particular concern to educators as missing just a few days of instruction due to absence can be potentially detrimental to students' academic success. Additionally, when students do return to school their ability to learn may be compromised for a significant length of time (Jantz, Davies, & Bigler, 2014).

Ransom and colleagues (2013) examined the relationship between learning and concussion recovery among elementary ($n = 17$), middle ($n = 74$), and high school students ($n = 124$). They found that both high levels of symptoms reported and symptom severity were related to learning difficulties (e.g., difficulty studying for tests, paying attention, completing homework). They also found that students experienced increased symptoms when asked to engage in activities that required cognitive effort. Exacerbation of symptomatology due to cognitive exertion is of specific concern for educators, as it is expected that students exhibit a significant amount of cognitive exertion when engaged in a learning environment.

School absences following a concussion have been related to both acute symptoms, as well as symptoms 3 days postinjury. These symptoms include disturbance of balance, slowed processing, fatigue, confusion, drowsiness, sleep problems, irritability, and symptom severity (all $p < 0.05$; Parsons et al., 2013). Parsons and colleagues also found a negative relationship between absences after a concussion and self-reported health-related quality of life ($p < 0.05$). Although the evidence base is limited, these studies give us insight into the direct and indirect impact of concussion on educational outcomes. School psychologists possess specific skills (e.g., problem solving, consultation) that qualify them to work within a multidisciplinary, multitiered return-to-learn (Baker et al., 2014) system designed to meet the unique needs of students as they reintegrate back into school following a concussion. Research is emerging that illuminates the necessity of including school psychologists in this framework.

Returning to Learn

The first International Conference on Concussion in Sport met in Vienna, Austria, in November 2001 with the aim of providing recommendations to improve the safety and health of athletes who endure a concussion (Aubry et al., 2002). From this conference experts created the "return-to-play" protocol, a stepwise procedure outlining the rehabilitation process of student athletes who experience a concussion. These steps include rest, light aerobic exercise, sport-specific exercise, noncontact training drills, full-contact practice, and, finally, a return to play. Once completely asymptomatic, the athlete begins to increase the duration and intensity of physical activity, while symptoms are closely monitored. If they worsen, the athlete takes a step back in the process. Ideally, within 10–14 days, progress will be made to a point where the athlete can once again fully participate in sporting activities (Aubry et al., 2002; McCrory et al., 2013). This model has limitations as it focuses solely on the child as an *athlete* and fails to take into account the child as a *student* and the full ecology of concussion recovery in the learning environment. Other concussion management protocols operate at the state level and therefore may not incorporate unique school-level implementation factors (e.g., stability of staffing, resources, school size, urbanicity) that have been empirically shown to increase program fidelity (Payne & Eckert, 2010).

