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School-Based Consultation to Improve Concussion Recognition and Response

Abstract

Many students who have sustained concussions return to school requiring academic adjustments while the brain heals. However, school personnel often are not trained on ways to accommodate these students. This exploratory project explored the usefulness of school-based training paired with ongoing consultation and continued dissemination of information in order to improve both concussion recognition and response among school personnel. A case study design was employed in which a school district received training that was followed by ongoing consultation and continued dissemination of concussion resources. This study highlights the importance of involving school psychologists in concussion management programs.

Concussions are mild traumatic brain injuries that disrupt brain functioning and may produce subtle effects for days, weeks, or even months. Concussions are more likely to be sustained by young children and adolescents than by adults (Buzzini & Guskiewicz, 2006; CDC, 2010; Langlois, Rutland-Brown, & Wald, 2006). Because concussions typically result in subtle rather than overt signs, students' concussions often go undetected or unreported (Buck, 2011; Lewandowski & Rieger, 2009), and the students often return to school while they are still symptomatic. Thus, it is important that school personnel be trained to recognize signs and symptoms of concussions, to understand risk factors, and to apply an appropriate response protocol.

Definition, Causes, and Prevalence

A concussion is caused by a direct blow or jolt to the head, face, or neck—or by a blow to the body—that causes the head and brain to shift rapidly back and forth; it results in a short-term impairment of neurological function (CDC, 2011). There are numerous causes of concussions among students, such as falling down or getting struck by an object (Kozlowski, Leddy, Tomita, Bergen, & Willer, 2007). Many concussions are sports-related; however, students also sustain concussions from recreational play, motor vehicle collisions, fights, and abuse (Kozlowski et al., 2007).

Many people who sustain concussions do not receive medical treatment; thus, it is difficult to calculate an accurate prevalence estimate. The Centers for Disease Control and Prevention (CDC, 2010) estimate that 1.7 million patients with TBI are hospitalized or seen in emergency departments annually. Approximately 80% of these TBIs result in same-day discharge, indirectly indicating a mild TBI (mTBI). However, many individuals with mild TBIs do not present to the medical system; thus, a more accurate estimate may be anywhere between

1.6 and 3.8 million concussions annually in the United States (Langlois, Rutland-Brown, & Wald, 2006). Approximately 100,000 – 140,000 children and adolescents sustain a concussion every year (Meehan & Mannix, 2010). Lewandowski and Rieger (2009) estimate that a high school of 1,000 students is likely to have anywhere from 5-10 students per year with a concussion.

Signs, Symptoms, and Consequences of Student Concussions

Concussions have been coined a “silent epidemic” because the symptoms can be subtle and covert (Boll, 1983; Langlois, Rutland-Brown, & Thomas, 2006). The CDC (2011) specifies four categories of concussion symptoms: physical, cognitive, emotional, and sleep-related.

Physical signs and symptoms include headache, nausea, vomiting, balance problems, visual problems, fatigue, sensitivity to light and/or noise, and a dazed or stunned appearance. Cognitive signs and symptoms include: feeling mentally “foggy;” feeling slowed down; having difficulty concentrating; having difficulty remembering things; forgetting recently learned information; experiencing confusion about recent events; responding slowly; and repeating questions.

Emotional signs and symptoms include irritability, sadness, increased emotionality, and anxiety.

Sleep-related signs and symptoms include drowsiness and changes in sleep patterns, including difficulty falling asleep, increased sleep, and/or decreased sleep.

The type and duration of concussion symptoms can vary greatly from person to person, thus students who sustain concussions may require post-concussion accommodations and monitoring of ongoing progress at school. This is particularly important because the demands of completing schoolwork may exacerbate the symptoms and have an adverse effect on students’ academic performance (Lewandowski & Rieger, 2009). Most concussion symptoms dissipate

within one or two weeks (McCrory et al., 2013); therefore, the majority of students who sustain concussions do not require special education services.

