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Research-Based Practice

Return to Learning: Going Back to School Following a Concussion

By Karen McAvoy

The Centers for Disease Control and Prevention (CDC) estimate that approximately 1.6 to 3.8 million sports and recreational concussions occur each year (Langlois, Rutland-Brown, & Wald, 2006). Countless more children sustain concussions from nonsports activities such as motor vehicle accidents, falls, and assaults. While not all children who sustain concussions are athletes, all children who sustain concussions are *students*.

Almost everyone understands the rationale for physical rest following a concussion. The cases of second impact syndrome, the phenomenon in which a student can suffer permanent brain damage or death from a second blow to the head during recovery from an initial blow (Cantu, 1998), highlight the importance of not returning to play (RTP) before the concussion is 100% healed. In just the past few years, experts in the field of concussion have come to the realization that cognitive demands, much like physical demands, can worsen symptoms and can delay recovery (Majerske et al., 2008). While the end result of continuing to push through cognitive exertion has yet to cause catastrophic brain damage or death, it would be wrong to believe that there are no risks at all. To date, there are no agreed upon formulas for return to learning (RTL). This is due largely to the fact that the return to school following concussion is an extremely individualized process. In concussion management, both RTP and RTL are common and important terms, but they are not parallel processes. The school psychologist and/or the school nurse are uniquely poised to facilitate the transition of a student with a concussion from the medical setting back to the educational setting.

Learn to Read the Symptoms : Symptoms Determine the Return to Learning

A concussion, no matter how mild it may seem at the time, is a brain injury. We know from animal studies that a concussion disrupts the brain on a cellular level. It challenges the balance between chemicals within the cell (potassium) and chemicals outside the cell (calcium). As a result, the brain cell, whose job is to efficiently supply the brain with fuel (glucose), is compromised. The more demand placed on the brain for fuel, the more potential for the student to flare a symptom (Giza & Hovda, 2001).

Immediately after a concussion, the simplest physical or mental demand can bring about severe symptoms. Pumps in the cells try desperately to reestablish the fragile balance between chemicals. Within a few days, the brain cells begin to heal themselves; therefore, light cognitive activity may still flare symptoms, yet symptoms usually become more tolerable, short-lived, and respond well to intermittent periods of rest.

The reregulation of the pumps in the brain cells occurs naturally and usually without medications, typically over a 1 to 3 week period of time (Collins, Lovell, Iverson, Ide, & Maroon, 2006). Prescription medications are not commonly used at this time, and even over the counter pain medications have been found to be minimally effective in addressing the concussion headache. Physical and cognitive rest are the best interventions for healing the brain cells. In the first few days, sleeping as much as possible has the highest yield.

Using symptoms as our lab work becomes our best ongoing measure of recovery. The rule of thumb is that if a student is physically or mentally exerting to the point of flaring a symptom, then physical/mental activity should be cut back. As the cells improve daily, so do symptoms. The reregulation of the pumps is ever-shifting and ever-improving. This is what makes a one size fits all RTL formula a challenge.

Since a concussion is a medical event, and its recovery spans the home and school setting for 3 or more weeks, the management of the concussion is best accomplished by a seamless system of communication and collaboration among parents, the school, and the healthcare providers (McAvoy, 2009). This multidisciplinary team approach to concussion management lends itself to consensus decision-making. It is best practice that the concussed student always returns to school with a signed release of information in place allowing for two-way communication between the school and the healthcare provider.

Returning to School

When a student returns to school following any injury, the school team's responsibility is to (a) assess the needs, (b) design an intervention plan, (c) monitor the effectiveness of the plan, and (d) adjust and readjust until the student no longer has special needs resulting from the condition. Returning a student to school following a concussion is no different.

It is common for emergency departments to suggest the student not return to school until they have either been seen or been cleared by the healthcare provider. This recommendation often leads to a student being out of school for up to 1 or more week(s) while awaiting an appointment with a doctor, which may not be reasonable or necessary. It is also common for a medical professional to suggest the student not return to school until they are symptom-free. While it is true that an athlete must be 100% symptom-free before RTP, they do not need to be 100% symptom-free to RTL. The student may return to school when symptoms are tolerable and manageable, *as long as the school makes appropriate adjustments for the student* (the key point is that the school must understand concussions and necessary accommodations in order for the student who is still exhibiting symptoms to return to learn).