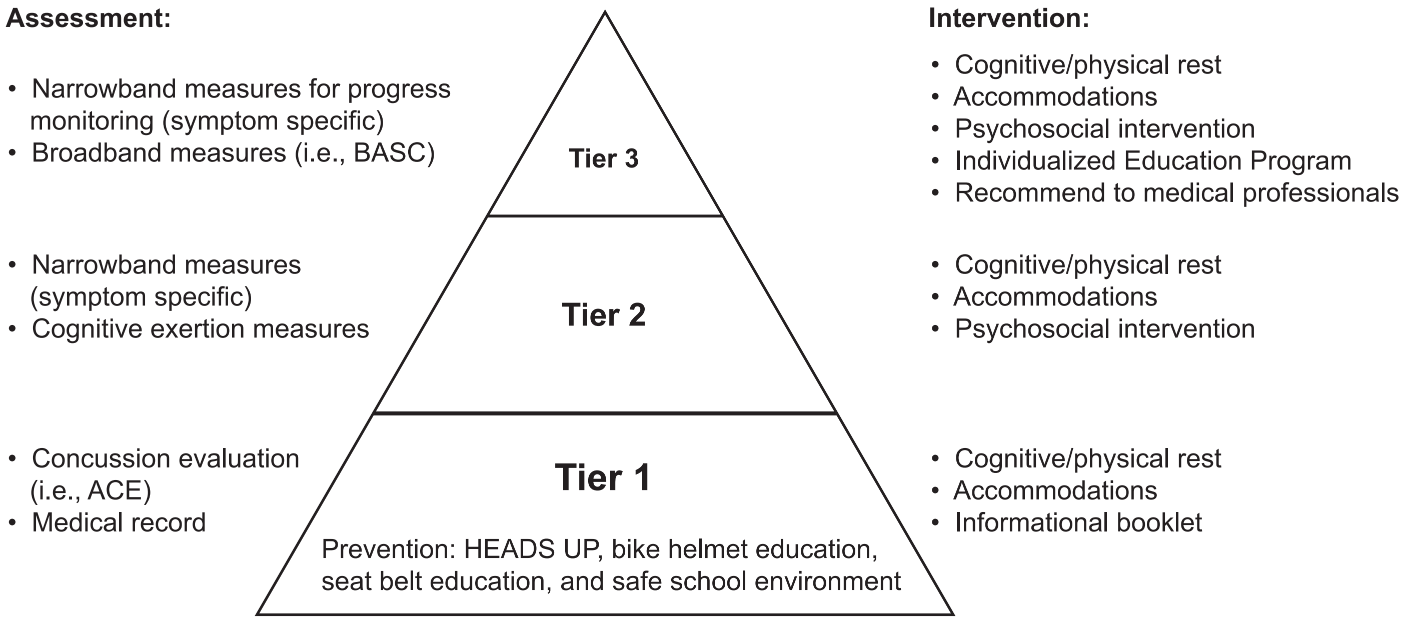
Using the return-to-play protocol as a blueprint, experts have begun to create guidelines for a return-to-learn (Baker et al., 2014) protocol in order to provide a systematic way of getting students back to regular classroom activities. Although there is no single agreed upon protocol, experts have proposed concussion management procedures that exhibit numerous commonalities (Arbogast et al., 2013; Brown, 2014; McAvoy, 2012; Sady, Vaughan, & Gioia, 2011). Broadly, a return-to-learn protocol should consist of assessment, intervention, progress monitoring, and intervention adjustment based on the student's needs (McAvoy, 2012). An important component that encompasses all of the steps within a return-to-learn protocol is communication. Given the impact concussion has on students' social, physical, behavioral, and emotional functioning, numerous stakeholders (e.g., school nurse, medical doctor, school psychologist, teacher) are likely to be involved. Therefore, it is critical that all colleagues share information throughout the process of returning to learn to best support the student and ensure the student is receiving services in all necessary domains. Using a multitiered system of supports framework, we have created recommended guidelines for how to best provide services to students who have sustained a concussion (see Figure 1).

Tier 1

Tier 1 includes both prevention and early intervention. Preventative measures include having a protocol in place outlining topics such as reporting and responding to a concussion, helmet and seatbelt education, as well as concussion education for all athletes, coaches, and parents of athletes. It also is important to have a safe school environment that includes precautions such as crosswalks and signs that indicate when floors are wet to prevent falls and head injuries.

Despite prevention education and precautionary measures, however, there will be students who sustain a concussion. As such, the school needs to be prepared to immediately implement concussion management procedures. School psychologists should initiate these early intervention procedures by

Figure 1. Multitiered System of Supports for Concussion Management



conducting a concussion evaluation. The Acute Concussion Evaluation (ACE; Gioia, Collins, & Isquith, 2008) is a structured clinical interview that is recommended for use after a student has sustained a concussion. The ACE can be administered by either the school psychologist or school nurse. The interviewer asks the student to recall characteristics of the injury (e.g., date, time, place) and identify symptoms experienced since the injury in addition to briefly asking about headache, developmental, and psychiatric history. This interview allows educators to gain a broad understanding of the injury and symptom characteristics.

After having conducted an initial assessment, the school psychologist should emphasize to caregivers the importance of sharing information between the educational system and medical system so that all professionals involved can work together to support the student. One way to immediately facilitate this collaboration across systems is for the school psychologist to request that caregivers provide written consent to release information upon commencement of the concussion management procedures. Additionally, the school psychologist should provide the student and family with an informational booklet outlining the symptoms, recovery time course, and coping strategies associated with a concussion. School psychologists can access fact sheets for parents and students from the Centers for Disease Control and Prevention website (see http://www.cdc.gov/headsup).

Ponsford and colleagues (2001) implemented a Tier 1 intervention with 130 children, ages 6–15 years, who had sustained an mTBI. The children were assigned to either an intervention group in which they received an informational booklet containing the information previously described or a control group in which they did not receive any information. Parents of children who received the informational booklet reported significantly fewer postconcussion symptoms and behavioral changes in their child 3 months after the injury compared to children in the control condition. Providing an informational booklet to students who have experienced a concussion is relatively easy, requires little resources, and is a feasible strategy to implement at a universal or Tier 1 level.