However, some children may exhibit post-concussive symptoms that bring on neurobehavioral changes persisting for weeks or months after a concussion (Mittenberg, Wittner, & Miller, 1997). Whether shorter or longer in duration, post-concussive symptoms are likely to affect a student's academic work, classroom participation, behavior, relationships, and/or extracurricular activities (McGrath, 2010). Such cases might warrant a 504 plan, which allows students accommodations if they have a physical and/or mental impairment that substantially limits one or more major life activities, such as learning (U. S. Department of Health and Human Services, 2006). Appropriate identification of and response to students who have sustained a concussion can help minimize the risk for post-concussive symptoms and is clearly essential for health, well-being, and academic success.

School Re-entry

Teachers see students up to several hours during the day and therefore may be the first to notice a change in a student's cognition, behavior, and/or emotions after a blow to the head. Although a student can return to school while he or she is still symptomatic, to do so safely, a teacher or other staff member may need to implement adjustments. Depending on the severity of any concussion symptom, it may be necessary, for example, for concussed students to re-enter school for a shortened day, allowing them to get the physical and the cognitive rest they need (Halstead, Walter, & The Council of Sports Medicine and Fitness, 2010). If they do not receive that rest, physical or cognitive exertion may exacerbate symptoms and prolong recovery. Furthermore, post-concussive students may need behavioral, mental health, and/or academic support to help them be successful in school. These supports may be part of a 504 plan or they

may be a more informal plan of temporary adjustments (sometimes referred to as a medical plan) that are monitored during the student's recovery period and kept as part of the student's cumulative record. These supports may be facilitated by a school team that includes the parent, school psychologist, teacher, school nurse, and administrator (and coach or athletic trainer, if applicable) to assist such students upon their return to school; this team is essential for consistency and effective communication.

School Personnel Training and Professional Development

School personnel often lack knowledge and training in recognizing and responding to concussions and other forms of traumatic brain injuries (Davies, 2013; Farmer & Johnson-Gerard, 1997; Hooper, 2006; Walk, 2011). Teacher education programs lack training in this area as well (Davies, Fox, Ettel, & Thomas, 2013). Clearly there is a need for increased awareness of and professional development in recognizing and responding to concussions. A school-based training is one way to help school personnel learn about concussions as part of their professional development (Somers & Sikorova, 2002).

Effective professional development requires school personnel to practice their new skills in their environment (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007), to utilize strategies that are evidence-based and linked to instructional content (Jones & Chronis-Tuscano, 2008), and to receive consultation on the targeted skills (Fuchs & Fuchs, 1992). According to Glang et al. (2010), professional development for traumatic brain injury should include evidence-based interventions, supervision of newly attained skills in the training site and classroom, and then continued follow-up in the form of mentoring, feedback, and consultation in teachers' classrooms.

Follow-up and consultation. Once a professional development session has ended, follow-up and consultation reinforce the knowledge and skills that were taught. One recent study indicated that knowledge of and skills relating to traumatic brain injury were retained from a professional development training at the two-month follow-up, but that knowledge and skills dissipated at the one-year follow-up (Davies & Ray, in press). This could be due to the lack of ongoing practice of skills, mentoring, feedback, and/or consultation that Glang et al. (2010) asserted is necessary.

There is currently a lack of research on school-based concussion trainings that include such continued consultation and follow-up with participants. This current investigation involved a school-based concussion training that was followed by ongoing dissemination of information and consultation. The goal of these activities is to utilize effective consultation to improve school-based services for students who sustain concussions.

Method

Participants

Case study district. The case study district was located in a suburban area and had 2,500 students, none of whom were on 504 plans for mild TBIs prior to the study. Prior to the training, neither the district nor buildings within the district systematically collected information on student concussions or school-based concussion management. The three school psychologists reported consulting on zero concussion cases. If there were concussion cases, they would implement the typical “sick day” policy (e.g., one make-up day per day missed) but would not make adjustments, provide accommodations, and would only write a report if the incident occurred on school grounds. In the case study district, 19 faculty and staff members attended the

one-hour concussion training and completed the concussion questionnaires. Attendees included teachers, school counselors, administrators, secretaries, coaches, and athletic directors.

Comparison district. The training also occurred in a comparison district of 650 students; fewer participants came to the training (n=12) and completed the follow-up survey (n=6); they did not receive any follow-up or consultation. Attendees included teachers, a secretary, and a nurse assistant.

