

How every family, school and medical professional can create a  
Community-Based Concussion Management Program

# REAP<sup>SM</sup> The Benefits of Good Concussion Management

**Center for  
Concussion**

**The REAP<sup>SM</sup>  
Project**

**Reduce  
Educate  
Accommodate  
Pace**

Authored by Karen McAvoy, PsyD



## About the Brain Injury Association of New York State

A statewide, non profit membership organization, the Brain Injury Association of New York State, (BIANYS) provides help and hope for individuals with brain injury and their families. The Association is the premier support and advocacy organization in New York State for those thrust into the often confusing and overwhelming world of brain injury, offering information, answering questions, sharing experiences, providing comfort and caring, as well as promoting prevention. Through its comprehensive Family Advocacy, Counseling, and Training Services Program (FACTS), online LEARNet resource, as well as training, public education, advocacy, chapters and support groups, BIANYS assures no one is forced to face the trauma of brain injury alone. BIANYS is the chartered state affiliate of the Brain Injury Association of America.

### Brain Injury Association of New York State

10 Colvin Avenue  
Albany, New York 12206  
518 459 7911 / 800 444 6443  
[www.bianys.org](http://www.bianys.org)

Authored by: Karen McAvoy, PsyD

Karen McAvoy, Psy. D, and HCA HealthONE LLC want to acknowledge and thank the Colorado Traumatic Brain Injury Trust Fund for providing the original funding for the development of the REAP Project.

COPYRIGHT © 2012 KAREN MCAVOY, PSYD  
Last revised June 2012



At Presbyterian/St. Luke's Medical Center  
The Medical Center of Aurora  
North Suburban Medical Center  
Rose Medical Center  
Sky Ridge Medical Center  
Swedish Medical Center



Support is provided in part by the New York State Department of Health (NYSDOH) by project H21MC06742 from the Department of Health and Human Services (DHHS), Health Resources and Services Administration, Maternal and Child Health Bureau.

Original funding from:

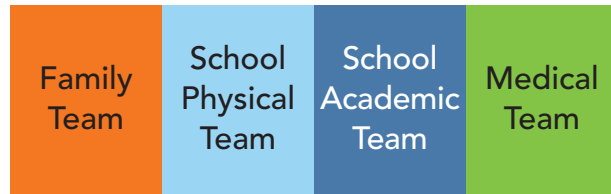


# The REAP<sup>SM</sup> Project

which stands for **Reduce • Educate • Accommodate • Pace** is a **community-based model for Concussion Management** that was developed in Colorado. The early origins of REAP stem from the dedication of one typical high school and its surrounding community. After the devastating loss of a student to “Second Impact Syndrome,” the Administrators, Teachers, Certified Athletic Trainer, School Nurse, School Psychologist and Counselors all banded together to **create a wider safety net for all students** in that school. The net became stronger when parents and community medical professionals also worked together to coordinate care and recovery from concussion.

The lessons learned from this tragic event are that a “Multi-Disciplinary Team” approach is the foundation of good Concussion Management.

## The Multi-Disciplinary Teams:



These teams work closely to watch and care for the student/athlete during his or her entire recovery from concussion.

The writing of REAP was funded by an Education Grant from the Colorado Traumatic Brain Injury Trust Fund in 2009. From 2009 to 2010, REAP was piloted at eight HealthONE Emergency Departments and four school districts. In one year (2009-2010), the REAP project received more than 150 referrals of students/athletes evaluated in Emergency Departments (ED) for concussion. After leaving the EDs, families, schools and community medical professionals were quickly contacted by the REAP Project and education and community collaboration commenced immediately. **Countless more REAP referrals spontaneously developed in communities via “word of mouth” between parents, physicians, schools and districts.** The short-term and the long-term benefits from REAP have been overwhelmingly positive.

**REAP is continuing to expand across Colorado** as a model program for Community-Based Concussion Management. It is a model that empowers schools, school districts, families, students and medical professionals to come together — to coordinate, collaborate and to help young people achieve the safest recovery from concussion.

Download a digital version of this publication at [www.bianys.org](http://www.bianys.org).



## Table of Contents

Intro and message to parents .....	1
How to use this manual .....	2
Reduce .....	3
Educate .....	4
R.E.A.P. timeframe .....	7
Accommodate.....	8
Pace .....	9
Special Considerations.....	11
Resources .....	12
Appendix.....	13
Teacher Template	
Symptom Checklist	

**Medical note** from Dr. Jeff Avner, MD, Professor of Clinical Pediatrics Chief, Pediatric Emergency Medicine Children's Hospital at Montefiore Albert Einstein College of Medicine



"Children are not just small adults; their brains are still developing, making them more vulnerable to impact from head trauma. Furthermore, the absence of concussive symptoms does not mean the brain is fully recovered. In children, the extent and duration of the concussion on cognitive function is variable and even subtle impairment may have dramatic effects on a child's school and social performance. We must be acutely aware of the significance of early recognition of sports-related concussion and the importance of individualized assessment as well as the need for sufficient rest and recovery time before returning to play."