The first step of the traditional return-to-learn protocol is to provide the student with cognitive rest (Arbogast et al., 2013; Brown et al., 2014; Sady et al., 2011). Brown and colleagues (2014) defined complete cognitive rest as no reading, homework, text messaging, videogame playing, online activity, or similar activities, with minimal amounts of watching television/movies and listening to music. This definition was used in the first prospective study to determine the effect of cognitive activity on the duration of postconcussion symptoms (Brown et al., 2014). A sample of 335 patients aged 8–23 years who presented to the Boston Children's Hospital with a concussion were asked to complete questionnaires about symptoms and cognitive activities at each visit. The questionnaire on cognitive activity ranged from 0 (complete cognitive rest) to 4 (full cognitive activity) and examples of activities representing each number were provided alongside the anchors. For instance, examples of moderate cognitive activity consisted of reading fewer than 10 pages per day and fewer than 20 text messages per day. The average scores on the questionnaire were then multiplied by the number of days in between visits to quantify the amount of cognitive activity. Those patients who reported the greatest amount of cognitive activity took longer to recover compared to those patients who engaged in less cognitive activity, reinforcing the need for cognitive rest (Brown et al., 2014). The recommendation for cognitive rest is supported by the International Conference on Concussion in Sport (McCrory et al., 2012), the American Academy of Pediatrics (Halstead et al., 2013), and the American College of Sports Medicine (American College of Sports Medicine, 2011), among others. Although these organizations support rest, the optimal dose (i.e., length, intensity) is an empirical question still under investigation.

There is growing evidence supporting brief (e.g., 1–2 days) and individualized cognitive/physical rest (e.g., limited computer time) rather than strict (e.g., no computer time) and extended rest (e.g., 5 days; Thomas, Apps, Hoffmann, McCrea, & Hammeke, 2015). This new evidence places an emphasis on the importance of accurate acute and post-acute symptom assessment to inform rest recommendations, as a one-size-fits-all dosage does not seem most beneficial for recovery. Although more research is needed, we believe that symptom assessment should drive length and intensity of rest with decisions regarding integration back into daily activities based on the assessment data.

The next step of the return-to-learn protocol is for the student to return to school for a partial day (Baker et al., 2014). This step should occur when the student has recovered enough to be able to focus on schoolwork for 30 minutes (McAvoy, 2012) to 1–2 hours (Arbogast et al., 2013) as evidenced by the student's ability to engage in activities such as light reading or watching television. When the student is able to tolerate returning to school for a partial day, a progression from a full day at school with maximal supports, to moderate supports, minimal supports, and last no supports should be followed with each reduction in supports representing its own step (Arbogast et al., 2013). Throughout this process, it is essential that the school psychologist monitor the student's symptoms and communicate this information to any medical professionals involved to inform decisions about moving to the next step of the protocol. If the student experiences new or worsening symptoms, it is our belief that this may indicate that the student is being cognitively overexerted and the school psychologist should consider moving the student back to the previous phase (Sady et al., 2011).

For the majority of students who experience a concussion, strategies implemented at a Tier 1 level will provide them with the needed support to fully recover and perform successfully in the classroom (Baker et al., 2014). Although Tier 1 of the return-to-learn protocol focuses mainly on the physical symptoms associated with concussions, other types of symptoms may be delayed in their presentation. Eisenberg and colleagues (2014) found that emotional symptoms were not commonly reported immediately after the concussion but developed around a week postinjury and persisted the longest. As such, it is important to have additional Tier 2 assessment and intervention strategies in place for students whose symptoms are not fully resolved following implementation of the return-to-learn protocol.

Tier 2

At a Tier 2 level, a more in-depth problem-solving process should be initiated. Jantz and colleagues (2014) describe the IDEAL concussion problem-solving process that includes identifying the reason for referral, defining the expected outcome in measurable terms after gathering relevant test data, exploring intervention strategies that will address the outcome, acting on an intervention and monitoring results, and looking at data to determine effectiveness. These steps are analogous to problem identification, problem analysis, plan implementation, and plan evaluation, respectively.