Regional districts. School psychologists (n=150) serving other districts in the case study district's region were surveyed about their level of participation in concussion consultation during the previous two years. Overall, respondents (n=50) consulted on less than one concussion case (mean=0.32, median=0) in 2011-12 and less than one concussion case (mean=0.58, median=0) in 2012-13. The purpose of this survey was to determine whether the number of reported concussion cases in the case study district were typical for the region.

Materials

Instrument. The questionnaire used in this study was a modified version of two unpublished questionnaires obtained from respected colleagues in the field: *Concussions in the Classroom Questionnaire* (Cuff, 2012) and *Sports Concussion Parent Measures* (Glang, 2012). The questionnaire was modified for this study by altering the wording to make it teacher-oriented (i.e., "teacher" instead of "parent," "your student" instead of "your child"). Questions related to concussion signs and symptoms, concussion assessment, accommodations for students with a concussion, and scenarios involving concussions. For example, one scenario involved a student who hit his head on a pole during recess. When he returned to school, he was moody and had a headache so he put his head down on the desk instead of reading. The respondents were required to check all of the "next steps" that should be done from a list of suggestions. These scenarios

tioned to the consultation that was later provided, as they included warning signs, accommodations to apply, and overall appropriate courses of action in different situations.

Information regarding the reliability and validity of the instrument was not known. A pilot test of the instrument, administered to a convenience sample of 12 educators at the researchers' university to help determine the approximate length of time needed to take the questionnaire and to ensure the questionnaire was clearly worded. The results of the pilot test indicated the survey needed to be shortened and the wording on a few questions required clarification. It was revised accordingly prior to being used for this exploratory project

The same questionnaire was administered immediately before and after the training, and at a four-month follow-up; however, the follow-up questionnaire administered four months later included an open-ended question asking participants to describe/explain their experience with any student or students who had sustained a concussion during that school year and how they had accommodated the student or students.

Training. The 60-minute school-based training involved a presentation on concussions covering prevalence, causes, signs and symptoms, assessment, academic challenges, school re-entry, and accommodations. This presentation was conducted in August at the beginning of the school year. At the end of the presentation, participants watched a five-minute video on concussions and discussed examples and scenarios of concussions.

Consultation materials. The consultation materials used in this study included *Heads Up to Schools: Know Your ABCs - A Fact Sheet for Teachers, Counselors, and School Professionals* (CDC, 2013), which defined a concussion, the signs/symptoms of a concussion, the danger signs of a concussion, how to recognize and respond to a student with a concussion and what to look for after the injury. Another resource was the *Teacher Packet* from *Brain 101:*

The Concussion Playbook (Oregon Center of Applied Science, 2011), which gave an example of a student's return to academics, accommodation suggestions, and an accommodation plan for healthcare providers. A list of accommodations and services that were most commonly suggested in this project's concussion consultation sessions are summarized in Table 1.

[Insert Table 1]

Follow-up emails. Continued dissemination of concussion information was provided to personnel who attended the concussion training in the case study district via email every two weeks during the first half of the school year. School personnel received eight follow-up emails regarding signs/symptoms of concussions, a smart phone app for concussion recognition and response (Gioia & Mihalik, 2013), a state house bill on return-to-play guidelines for student athletes (Concussion awareness, training and procedures in youth sports organization, Ohio HR 143, 129th Cong., (2013), reminders of contact persons within the school to help with concussion management, and specific recommendations of accommodations for students who sustained a concussion.

Procedure

The University of Dayton's Institutional Review Board (IRB) approved this project as appropriate for use with human subjects. The summer prior to the school year, the school psychology intern was trained in concussion recognition and response by a faculty member with expertise in school-based concussion recognition and response. The faculty member has published an number of articles on traumatic brain injuries, conducted national presentations on concussion, and published a book on working with traumatic brain injuries in schools. The intern and faculty member then collaboratively created the training materials and presentation. At the beginning of the school year, 19 faculty members in the case study district participated in the

intern's one-hour school-based concussion training and received ongoing consultation and further dissemination of information on concussions over the next four months via bimonthly emails and/or face-to-face contact. The comparison district received only the training and no follow-up materials or consultation.