The school psychologist and/or the school nurse are the most skilled professionals at the school to help advise the parent and doctor when it is best to return the student to school. However, as the ultimate decision often/usually falls upon the parent, parents can utilize symptoms to determine when to safely return their student to school.

- If symptoms prevent the student from concentrating on mental activity for even up to 10 minutes at a time, rest is required. The student should be kept home from school on total bed rest with no (or very limited) television, video games, texting, reading, homework, or driving. Parents should consult a healthcare professional if this state lasts longer than a few days.
- If symptoms allow the student to concentrate on mental activity for up to 20 minutes at a time, parents should still consider keeping their student home from school, but total bed rest may not be necessary. Between periods of resting and napping, the student may engage in light mental activity, such as light reading or television, as long as these activities do not provoke symptoms.

When the student is beginning to tolerate 30 minutes of light mental activity, parents can consider returning him or her to school. Best practice suggests that (a) parents communicate with the school (school nurse, teacher, and/or school mental health professional) and sign a release of information for the school personnel to coordinate with the healthcare provider, and (b) parents and the school decide together the level of academic adjustment needed at school depending upon the type and severity of the symptoms present and the times of day when the student feels better or worse.

Academic Adjustments

The school psychologist and/or the school nurse are in an ideal position to help facilitate the RTL of a student with a concussion. As allied health professionals, school psychologists and school nurses understand the complex overlap between medical and psychological conditions. They also know how to guide administrators, teachers, counselors, and other staff through the maze of academic, emotional, and behavioral demands following any medical condition. The diagnosis of a concussion is a medical decision. Clearance from a concussion is also a medical decision. However, how to adjust academic demands during the recovery from a concussion is a task uniquely suited to professionals at the school—the school psychologist, social worker, school nurse, counselor, and/or teacher.

The balance between the student's medical and academic needs should be closely coordinated between the school personnel and the healthcare provider. As each concussed student will have a different combination of symptoms, a different level of severity, and a different rate of recovery, each student should have an individualized academic adjustment plan. The term academic *adjustment* is used intentionally in this article to reflect classroom changes that are more flexible and transient than *accommodations* (as in reference to Section 504) or *modifications* (as in reference to IDEA).

Practitioners in concussion management have found it challenging to create a one-size-fits-all graduated RTL formula for academics. The complexities of the learning environment do not lend themselves to a linear stepwise RTL model. Instead, as symptoms of a concussion are cyclical and ever changing, the Symptom Wheel (see Figure 1) reflects the fluidity needed to choose interventions that are logical, reasonable, and flexible.

Most Commonly Affected Mental and Functional Areas

Mental Fatigue. During recovery, the concussed brain is starved for energy whenever it exerts. As a result, it tires more easily with almost all physical or mental demands. This underlying issue is the primary explanation for most of the physical, cognitive, emotional, and sleep/energy symptoms. Understanding the need to reduce the physical and/or mental exertion is the key to reducing mental fatigue. Suggested interventions include:

- Shortened day, if needed. This typically means a later start or an early dismissal, depending upon the student's peak time of the day. This is the crux of the return to school part-time or full-time question. If the student's symptoms are so severe that he/she can only tolerate a partial day, then that must be the temporary, initial plan. However, as the student improves on a daily basis, the need for part-time school must be assessed frequently and the student should increase time at school as tolerated. When given the choice to increase academic adjustments or to decrease time at school, the recommendation would be to increase academic adjustments. This keeps the student at school and on the appropriate developmental, social, and academic track during the recovery from the concussion.
- Frequent 15- to 20-minute rest periods throughout the day as needed.
- Even better than random rest periods, the student is advised to take strategic rest periods (i.e., scheduled breaks at regular intervals).
- Cutting back the amount of in-class schoolwork and at-home homework. Cutting back is determined by the teacher and is based upon the material being taught and the style of teaching:
 - Cutting back in a class with sequential instruction may mean reducing the number of problems (e.g., from 20 to 10).
 - Cutting back in a lecture-based class may mean allowing the student to audit the lecture. Audit refers to the ability to listen to the lecture without producing the written work.
- Sunglasses for light sensitivity and/or earphones for sound sensitivity. In some cases, removal from loud, congested areas, such as the lunchroom, passing in the hallways, etc.
- Emotional melt downs and behavioral outbursts are a common result of mental fatigue, especially in younger children. Allow the student to leave the room for a rest break or a time away, or a check in with the nurse or mental health professional.