At this point in the concussion management process, the school psychologist will likely have an understanding of the reason for referral in that new symptoms have arisen or the student has not fully recovered following Tier 1 strategies. The school psychologist should contact those medical professionals working with the student to gain additional information related to the student's recovery and may administer narrowband measures to assess specific symptoms (e.g., depression, anxiety) in order to better quantify the problem. When defining the expected outcome, it is important to take into consideration premorbid child factors that were identified in the initial assessment (i.e., ACE). The specific risk factors for concussion previously discussed can lead to hypotheses about behaviors of concern. For example, if the student were diagnosed with ADHD prior to the concussion, it would be important for the school psychologist to understand that the symptoms may worsen as a result of a concussion. These worsening symptoms are likely to be identified as the reason for referral (e.g., lack of focus, irritability). It also is important to consider prior functioning when defining expected outcomes in order to determine realistic goals. If the student with ADHD were on task 50% of the time before the concussion, whereas his or her peers were on task 80% of the time, the goal should reflect this discrepancy. The goals established after determining the expected outcome should lead directly to interventions, and students' progress should be monitored to ensure that the interventions are effective.

Tier 3

Despite the attempts made at a Tier 1 and Tier 2 level to help the student recover, there will be a small percentage of students who need prolonged and potentially permanent curricular modifications that require documentation through an Individualized Education Plan or Section 504 plan (Halstead et al., 2013). These students make up Tier 3. Eisenberg and colleagues (2014) found that 5.3% of patients reported headaches 3 months after injury, 3.4% reported poor concentration, and 1.4% reported depression. In order to meet the student's special needs at this tier, it is recommended that a multidisciplinary team meeting be convened that would include the student's caregivers and medical professionals to develop a formalized educational plan. This educational plan may include interventions focused on academic, behavioral, psychosocial, and physical progress and performance. In addition to symptom-specific interventions, cognitive rest has been shown to be beneficial later in recovery and may be reintroduced at Tier 3 (Moser, Glatts, & Schatz, 2012).

Importance of Communication in Prevention and Intervention of Concussion

The previous sections of this article presented key information on concussions in youth, focusing on the neurochemical and structural changes in the brain and how these changes are presented in the physical and emotional symptoms of the affected individual. These symptoms can make it difficult for a student who has experienced a concussion to reenter the educational setting and successfully navigate the academic and socioemotional challenges presented in school. The school psychologist can play a significant role in supporting the student through application of the tiered problem-solving process to address presenting problems and implement effective interventions. Although these recommended procedures provide a roadmap for the school psychologist, a critical component to supporting these individuals is communication between stakeholders. This next section will discuss the importance of communication in the prevention and intervention of concussion.

Systems-Level Communication

At the most basic level, a member of the school needs to be notified when a student suffers a concussion. If the concussion occurs at the school or during a school-related activity (e.g., sport event, field trip), the likelihood of school personnel being notified of the head injury is stronger than if the injury occurs off campus.

Communication of a Concussion to the School

It is well known in the literature that concussions are underreported (Reddy et al., 2008), and with regard to sports-related injuries, report of a head injury may not be disclosed due to concern that an athlete may not be able to continue participation in the sport (Lewandowski & Rieger, 2009). Thus, strategies must be developed to encourage communication of head injuries to school personnel. One recommended strategy is to identify a point person to receive this information. The school psychologist, based upon training in problem solving and tiered delivery of services, is an ideal professional in the school to serve as the point person for notification, as well as a liaison for communication and case management across stakeholders (Lewandowski & Rieger, 2009). Providing a contact name and number at the school for those individuals to report head injuries is important to facilitate communication. This point of contact could also be listed on the school website for easy access.

In addition to identifying the individual within the school system to contact, another necessary strategy is to educate key stakeholders on the importance of communicating information to the schools. These stakeholders include parents, educators, coaches, medical professionals, and students themselves. Therefore, a role of the school psychologist would be to educate these stakeholders about the importance of communicating, with whom to contact at the school, and what types of information to share. Additionally, the school psychologist can present the tiered problem-solving model and discuss the importance of ongoing communication at each level to ensure the most positive outcomes for students. This presentation of information to school personnel could be incorporated in professional development workshops offered to district educators at the beginning of each school year, followed by written materials that are given to all educators as a reference throughout the year. Workshops for parents, both at the school and in community recreational organizations, could be offered. When speaking with parents, the school psychologist also can recommend that parents provide consent, in the case of a concussion, for school and medical personnel to communicate for the purposes of assessment, intervention, and ongoing progress monitoring.