Further, if a staff member in the case study district observed a student who may have sustained a concussion, he or she was asked to notify the school psychology intern to receive consultation regarding the student. The school psychology intern also established a relationship with the athletic director and athletic trainer in order to begin developing a seamless transition from the sidelines to the classroom. Because the district athletic trainer was considered a health care provider, she was subject to the HIPAA's protection of privacy standards. Thus, the athletic trainer sought and received parental consent to notify the school and the school psychologist when a student sustained a sports-related concussion. This, in turn, allowed the school psychology intern to consult with the teachers so they could put the accommodations in place prior to the student's return to the classroom.

Consultation approach. Once a referral was made and written consent was secured from the parents, the school psychology intern contacted all of the student's teachers and parents to discuss concussion signs/symptoms and accommodations the student might require while symptomatic. Both formal and informal consultation techniques were employed. When the school psychology intern used formal consultation, she followed the problem-solving process, which included problem identification, problem analysis, intervention/plan, and intervention evaluation (Kratowill & Bergan, 1990) and utilized the consultation material resources. Informal consultation involved checking in with teachers whose students had sustained concussions to collaboratively develop strategies, assist with progress monitoring, and provide

additional resources. Information regarding each consultation session was documented, and when appropriate, a specific accommodations plan was recorded and monitored by the intern and relevant team members, such as the school nurse, who had ongoing involvement with most of the cases. In December, training participants reported data regarding the number of concussions cases for which they provided accommodations. The school psychology intern reported the number of concussion consultation requests she received and to which she responded. She also provided end-of-year concussion consultation data.

Results

Outcomes of a school-based concussion training that was followed by ongoing dissemination of information and consultation were evaluated by the number of concussion cases, type of services provided, and stakeholder feedback.

Number of Concussion Cases

Similarly to the regional districts that were surveyed, the school psychologist in the comparison district reported involvement with 0 concussion cases during the school year. Conversely, between August and the four-month follow-up in December, the school psychology intern in the case study district consulted on 14 concussion cases: 1 in August, 5 in September, 4 in October, 2 in November, and 2 in December. Participants (school personnel who attended the training) initiated three of these cases; individuals who had not attended the training initiated the rest of the cases. Between January and May 1st (eight months post-training), the school psychology intern consulted on an additional 14 cases: 2 in January, 1 in February, and 11 in April; thus the total number of concussion cases that received consultation in the case study district were 28 cases. According to reports from the teacher or parents, thirteen of the

concussion cases were a result of a sports injury and five were from accidents or fights; the causes for the remaining cases were not specified.

At the four-month follow-up, the participants who attended the training reported that they had directly served a total of 15 students who sustained a concussion between August and December (because most of these were high school students, reports may have been on the same student, served by multiple teachers—a limitation of the way data was collected in this exploratory project).

Services Provided

Once the school psychology intern was notified about a student who had sustained a concussion, she consulted with the student's teachers and parents regarding the needs of students with concussions and appropriate accommodations based on the student's specific symptoms. Teachers received a list of concussion signs and symptoms, as well as a list of danger signs to be cognizant of while the student was symptomatic. The number and type of accommodations varied based upon the severity of the concussion, the student's grade level, and his or her unique constellation of signs and symptoms. As the medical professional in the district, the nurse typically monitored physical symptoms and provided pain medication, if needed. As the student's symptoms decreased, the accommodations were reduced. This was done through progress monitoring data that was shared collaboratively among teachers and the consulting school psychology intern.

Stakeholder Feedback

On the final follow-up questionnaire, open-ended feedback was sought from teachers, parents, coaches, and nurses who received consultation, regardless of whether they participated in the initial training. A sample of this feedback follows:

“Since my first email [date] I’ve had more students with concussions so the information from your session is proving to be very valuable... Thanks!” Teacher (Participant)

“Thank you. It does make me feel better that you are there and everyone will be well informed!” Parent (Non-Participant)

“That is so nice – thanks so much for contacting the teachers and also, the parents. If I was a parent, I would be so appreciative... must be a scary time for them and for the student.” School Nurse (Non-Participant)

“Thanks for the great talk on concussions given tonight. We are better prepared now. I will look for the card in our medicine kit and also inform our parents how the process works before a student athlete is allowed back to practice and compete after suffering a concussion. Again, thanks for the time preparing and presenting this important athlete welfare information regarding concussions.” Coach (Participant)

Of the participants who received the follow-up emails, 80% indicated on the follow-up questionnaire that “They were beneficial,” 20% indicated that “They were somewhat beneficial,” and 0% indicated that “They were not beneficial.”