**TRUE or FALSE?**

A concussion is just a "bump on the head."

**False!** Actually, a concussion is a traumatic brain injury (TBI). The symptoms following a concussion can range from mild to severe and usually involve: confusion, disorientation, memory loss, slowed reaction times and extreme emotional reactions. The severity of the symptoms cannot be predicted at the time of the injury.

**TRUE or FALSE?**

A parent should awaken a child who falls asleep after a head injury.

**False!** Current medical advice is that it is not dangerous to allow a child to sleep after a head injury, once they have been medically evaluated. The best treatment for a concussion is sleep and rest.

**TRUE or FALSE?**

A concussion is usually diagnosed by neuroimaging tests (ie. CT scan or MRI).

**False!** Concussions cannot be detected by neuroimaging tests; a concussion is a "functional" not structural injury. Concussions are typically diagnosed by careful examination of the signs/symptoms of concussion at the time of injury. The cause of symptoms during a concussion are thought to be due to an ENERGY CRISIS in the brain cells. At the time of a concussion, the brain cells (neurons) stop working normally. The "fuel" (sugar) that is needed to generate activity – for playing and for thinking- is simply not being delivered efficiently to the cells. As a result, a symptom will "flare." It is the brain's way of telling the body that it is not working properly. While a CT scan or an MRI is often used to rule out more serious bleeding in the brain, it is not a diagnostic test for concussion. A negative scan does not mean that a concussion did not occur.







## Did You Know...

>> **More than 80% of concussions resolve very successfully if managed well within the first three weeks post-injury.**<sup>1</sup> REAP sees the first three weeks post- injury as a “window of opportunity.” Research shows that the average recovery time for a child/adolescent is about three weeks, slightly longer than the average recovery time for an adult.<sup>2</sup>

- >> The REAP project works on the premise that **concussion is best managed by a Multi-Disciplinary Team** that includes: the Student/Athlete, the Family, various members of the School Team and the Medical Team. The unique perspective from each of these various teams is essential!
- >> **The first day of the concussion is considered Day 1.** The first day of recovery also starts on Day 1. The REAP Project can help the Family, School and Medical Teams mobilize immediately to maximize recovery during the entire three week “window of opportunity.”

**False!** According to the American Academy of Neurology (AAN), a concussion is any “traumatically induced alteration in mental status that may or may not involve a loss of consciousness.” CDC reports that an estimated 1.6 to 3.8 million sports- and recreation-related concussions occur in the United States each year.<sup>3</sup> Ninety percent of concussions do not involve a loss of consciousness. While many students receive a concussion from sports-related activities, numerous other concussions occur from non-sports related activities — from falls, from motor vehicle, bicycle and playground accidents.

## Message to Parents

To maximize your child’s recovery from concussion, double up on the R’s. **REDUCE** and **REST!** Insist that your child rest, especially for the first few days post concussion and throughout the three week recovery period. Some symptoms of concussion can be so severe on the first day or two that your child may need to stay home from school. When your child is at school, request that he/she be allowed to sit out of sports, recess and physical education classes immediately after the concussion. Work with your Multi Disciplinary Concussion Management Team to determine when your child is ready to return to physical activity, recess and/or PE classes (see PACE).

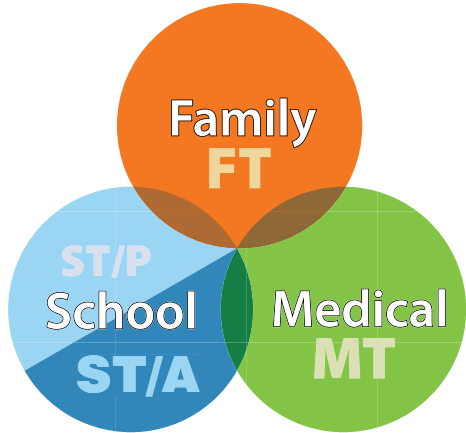
Don’t let your child convince you he/she will rest later (after the prom, after finals, etc.). Rest must happen immediately! The school team will help your child reduce their academic load (see AC COMMODATE). However, it is your job to help to reduce sensory load at home. Advise your child/teen to:

- avoid loud group functions (games, dances)
- limit video games and text messaging
- limit reading and homework

A concussion will almost universally slow reaction time; therefore, driving should not be allowed pending medical clearance.