With regard to facilitating communication between medical professionals and school psychologists, recent research found that while both professionals support the importance of communication, in reality it occurs infrequently. Complementary studies looking at the frequency of communication between pediatricians and school personnel related to children with chronic health conditions found that the majority of these professionals are in contact with each other only a few times per year or less (Bradley-Klug et al., 2013). Results of a survey sent to selected members of the American Academy of Pediatrics found that respondents valued the need for communication and collaboration with school personnel, and, in some cases, indicated that this type of communication is essential to providing the best treatment for youth with chronic health conditions (Bradley-Klug, Sundman, Nadeau, Cunningham, & Ogg, 2010). However, they also reported a number of barriers to their attempts to collaborate with educators. Specifically, respondents indicated that it was difficult to find time during their already busy schedule to contact schools, and when they did they were often unsure of whom to contact. Others reported that school personnel were often inaccessible. An additional frequently cited barrier was the lack of reimbursement received for collaborating with schools (Bradley-Klug et al., 2010). Similarly, a study conducted with members of the National Association of School Psychologists to assess their experiences with communicating and collaborating with medical personnel found somewhat related results. In fact, school psychologists also reported inaccessibility of personnel and lack of time as the top two barriers. Less frequently endorsed obstacles included differing views on child development with medical professionals and obtaining parent permission to share a child's information with another professional (Bradley-Klug et al., 2013). In addition to receiving feedback on barriers, both groups were asked to indicate their perceived benefits of interdisciplinary communication and collaboration. The majority of respondents in both groups indicated improved patient/student outcomes, cross-disciplinary problem solving, the ability to assess progress across settings, and opportunities to share resources as benefits. Nonduplication of services also was ranked high by these professionals (Bradley-Klug et al., 2010, 2013). Thus, there is a desire to communicate across systems, despite the obstacles.

To encourage communication, school psychologists should reach out to medical professionals to make them aware of the active stance being taken in the local schools related to concussion prevention and intervention, and to request their support in these efforts. School psychologists could offer to provide presentations at medical grand rounds in local hospitals or arrange for a meeting with community-based medical professionals to establish methods to facilitate communication and collaboration across systems. When establishing specific methods of communication, guidelines and procedures could be adapted such as the best time of day to reach one another by phone, the most efficient and effective types of information to share, and methods to ensure nonduplication of services. Most importantly, such meetings would allow for professionals from across systems to clarify their roles and share mutual respect for one another in this partnership. This type of interagency relationship building, as described by Chesire, Canto, and Buckley (2011), should be one of the first initiatives addressed by schools to facilitate communication across systems.

Additional Communication Barriers

A controversy that is important for school psychologists to be aware of relates to the terminology used when communicating information about youth who have sustained a head injury. Specifically, this controversy centers on the use of two terms, concussion versus TBI. As discussed earlier, there seems to be no agreement on the use of these terms as they apply to the pediatric population. In fact, it is reported that the term concussion is sometimes used in the clinical setting instead of the term brain injury because it may result in less distress to caregivers (DeMatteo et al., 2010). However, use of the term concussion was found to be associated with earlier release from the hospital, earlier return to school, and the potential belief that the child did not sustain a brain injury, as compared to children who were labeled as having an mTBI (DeMatteo et al., 2010). Additionally concerning is that using the term concussion may result in less vigilance in monitoring the potential short- and long-term symptoms of the injury. It is important for the school psychologist to understand this controversy in terminology and to encourage all stakeholders to report any type of head injury, regardless of the medical diagnosis. As professionals across systems continue to work together, clarification of terms should become part of the communication process.

Understanding the clinical terminology used to describe a head injury directly links to the topic of health literacy, which can serve as another barrier to communication. The concept of health literacy is defined as individuals' understanding of their health condition and how that understanding allows them to make positive, everyday decisions related to health management (Kickbusch, 2008; Manganello, 2008). Applied to the topic of concussion, health literacy refers to students' understanding of their injury, their current and anticipated symptoms, how these symptoms may affect their performance in a variety of settings, and what they can do to advocate for their needs. Critical to this topic area is the need to educate youth about the importance of disclosing a head injury. If students are aware of the consequences of a concussion and the need for physical and cognitive rest, as well as the potential for being at risk for additional head injuries, they may be more likely to disclose the injury and advocate for their needs throughout recovery. It is incumbent upon those who work with these students to help them understand their injury and provide them with the information necessary to make informed decisions regarding the management of their condition.