Discussion

The purpose of this exploratory project was to evaluate the usefulness of a school-based training on concussions and to determine if a school-based training paired with ongoing

consultation and continued dissemination of information on concussions would increase the number of concussion consultations and improve school-based services for students who sustained concussions.

People who attended the training provided accommodations for fifteen students who sustained a concussion within the four months following the training. They provided those students with rest breaks during class, time in the nurse's office to lie down, and a quiet room for work. They also addressed sensory issues by allowing students to wear sunglasses, placing them away from the window, and dimming the lights in the room. Workload was reduced by postponing homework, quizzes, and tests, and/or by exempting students from assignments.

In addition, the school psychology intern consulted on a total of 28 concussion cases by April (14 of which occurred by December). Prior to this widespread concussion consultation, students who sustained a concussion did not receive specific accommodations in the classroom. During the school year studied, they received individualized accommodations in the classroom, and personnel in the district had more resources at-hand.

Results of the regional survey indicated that school psychologists in the area in which this project took place have little involvement in concussion consultation. School psychologists in the region service districts representing a variety of sizes and demographics, but there was no identifiable reason why rates of student concussions might differ between the case study district and all other districts in the region. To have 28 concussion cases in the case study district of 2500 students is on the high end of Lewandowski and Rieger's (2009) rate of 5-10 concussions per 1000 students. While firm conclusions cannot be drawn at this point, it is possible that students in most school districts who sustain concussions are primarily managed by parents and, perhaps, teachers, with little—if any—involvement from the school psychologist or other main

office staff. If the school staff members are not notified, a record of the injury is not made. Such records are important if the student experiences academic problems post-injury or sustains a second injury later.

This exploratory project suggests that school personnel can create concussion awareness through having a leader who is perceived as a valuable resource and consultant for responding to concussions in the district. In this case the leader was the school psychology intern, who demonstrated expertise to school personnel by providing information on concussions and consultation services, developing a team to respond when a student sustained a concussion, and supporting staff members while they served students with concussions.

Future Directions

In this exploratory study, participants were obtained through convenience sampling rather than through systematic randomization. Further, because the school did not mandate the training, fewer participants attended the initial training than were expected. Therefore, creative incentives might help obtain more participation in trainings. It will also be helpful to systematically collect data on which accommodations were used and for how long, as well as objective information about how well the consultant applied the recommended strategies.

Following the consultation steps described in the procedures section of this project can help facilitate the portability of the model presented in this project. It is important that practitioners understand they do not need to develop an entirely new skill set in order to engage in effective concussion consultation. Instead, they are able to apply existing skills, such as following the problem-solving process, to a new population of students.

This study illustrated the effects of effective consultation. In this study, the researcher's goal was not to measure individual student outcomes, but to engage in collaborative problem-

solving consultation by providing resources and support to faculty and staff working with students with concussions. The researchers originally expected to consult on one to two concussion cases. To have 14 concussion consultations within four months—and 28 cases by May 1—was nothing short of stunning to the research team. This indicates there may be a significant unmet need for students who have sustained concussions—and for those who teach them. It seems that consultation provided by a school faculty member, such as a school psychologist, is an excellent way to meet this need. School psychologists can provide training and ongoing information to staff members on how to recognize and respond to concussions. They can offer assistance by facilitating meetings at which adjustments to the school environment and curriculum are discussed, and they can build a bridge between the school, the families, the sports teams, and medical facilities, such as sports concussion clinics.