Plenty of sleep and quiet, restful activities after the concussion maximizes your child’s chances for a great recovery!

# Community-Based Multi-Disciplinary Concussion Management Team



## How to use this Manual

Because it is important for each member of the Multi-Disciplinary Concussion Management Team to know and understand their part and the part of other members, this manual was written for the entire team. However, as information is especially pertinent to a certain group, it is noted by a color.

>> Pay close attention to the sections in **ORANGE**

<b>FT</b>	<b>Family Team</b>	Student, Parents; may include Friends, Grandparents, Primary Caretakers and others...	For more specific information, download parent fact sheets from the various <b>"Heads Up"</b> Toolkits on the CDC website: <a href="http://www.cdc.gov/concussion/">www.cdc.gov/concussion/</a>
-----------	--------------------	---	---

>> Pay close attention to the sections in **LIGHT BLUE**

<b>ST/P</b>	<b>School Physical Team</b>	Coaches, Certified Athletic Trainers (ATC), Physical Education Teachers, Playground Supervisors, School Nurses and others...	For more specific information, download the free <b>"Heads Up: Concussion in High School Sports or Concussion in Youth Sports"</b> from the CDC website: <a href="http://www.cdc.gov/concussion/">www.cdc.gov/concussion/</a>
-------------	-----------------------------	--	---

>> Pay close attention to the sections in **DARKER BLUE**

<b>ST/A</b>	<b>School Academic Team</b>	Teachers, Counselors, School Psychologists, School Social Workers, Administrators, School Neuropsychologists and others...	For more specific information, download the free <b>"Heads Up to Schools: Know Your Concussion ABCs"</b> from the CDC website: <a href="http://www.cdc.gov/concussion/HeadsUp/Schools.html">www.cdc.gov/concussion/HeadsUp/Schools.html</a>
-------------	-----------------------------	--	---

>> Pay close attention to the sections in **GREEN**

<b>MT</b>	<b>Medical Team</b>	Emergency Department, Primary Care Providers, Nurses, Concussion Specialists, Neurologists, Clinical Neuro-psychologists and others...	For more specific information, download the free <b>"Heads Up: Brain Injury in your Practice"</b> from the CDC website: <a href="http://www.cdc.gov/concussion/HeadsUp/physicians_tool_kit.html">www.cdc.gov/concussion/HeadsUp/physicians_tool_kit.html</a>
-----------	---------------------	--	--

## Allie Kem

7<sup>th</sup> Grade

“On September 25th, 2011, I was hit in the head with a ball during a lacrosse tournament. A player from

the other team was shooting on goal but the ball bounced off the goal post, hitting me square in the forehead. The next day, the doctor told me I had a concussion. Integrating back into a normal school schedule was a big challenge for me. Although I had the help of my parents and some help from school, I still felt overwhelmed and very behind in my work. I have to admit, it was scary. Trying to keep up with my grades was hard, but throughout the year I have managed to maintain my spot on high honor roll. Some advice that I would give to students with this same type of injury would be to never feel alone and to never be afraid to ask for help. I would also advise students to try and stay connected with their friends and to make sure they understand what you are going through. Unfortunately, there are many challenges that come along with a head injury. I believe that with the large amount of students who get head injuries, all schools should be prepared for when a student gets a concussion.”

After your child/student has been evaluated and determined to have a concussion,

## There is One Immediate and Essential Focus

>> **Reduce** the potential of further injury or stress to the brain! With concussion, it is important to reduce both physical AND cognitive demands!

Most of us know that when an athlete is injured, stress on that injured area needs to be immediately reduced. If an athlete sprains an ankle while running a marathon, the immediate action is to remove the runner from the race. With proper management of the injury and gradual rehabilitation, the athlete may be allowed to run again in a later race. Athletes know that following injury, immediate removal from activity and gradual return to activity is necessary to avoid serious, long-term physical effects or the potential for re-injury. Following a concussion, the student/athlete should be removed from sports, recess, physical education classes, etc. until further notice (see PACE).

In the marathon of life, a concussion is much like the sprained ankle — it is an injury to the brain. Since the brain is the organ responsible for managing all moving (physical) and thinking (cognitive) functions of the body, both physical and cognitive demands on the brain must be reduced during recovery from concussion. Reducing just the physical demands alone (and not the cognitive demands) may delay or hamper recovery. Since school is the place where thinking demands are at their highest, REAP places great emphasis on helping the School Team-Academic (ST/A) understand their part in concussion management. In REAP, the ACCOMMODATE page will help schools provide strategies for cognitive reduction in school.