Slowed processing speed. Slowed processing speed is a common symptom of brain injury/concussion. Slowed processing speed will still allow a student to learn and complete work but at a much slower pace, and often with much more mental energy expended. Suggested interventions include:

- Cutting back on the amount of work given in class and for homework. With slowed processing speed, it will take the concussed student much longer to complete work, and too much will undoubtedly cause mental overexertion. The teacher should decide what concepts are most important to teach and the student to learn during the recovery. Strive for quality of work, not quantity at this time.
- Extra time on projects and tests. Note that it is unfair to give a concussed student a test during recovery. Even if the concepts have been learned, giving the test at this time will likely be an unfair assessment of mastery.
- Use of a tape recorder, Smart Pen, note buddy, or copies of teacher's notes.
- Use of organizational helpers and/or technology to make output easier and more efficient.
- Adjust due dates.

Difficulty with new learning. Educators need to be sensitive to the fact that while the goal of school every day is to impart new learning, the compromised brain is inefficient in its ability to create new learning. The material presented to a student during recovery from concussion has a difficult time being converted, not only into memory, but also into conceptual learning. Difficulty with new learning leads to these suggested interventions:

- Be thoughtful about the material most important to impart during a concussion. Because the learning process is compromised, the teacher will need to choose the most salient elements in the lesson plan.
- Remove or exempt from tests or large projects. It would not be fair to test/ assess a student on a high stakes test or project during the recovery from a concussion.
- Focus on understanding the material rather than rote memorization of the facts.
- Remove, do not just postpone, in-class work and homework. It is not possible for the student to make up all the work missed while recovering from a concussion. Simply carrying work over for a later date creates significant anxiety and impedes recovery.

Moving Target

Once the student returns to school with the appropriate interventions in place, the questions will be: Are the interventions working? How long do the academic adjustments need to be in place?

The process of assess – intervene – monitor progress – adjust repeats until the student is recovered from the concussion. On average, 80% to 90% of students recover from their concussion in 1 to 3 weeks (Collins et al., 2006). Therefore, it is well worth front loading academic adjustments to avoid complications and prolonged recovery on the back end. The student will experience the ability to cognitively exert more and more each day, while flaring less and less symptoms.

Due to the quick turnaround of a concussion, the academic adjustments must be flexible and fluid. It is difficult (if not impossible) for healthcare providers to consult on academic interventions on a daily basis; they are simply not available enough, nor do they understand school systems well enough to make daily academic recommendations. Therefore, it is the prerogative of the school team to assess, to add and to remove academic adjustments as needed for the concussed student. Support and input from the healthcare provider is always appreciated; however, a medical prescription is not necessary for academic changes. The school psychologist and/or school nurse, in communication with the healthcare professional, can be instrumental in supporting changes to the academic plan and using observational and/or formal cognitive measures to justify adjustments. The art of making academic adjustments falls within the purview of good teaching. Many master teachers intuitively know how to make these adjustments and

also know when to let them lapse. School psychologists are pivotal in providing training, consultation, and support to teachers to effect smooth and appropriate academic adjustments.

School teams should consider academic adjustments for concussion similarly to how they might if being asked by a doctor to watch and adjust for a student during a medication change. For example, when a student undergoes a medication change for epilepsy, diabetes, or bipolar disorder, various physical, cognitive, and/or behavioral changes can affect schoolwork for weeks. A collaborative school team consisting of, but not limited to, a school nurse, a school mental health professional, a teacher, and a counselor should be able to determine how best to make daily classroom adjustments throughout the medication change process. A formal plan is often not needed for these temporary medical adjustments. A school psychologist can help to guide teachers through rounds of assessment, intervention, and progress monitoring until medical clearance for a concussion occurs.

Concussions Outside the Box

A small percentage of concussions will fall outside the 1- to 3-week recovery window. The usual presentation would be a student who continues to have symptoms for 4 or more weeks.