CASE STUDY

In order to illustrate the implementation of a return-to-learn multitiered process, the following complex case study is presented. Luke, a 16-year-old young man in his junior year of high school, fell off a ladder while changing a lightbulb during the weekend. He appeared and acted normal to his parents, and as a result his parents did not take him to be examined by a medical professional. Despite having a headache, he attended school on Monday morning because he knew he had a test. The headache worsened as the day continued, especially after taking the test in the afternoon. Luke visited the school nurse and was asked if he had experienced any recent injuries or blows to the head. These questions prompted him to tell the nurse about the accident. The nurse administered the ACE (Gioia et al., 2008), and the results of this assessment indicated a possible concussion. The school psychologist contacted Luke's parents and gave them copies of the assessment report with a recommendation to consult with a medical professional. The school psychologist advised Luke and his parents to seek immediate medical attention if they noticed red flag symptoms (e.g., increasing confusion or irritability, neck pain, change in state of consciousness) and gave the family an informational brochure on concussion. Luke also was encouraged to rest, and as a result he stayed home from school for 2 days. During this time, the school psychologist communicated with Luke's teachers, consulting with them regarding Luke's concussion, and educating them about his physical and educational needs. His parents were informed of the school's return-to-learn protocol and provided written consent for the school psychologist to consult Luke's medical professional regarding his needs upon returning to school.

During the first week of implementing the return-to-learn protocol, Luke came to school for 2 hours in the morning on Thursday and Friday. The school psychologist met with Luke each day when he arrived and again before he left to monitor his symptoms. Luke told the school psychologist he was experiencing sensitivity to noise and bright lights. The school psychologist advised him to wear sunglasses at school and to avoid changing classes during high traffic times and participating in school routines (e.g., lunch in cafeteria) during times when the volume was especially high. During the second week of school, Luke told the school psychologist that his peers and soccer teammates were teasing him about attending school part time and wearing sunglasses while inside the school building. In particular, Luke's friends told him he "just fell off a ladder" and that they believed he was engaging in these behaviors for attention. Luke explained to the school psychologist that he was feeling more irritable and was easily losing his patience with others. However, he reported his headaches were less frequent. The school psychologist provided Luke with strategies to cope with his peers and consulted with his parents and the medical professional who agreed to encourage Luke to extend his hours at school to half day.

The school psychologist continued to monitor Luke's progress throughout his second week back to school and consulted with Luke's teachers to ensure he was not asked to make up missed work and was excused from completing his homework. Luke continued to report fewer headaches and physical symptoms, but complained of experiencing several emotional symptoms at both school and home, including irritability and fatigue. Luke's parents also reported observable changes in his mood at home.

During the third week, the problem-solving team met to discuss Luke's progress. His teachers provided feedback on his academic performance, which appeared consistently positive across his classes. Plans were developed to address Luke's emotional symptoms, as well as to educate school staff and his peers about the effects of concussion. The school psychologist administered a narrow band measure for depression with Luke, and results indicated he was at elevated risk of experiencing depressive symptoms. During an interview, Luke also indicated he was missing the preseason conditioning and upcoming tryouts for soccer, which contributed to his depressive mood. As a result, the school psychologist recommended incorporating aspects of cognitive-behavioral therapy into Luke's intervention plan.

The school psychologist continued to meet with Luke and monitor his progress during the fourth week. Simultaneously, Luke's soccer coach met with Luke to reassure him that he would not be cut from the team despite his missing conditioning practice and tryouts. Luke was encouraged to attend and observe all games and assist the coach in developing set plays and game strategies. Progress monitoring during the fifth week, including a consult with the medical professional, indicated Luke's physical symptoms had dissipated, and by the sixth week he was no longer reporting symptoms of depression. Luke, his parents, and his soccer coach agreed to maintain regular contact with the school psychologist and report any recurring or new symptoms.

CONCLUSION

Although the research on educational outcomes of students who have sustained a concussion is in its infancy, it is clear that any type of head injury may result in symptoms that have an impact on a student's performance. Implementation of a multitiered system of support, incorporating steps of the return-to-learn (Baker et al., 2014) protocol, is recommended for student success. A potential limitation to this type of protocol relates to the interdisciplinary collaboration necessary to support the student. Thus, communication of critical information between key stakeholders, including the student, caregivers, educators, and medical professionals, is critical. School psychologists can serve as the facilitator of the school-based protocol and as the liaison between stakeholders, as illustrated in the case study of Luke. As additional research on the consequences of concussions in youth becomes available in the empirical literature, the role of the school psychologist in working with these students will continue to evolve.

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