In rare cases, an unresolved concussion may set the stage for permanent brain damage and/or death. This phenomenon, known as Second Impact Syndrome (SIS), theoretically can occur when a second blow to the head is sustained before the first concussion has healed.<sup>4</sup> The concern for SIS in the developing adolescent brain has led to the practice that concussion symptoms should be 100% resolved before further significant physical or cognitive stress is encountered.

# Once the injury happens, the treatment of choice is to EDUCATE and COLLABORATE

Did you know that a doctor cannot predict the course of recovery at the time of the injury? The course of recovery depends 100% on the on-going (sometimes daily) monitoring, management and resolution of symptoms!

>> **STEP 1: Educate...Know the Symptoms** Knowing *if* the student/athlete is recovering from the symptoms of concussion and *how* the student/athlete is recovering from his/her symptoms is still the best measure of recovery. Therefore, it is essential that everyone understand, recognize and be mindful of ALL symptoms related to concussion. Every symptom is important. The common symptoms of concussion cluster in general categories:

### PHYSICAL How a Person Feels Physically

Headache/Pressure	Nausea
Blurred vision	Vomiting
Dizziness	Numbness/Tingling
Poor balance	Sensitivity to light
Ringing in ears	Sensitivity to noise
Seeing stars	Disorientation
Vacant stare/Glassy eyed	Neck Pain

### EMOTIONAL How a Person Feels Emotionally

Inappropriate emotions	Irritability
Personality change	Sadness
Nervousness/Anxiety	Lack of motivation
Feeling more emotional	

### COGNITIVE How a Person Thinks

Feel in a fog
Feel slowed down
Difficulty remembering
Difficulty concentrating/easily distracted
Slowed speech
Easily confused

### MAINTENANCE How a Person Experiences Their Energy Level and/or Sleep Patterns

Fatigue	Drowsiness
Excess sleep	Sleeping less than usual
Trouble falling asleep	



### Medical Box

It is not appropriate for a child or adolescent athlete with concussion to Return to Play (RTP) on the same day as the injury, regardless of the athletic performance. <sup>5</sup>

Consensus Statement on Concussion in Sport: the 3rd International Conference on Concussion in Sport, Zurich 2008

### IMPORTANT!

All symptoms of concussion are important; however, monitoring of physical symptoms, within the first 48 to 72 hours, is critical! If physical symptoms worsen, especially headache, confusion, disorientation, vomiting, difficulty awakening, it is often a sign that a more serious medical condition is developing in the brain.

**SEEK IMMEDIATE MEDICAL ATTENTION!**

Thorough symptom monitoring is the key to good management. Therefore, REAP strongly suggests that all Multi-Disciplinary Concussion Team members, especially the student/athlete, learn to rate symptoms on a severity level of 0 to 6. Assigning numbers to symptom intensity provides an objective measure and a common language for all team members to understand (see the Symptom Checklist in the APPENDIX).



## >> STEP 2: Collaborate...Managing Your Multi-Disciplinary Concussion Management Team

Most students/athletes report that symptoms of concussion are most intense and most frequent Days 1 through 4, continue throughout Week 1 and begin to wane during Weeks 2 and 3. REAP has developed a suggested timeframe to check and monitor symptoms over a three-week period. REAP has also assigned recommended responsibilities to certain teams to manage specific symptoms. As every concussion is different and unique, each Concussion Management Team must remain fluid and flexible.

REAP is based upon the premise that there are a few elements that are essential to any good concussion management program. Those essential factors are:

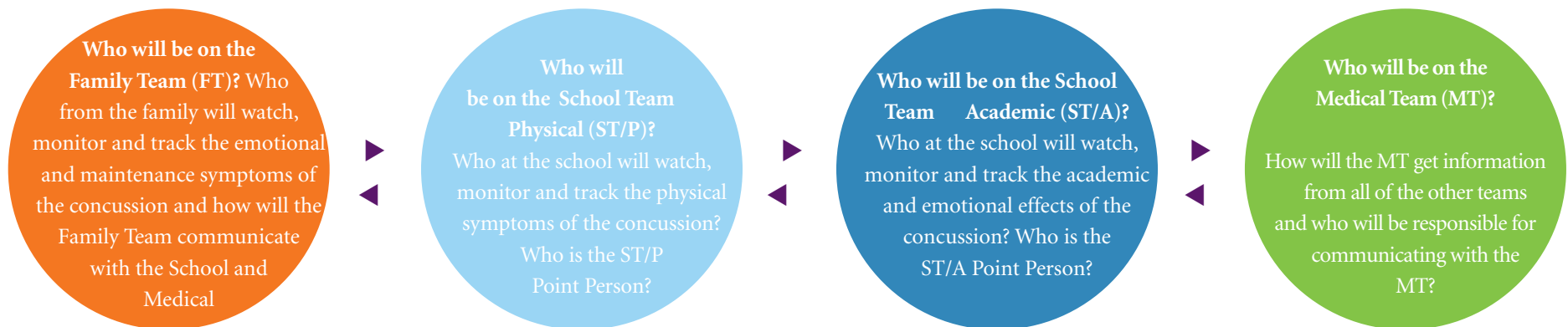
### A "Multi-Disciplinary Team"