In those cases, academic adjustments will need to remain in place longer and/or may need to be strengthened. More and more schools are incorporating protracted concussion recovery into the response-to-intervention protocol. When academic adjustments are at their maximum and/or when attendance and achievement goals are compromised, the school may want to consider formalizing the adjustments into a Section 504 Plan (making academic *adjustments* into academic *accommodations*). The school psychologist and/or school nurse can help to facilitate an appropriate plan for these struggling students.

If problems persist over a significant amount of time or require specialized instruction, special placement, and/or modification of curriculum, the school team will be obligated to consider a referral for special education. The initial diagnosis of concussion, or the fact that the student received the injury playing a sport, should in no way compromise a referral for special education. A concussion is a brain injury and schools should proceed with a referral as if the brain injury were sustained in any other manner (motor vehicle accident, fall, assault).

It is rare that a student with a concussion will need a Section 504 Plan or IEP. What is infinitely more common is the occasion of a student having one concussion, followed by a second and even third concussion. Each individual concussion may resolve with no apparent problem; however, small effects may add up to a disability further down the road. In those cases, the student may come to the attention of the problem-solving team due to lingering cognitive, emotional, or behavioral concerns. In the past, the history of multiple head injuries may not have been on our radar. But in today's climate, more attention is being focused on the possibility, even plausibility, that multiple concussions may be the underlying cause of the current problem. One benefit of having the school psychologist involved in the management of concussions is that it puts every student and every concussion on the radar of a school professional who can track progress forward.

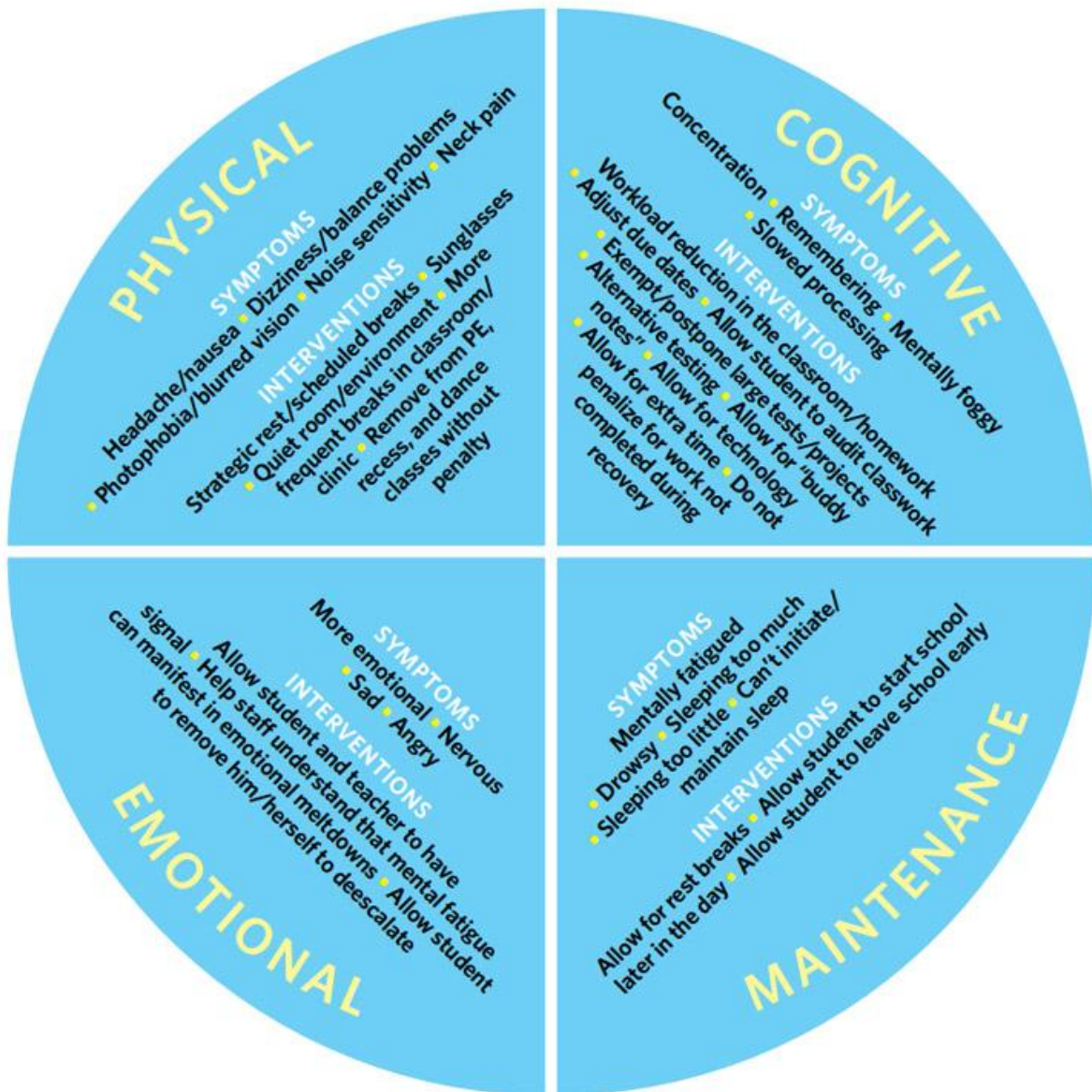
The state of Colorado has developed a website called Traumatic Brain Injury Networking Team Resource Network (<http://www.cokidswithbraininjury.com/>). This website provides guidance to school psychologists and related service providers through assessments and interventions for students with a traumatic brain injury.