Future research might replicate this design with a single subject design across participants. This could allow for data collection on specific accommodations provided to students and their outcomes. It may also be beneficial to examine how school athletic departments communicate information regarding sports-related concussions to school administrators, school nurses, and school psychologists. Additionally, researchers might further examine the efficacy of concussion management teams, school-based concussion management protocols, return-to-academics programs, and return-to-play guidelines to determine their effectiveness in supporting students who have sustained concussions. Finally, it would be helpful to collect data on actual in-class performance and behaviors, such as time on task, percent of work completed, and so forth, to document improvements.

References

- Boll, T. J. (1983). Minor head injury in children: Out of sight but not out of mind. *Journal of Clinical Child Psychology, 12*, 74-80. doi: 10.1080/15374418309533114
- Buck, P. W. (2011). Mild traumatic brain injury: A silent epidemic in our practices. *Health and Social Work, 36*(4), 299-302.
- Buzzini, S. R., & Guskiewicz, K. M. (2006). Sport-related concussion in the young athlete. *Current Opinion in Pediatrics, 18*, 376-382. doi: 10.1097/01.mop.0000236385.26284.ec
- Centers for Disease Control and Prevention. (2010). Traumatic brain injury: United States emergency department visits, hospitalizations, and deaths 2002-2006. Retrieved from http://www.cdc.gov/traumaticbraininjury/pdf/blue_book.pdf
- Centers for Disease Control and Prevention. (2013). Concussion and mild TBI. Retrieved from <http://www.cdc.gov/concussion/index.html>
- Cuff, S. (2012). *Concussions in the classroom questionnaire*. Unpublished questionnaire. Nationwide Children's Hospital.
- Davies, S. C. (2013). School psychology programs: Graduate preparation in traumatic brain injury. *Trainers' Forum: Journal of the Trainers of School Psychologists, 31*(2), 5-16.
- Davies, S. C., Fox, E., Glang, A., Ettel, D., & Thomas, C. (2013). Traumatic brain injury and teacher training: A gap in educator preparation. *Physical Disabilities: Education and Related Services, 32*(1), 55-65.
- Davies, S. C., & Ray, A. M. (2014). Traumatic brain injury: The efficacy of a half-day training for school psychologists. *Contemporary School Psychology, 18*(1), 81-89. doi: 10.1007/s40688-013-0003-5

- Farmer, J. E., & Johnson-Gerard, M. (1997). Misconceptions about traumatic brain injury among educators and rehabilitation staff: A comparative study. *Rehabilitation Psychology, 42*, 273-286. doi: 10.1037/0090-5550.42.4.273
- Fuchs, D., & Fuchs, L. S. (1992). Limitations to a feel good approach to consultation. *Journal of Educational and Psychological Consultation, 3*, 93-97. doi: 10.1207/s1532768xjepc0302_1
- Gioia, G. A., & Mihalik, J. (2012). Concussion Recognition and Response: Coach & Parent Version by PAR, Inc. (Version 1.2.2) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Glang, A. (2012) *Sports concussion parent measures*. Unpublished questionnaire. Center on Brain Injury Research and Training.
- Glang, A., Todis, B., Sublette, P., Brown, B. E., & Vaccaro, M. (2010). Professional development in TBI for educators: The importance of context. *Journal of Head Trauma Rehabilitation, 25*, 426-432. doi: 10.1097/HTR.0b013e3181fb8f45
- Halmstead, M.E., Walker, K.D., & The Council of Sports Medicine and Fitness. (2010). Sport-related concussion in children and adolescents. *Pediatrics, 126*(3), 567-615.
- HR 143, 129th Cong, Ohio. (2013). Retrieved from http://www.legislature.state.oh.us/bills.cfm?ID=129_HB_143
- Hooper, S. R. (2006). Traumatic brain injury: Preface. *Exceptionality, 14*, 121-123. doi: 10.1207/s15327035ex1403_1
- Jones H. A., & Chronis-Tuscano, A. (2008). Efficacy of teacher in-service training for attention deficit/hyperactivity disorder. *Psychology in the Schools, 45*, 918-929. doi: 10.1002/pits.20342