Team members who provide **multiple perspectives** of the student/athlete

AND

Team members who provide **multiple sources of data**

As long as a school/community can accommodate for the essential elements listed above, the principles of REAP (aka **good concussion management**) can be applied successfully across any community or school district. On a case-by-case basis, each Multi-Disciplinary Team should utilize the guidelines recommended in REAP to determine:



EDUCATE

For each case, who will be the overall REAP Manager and coordinate the vortex of information between the FT, ST/P, ST/A and MT?

### Message to Educators

Concussion can cause significant academic problems, which in turn can complicate the student's recovery. Because of this, proper management of return to learn is just as important as return to play.

**Dr. Brian Rieger**  
SUNY Upstate Concussion Center

The REAP Manual cannot prescribe who will be on each team — different schools have different resources and not all schools have all resources. However, most typically, the ATC, School Nurse (or Health Aide) often acts as the ST/P. In some creative school districts, a well-educated Coach or Office Manager has acted as the ST/P. Similarly, typically the School Psychologist/Social Worker or Counselor often acts as the ST/A. However, on occasion, a very dedicated General Education Teacher has served as the ST/A.

*continues on next page*

In order to obtain a common language between all Concussion Management Team members, an objective measure of symptoms has been found to be helpful. Therefore, one important suggestion in REAP is that the REAP Manager (on each particular concussion case) take responsibility for meeting with the student (daily or at specified intervals, see REAP TIMEFRAME) to help the student/athlete rate symptoms. Areas of symptom concern/improvement are then shared with the other team members responsible for managing different symptoms. This allows for immediate accommodations/adjustments to be made. In our experience, the majority of communication occurs between team members via phone or email. Formal meetings have rarely been necessary. **The REAP Project promotes better manage-**

**ment of concussion through better management of information and better coordination between team members.**

REAP realizes that every community and every school district has strengths and limitations. If resources allow for only one Point Person at a school, it is important that that one person be equally committed to managing all symptoms — cognitive, emotional, maintenance, as well as, physical symptoms. It is possible that in some smaller communities, there may only be one person on a School Team who then has to manage both Physical and Academic responsibilities. That one school Point Person can still partner with someone from the Family Team and together, they can partner with someone from the Medical Team. REAP feels that more “eyes” on the

concussion and more varied perspectives (even if only three perspectives!) lead to better decision-making. The REAP model does not depend upon “more resources.” Instead it depends upon the strength of a strongly educated and well-coordinated team.

**John’s Mom’s Story**

We really didn’t know what to expect for John. The healing process was very difficult for him. Every day, I kept hoping he would feel a little better and have some relief from his terrible headaches. We realized that his concussion would take as much time as it needed to heal. Never in a million years would I have thought that John would miss almost 3 months of school from heading a soccer ball!

There were several challenges with John’s injury. The more difficult one was trying to keep him low key on the days that he felt better. He missed his friends, computer, and video games, but just a little overload on his good days would set him back several more.

The key to John’s recovery process was the support he received at school. I had constant contact with the counselor and John’s teachers. Eventually, John was able to attend half days with the option to go to the nurse’s office if needed. He was allowed to test in a separate room if the noise and/or lights in the classroom bothered him. The ability to ease him back into the classroom and lunch room was a big help in his recovery. Too much stimulation both in and out of the classroom would cause difficulties.

Luckily, John has fully recovered from his concussion and ended up on the High Honor Roll despite missing most of the fall semester. I don’t know what we would have done without the support and guidance we received from the Concussion Management program and John’s school counselors, teachers, and staff, and I hope that some of our experiences will help others in their journey to recovery.

Marianne Frasier

The REAP Project is happy to provide support and education to your community, no matter what your unique needs may be. We are confident that the essential elements of good concussion management can be achieved in any community — with a lot of good intent and a little creativity!