Return to Learning Before Return to Play

Educators are the newest team members to come to the table on concussion. The experts in concussion management know now that they cannot thoroughly treat the *athlete* unless they also treat the *student*. Current best practices of RTP require that the student be symptom-free before starting back to physical activity (McCrorry et al., 2009). If the student is still receiving academic adjustments of any kind due to the presence of any symptoms, they cannot be considered symptom-free. Therefore, a successful RTL is necessary before approval for RTP. In this light, the school psychologist and school nurse are now not only the interventionists; they can play a pivotal role in collecting data to be used in the decision to return an athlete to play.

In summary, a concussion is a brain injury that affects cognitive, emotional, behavioral, physical, and sleep/energy patterns. Having educators understand the underlying neurological issues related to a concussion allows them to use their expertise in helping to create flexible, temporary, and fluid academic adjustments over a period of (typically) 3 weeks. The school psychologist and school nurse are uniquely trained to understand the complex neurological issues related to a concussion. Their role is to help educate and facilitate subtle and profound academic adjustments over the course of recovery from concussion. The result of early intervention and comprehensive management of the concussion by the school team can make all the difference in subsequent cognitive and physical recovery.

Figure 1. Symptom Wheel



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References

- Cantu, R. C. (1998). Second impact syndrome. *Clinical Sports Medicine*, 17(1), 37–44.
- Collins, M. W., Lovell, M. R., Iverson, G. L., Ide, T., & Maroon, J. (2006). Examining concussion rates and return to play in high school football players wearing newer helmet technology: A three-year prospective cohort study. *Neurosurgery*, 58(2), 275–286.
- Giza, C. C., & Hovda, D. A. (2001). The neurometabolic cascade of concussion. *Journal of Athletic Training*, 36(3), 228–235.
- 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 and Rehabilitation*, 21(5), 375–378.
- Majerske, C. W., Mikalik, J. P., Ren, D., Collins, M. W., Cmiolo Reddy, C., Lovell, M. R., & Wagner, A. K. (2008). Concussion in sports: Postconcussive activity levels, symptoms, and neurocognitive performance. *Journal of Athletic Training*, 43(3), 265–274.
- McAvoy, K. (2009). *REAP the benefits of good concussion management*. Centennial, CO: Rocky Mountain Sports Medicine Institute Center for Concussion. Retrieved from http://issuu.com/healthone/docs/reap_april_2011?mode=embed&layout=http%3A%2F%2Fskin.issuu.com%2Fv%2Flight%2Flayout.xml&showFlipBtn=true
- McCroly, P., Meeuwisse, W., Johnston, K., Dvorak, J., Aubry, M., Molloy, M., & Cantu, R. (2009). Consensus statement on concussion in sport: The 3rd international conference on concussion held in Zurich, November 2008. *Journal of Athletic Training*, 44(4), 434–448.
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