- Kozlowski, K. F., Leddy, J. J., Tomita, M., Bergen, A., & Willer, B. S. (2007). Use of the ICECI and ICD-10 E-coding structures to evaluate causes of head injury and concussion from sport and recreation participation in a school population. *NeuroRehabilitation, 22*, 191-198.
- Kratochwill, T. R., & Bergan, J. R. (1990). *Behavioral consultation in applied settings: An individual guide*. New York: Plenum.
- Langlois, J. A., Rutland-Brown, W., & Thomas, K. E. (2006). *Traumatic brain injury in the United States: Emergency department visits, hospitalizations, and deaths*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.
- Langlois, J. A., Rutland-Brown, W., & Wald, M. M. (2006). The epidemiology and impact of traumatic brain injury: A brief overview. *Journal of Head Trauma Rehabilitation, 21*, 375-378.
- Lewandowski, L. J., & Rieger, B. (2009). The role of a school psychologist in concussion. *Journal of Applied School Psychology, 25*, 95-110. doi: 10.1080/15377900802484547
- McCrory, P., Meeuwisse, W. H., Aubry, M., Cantu, R. C., Dvořák, J., Echemendia, R. J., & ... McCrea, M. (2013). Consensus statement on concussion in sport: The 4th international conference on concussion in sport, Zurich, November 2012. *Journal of Athletic Training, 48*(4), 554-575. doi: 10.4085/1062-6050-48.4.05
- McGrath, N. (2010). Supporting the student-athlete's return to the classroom after a sport related concussion. *Journal of Athletic Training, 45*, 492-498. doi: 10.4085/1062-6050-45.5.492

- Meehan, W. P., & Mannix, R. (2010). Pediatric concussions in United States emergency departments in the years 2002 to 2006. *Journal of Pediatrics*, *157*, 889-893. doi: 10.1016/j.jpeds.2010.06.040
- Mittenberg, W., Wittner, M. S., & Miller, L. J. (1997). Postconcussion syndrome occurs in children. *Neuropsychology*, *11*, 447-452. doi: 10.1037/0894-4105.11.3.447
- Oregon Center for Applied Science, ORCAS. (2013). Retrieved from <http://brain101.orcasinc.com/5000/>.
- Somers, J., & Sikorova, E. (2002). The effectiveness of one in-service education of teachers course for influencing teachers' practice. *Journal of In-Service Education*, *28*, 95-114. doi: 10.1080/13674580200200173
- U. S. Department of Health and Human Services. (2006). Fact sheet: Your rights under section 504 of the rehabilitation act. Retrieved from <http://www.hhs.gov/ocr/civilrights/resources/factsheets/504.pdf>
- Walk, A. (2011). Traumatic brain injury: Teacher knowledge and skills. (Master's thesis). University of Dayton; Dayton, Ohio. Available from OhioLINK ETD. (http://etd.ohiolink.edu/view.cgi?acc_num=dayton1312572728)
- Yoon, K. S., Duncan, T., Lee, S., Scarloss, B., & Shapley, K. L. (2007). Reviewing the evidence on how teacher professional development affects student achievement. *Regional Educational Laboratory Southwest*, *62*.

Table 1

Concussion Accommodations and Services

___shortened or modified school day (modified day might include starting late, leaving early, only attending core classes, or auditing classes without receiving grades)

___no physical education or physical play at recess

___avoid loud environments (cafeteria, band, pep rallies). Allow student to study, work, and take tests in a quiet environment

___avoid bright environments (allow student to wear sunglasses or hat with brim, draw the blinds)

___avoid crowded environments (e.g., allow student to change classes before or after crowds have passed)

___allow rest periods during the day (e.g., in school nurse's office); allow student to discreetly leave class as needed

___remove, limit, or postpone tests and high-stakes projects

___eliminate, reduce, or postpone class assignments and homework; grade based on adjusted work. **as much as possible avoid having assignments "build up," as this can be stressful to student*

___allow alternate ways of performing work (e.g., oral instead of written; allow use of notes or word banks)

___provide class notes; allow use of tape recorder or smart phone

___be mindful that cognitive exertion can exacerbate symptoms; do not substitute mental for physical activity

___as symptoms improve, allow student to attend but not fully engage in extra-curricular activities (e.g., sports practice)

___identify an adult in the school the student can talk with about symptoms and emotions