**John Frasier was a 15-year-old 9th grader when he was hit in the head by a soccer ball.** It was a regular day and a regular soccer game. Our team had just attempted to score, but the goalie caught it. He punted it, and the ball was coming in at a perfect angle for me to hit it with my head. It hit me like it did every other time, and then rebounded up the field. Only for some reason, this time didn’t feel like every other time. I didn’t have a headache, and I wasn’t dizzy. I was just... confused. The next day at school was a blur. I had all of the symptoms of a concussion, and my friends could tell. I remember them saying, you should really go see the nurse, but I didn’t think I had to. After school, I went to my pediatrician’s office. I did have a concussion. I couldn’t believe that I had gotten a concussion during soccer. At the time, I didn’t know that soccer was actually one of the most common sports for concussions. I’m finally back in school, and all of my work is caught up. The headaches and dizziness are gone, and I’ve never been more thankful. However, I feel that more work should be done to prevent concussions so that no one has to go through what I did, even with all of the help I received. John Frasier, 9th Grade

# >> REAP suggests the following timeframe:

			Week 2	Week 3
	<p><b>Family Team</b> Help child understand he/she must be a "honest partner" in the rating of symptoms</p> <p><i>*Sign a Release of Information so that School Team and Medical Team can communicate with each other as soon as possible.</i></p>		<ul style="list-style-type: none"> <li>Continue to assess symptoms (at least 3X week or more as needed), monitor if symptoms are improving.</li> <li>Continue to assess symptoms and increase/decrease demands accordingly.</li> </ul>	<ul style="list-style-type: none"> <li>Continue with all assessments (at least 2X week or more as needed).</li> <li>Continue to assess symptoms and increase/decrease demands accordingly.</li> </ul>
		<ul style="list-style-type: none"> <li>REAP suggests immediate removal from play/physical activities!</li> <li>Assess physical symptoms daily, use objective rating scale.</li> <li>ATC: assess postural-stability (see NATA reference in RESOURCES).</li> <li>School Nurse: monitor visits to school clinic. If symptoms at school are significant, contact parents and send home from school.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assess symptoms (at least 3X week or more as needed) and increase/decrease demands accordingly. (See PACE)</li> <li>ATC: postural-stability assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Continue with all assessments (at least 2X week or more as needed) and increase/decrease demands accordingly. (See PACE)</li> <li>ATC: postural-stability assessment.</li> </ul>
		<ul style="list-style-type: none"> <li>Reduce all cognitive demands (reduce, do not eliminate cognitive demands).</li> <li>Meet with student periodically to create academic accommodation plan for cognitive/emotional reduction no later than Day 2/3 &amp; then assess again by Day 7.</li> <li>Educate all teachers on the symptoms of concussion (see Teacher Template in Appendix).</li> <li>Make immediate academic accommodations.</li> <li>See ACCOMMODATE section.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assess symptoms (at least 3X week or more as needed) and slowly increase/decrease cognitive and academic demands accordingly.</li> <li>Continue academic accommodations as needed.</li> </ul>	<ul style="list-style-type: none"> <li>Continue with all assessments (at least 2X week or more as needed) and increase/decrease cognitive and academic demands accordingly.</li> <li>Continue academic accommodations as needed.</li> <li>Assess if longer term academic accommodations are needed (504 Plan, IEP, etc.).</li> </ul>
		<ul style="list-style-type: none"> <li>Assess and diagnose concussion.</li> <li>Educate student/athlete and family on the typical course of concussion and the need for rest.</li> <li>Monitor that symptoms are improving throughout Week 1 — not worsening in the first 48 to 72 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to consult with school and home teams.</li> <li>Follow-up medical check including: comprehensive history, neurologic exam, detailed assessment of mental status, cognitive function, gait and balance.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to consult with school and home teams.</li> </ul> <p><b>It is best practice that a medical professional be involved in the management of each and every concussion.</b></p>

>> Don't be alarmed by the symptoms - symptoms are the hallmark of concussion. The goal is to watch for a slow and steady improvement in ALL symptoms over time. It is typical for symptoms to be present for up to three weeks. If symptoms persist into Week 4, see SPECIAL CONSIDERATIONS.

“With the advent of new brain imaging technology, we more clearly understand what happens to the brain following a concussion.

This is a complex physiologic event that affects how the brain works. However, since the issue is with function of the brain and not the structure, the injury cannot be seen on routine CT scans or MRIs. As a result the true severity of a concussion is often unrecognized and undertreated. In order to keep our student athletes safe it is essential to educate coaches, trainers, student athletes and their families to anticipate and recognize symptoms and seek proper medical treatment from a health care professional experienced in evaluating and treating concussions.

Dr. Jennifer Semel

The newest research shows that neuropsychological testing has significant clinical value in concussion management, especially with teenagers and especially when baseline scores are available. The addition of neuropsychological tests is an emerging best practice. However, limited resources and training are a reality for school districts. An extensive list of paper and pencil neurocognitive tests known to be sensitive to TBI can be found at www.COkidswithbraininjury.com. Whether or not a school district chooses to include any type of neurocognitive testing, REAP is still the foundation of the Concussion Management program. Data gathered from serial post concussion testing (by Day 2/3, by Day 7, by Day 14 and by Day 21, until asymptomatic) can only serve to provide additional information. However, no test score should ever be used in isolation. Professionals must adhere to all ethical guidelines of test administration and interpretation.

# Most Common “Thinking” Cognitive Problems Post-Concussion

## And suggested accommodations

Areas of concern	Suggested Accommodations
<b>Fatigue, specifically Mental Fatigue</b>	<ul style="list-style-type: none"> <li>&gt; Schedule strategic rest periods. Do not wait until the student’s over-tiredness results in an emotional “meltdown.”</li> <li>&gt; Adjust the schedule to incorporate a 15-20 minute rest period mid-morning and mid-afternoon.</li> <li>&gt; It is best practice for the student to be removed from recess/sports. Resting during recess or PE class is advised.</li> <li>&gt; Do not consider “quiet reading” as rest for all students.</li> </ul>
<b>Difficulty concentrating</b> <i>Feels like being in a “fog”</i>	<ul style="list-style-type: none"> <li>&gt; Reduce the cognitive load — it is a fact that smaller amounts of learning will need to take place during the recovery.</li> <li>&gt; Since learning during recovery is compromised, the academic team must decide: What is the most important concept for the student to learn during this recovery?</li> <li>&gt; Be careful not to tax the student cognitively by demanding that all learning continue at the rate prior to the concussion.</li> </ul>
<b>Slowed processing speed</b> <i>Feels like being converted from high speed internet to dial up internet</i>	<ul style="list-style-type: none"> <li>&gt; Provide extra time for tests and projects.</li> <li>&gt; Assess whether the student has large tests or projects due during the 3-week recovery period and remove or adjust due dates.</li> <li>&gt; Provide a peer notetaker or copies of teacher’s notes during recovery.</li> </ul>
<b>Difficulty with working memory</b> <i>The ability to temporarily store and manage information during complex cognitive processes such as learning and reasoning</i>	<ul style="list-style-type: none"> <li>&gt; Initially exempt the student from routine work/tests.</li> <li>&gt; Since memory during recovery is limited, the academic team must decide: What is the most important concept(s) for the student to know?</li> <li>&gt; Work toward comprehension of a smaller amount of material versus rote memorization.</li> </ul>
<b>Difficulty converting new learning into memory</b>	<ul style="list-style-type: none"> <li>&gt; Allow student to “audit” the material during this time.</li> <li>&gt; Remove “busy” work that is not essential for comprehension. Making the student accountable for all of the work missed during the recovery period (3 weeks) places undue cognitive and emotional strain on him/her and may hamper recovery.</li> <li>&gt; Ease student back into full academic/cognitive load.</li> </ul>
<b>Emotional symptoms</b>	Be mindful of emotional symptoms throughout! Students are often scared, overloaded, frustrated, irritable, angry and depressed as a result of concussion. They respond well to support and reassurance that what they are feeling is often the typical course of recovery.

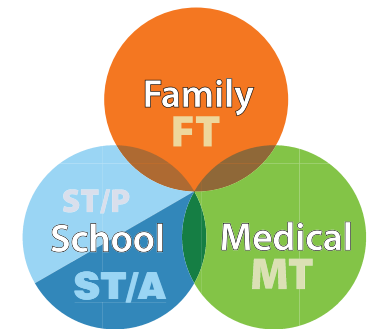
# Management of Concussion is Difficult Because it is a Moving Target

A medical doctor, whether in the Emergency Department or at a follow-up clinic, cannot predict the length or the course of recovery from a concussion. In fact, a doctor should no longer tell a family that a concussion will resolve in X number of days because every concussion is different and each recovery time period is unique to the student/athlete. The best way to assess when a student/athlete is ready to start the step-wise process of “Returning-to-Play” is to ask these questions:

## Return to Academics

After a concussion, one of the first decisions a parent has to make is... should my student/athlete go to school? If so, when? Every student/athlete is different and their return to school will be based upon their level of symptoms in the days following the concussion. As a rule of thumb, a student/athlete may return to school while symptoms are still present but are improving. REAP would not suggest, however, that a student/athlete return to school if symptoms are severe (ie extreme headache, severe nausea, vomiting, major dizziness, etc.) Since symptoms are usually only severe for the first day or two following a concussion, it is perfectly acceptable for a student/athlete to miss a day to two days of school (with severe symptoms) in the very beginning of the recovery. Rarely, however, would a student/athlete need to miss more than a few days of school due to a concussion. When the student/athlete DOES return to school, the parent MUST inform the school about the concussion and the school MUST consider putting academic accommodations in place. The level of academic accommodation should be based upon the individual needs of the student/athlete. Once the student/athlete is at school, increasing their cognitive load should be gradual and should follow roughly the same principles as the graduated Return-to-Play. For example, the student/athlete will likely have “tolerable” symptoms upon their return to school. As symptoms improve, the cognitive demands can be slightly increased. Do symptoms return or get “intolerable”? If so, reduce mental activity and rest for 24 hours. If not, cognitive demands can continue to be increased slowly. Remember: the student/athlete must be functioning successfully (academically) at school before he/she can be considered ready to start the graduated Return-to-Play progression.

- >> Do data from multiple perspectives and multiple sources suggest that all symptoms have resolved?
- >> Do all symptoms stay “resolved” even with exertion and even when medications are no longer being used?
- >> Is the student/athlete functioning back to baseline academically (and/or on measures of cognitive abilities)?



The answers to these questions can only be available on a daily basis to the student/athlete, the family and the school team(s). Even the most involved medical professional will likely not be able to see the student on a daily basis; therefore, periodic symptom assessment must be collected by the Family and School Team(s) and must be shared with the Medical Team. The key to success is **communication and collaboration!**

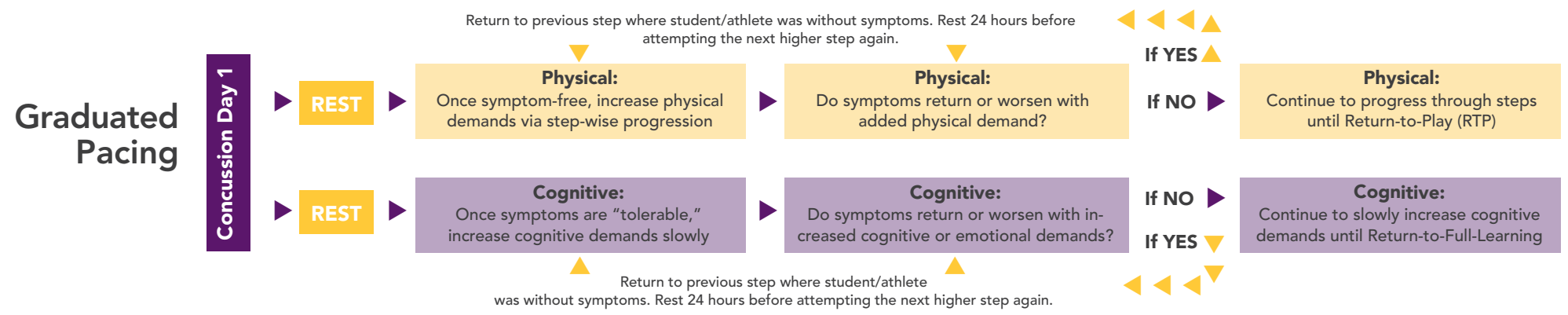
**In the spirit of teamwork, the decision for the student/athlete to begin the graduated Return-to-Play (RTP) protocol and return to 100% participation in physical activities cannot and should not be made by any one single member of the team.** For example, an ATC should not return a student/athlete to contact sports without family/educator/medical professional input and support. Likewise, a community medical professional should not make a Return to Play decision without family and school input. In addition, REAP provides a word of caution ... although gaining in popularity at this time, no one single assessment tool (computerized or paper/pencil neuropsychological testing, balance assessment or others) should ever be used in isolation in making the RTP decision. The best practice is clear... multiple points of data, from multiple sources MUST be considered to make the soundest decision. **In other words, the initiation of the Return-to-Play decision must be made by consensus of the Multi-Disciplinary Concussion Management Team, in consultation with a medical professional.**



The 2008 Zurich Consensus Statement on Concussion in Sport Recommends

# A Graduated Return-to-Play (RTP)

STAGE	ACTIVITY	FUNCTIONAL EXERCISE	CHILD/STUDENT EQUIVALENT	OBJECTIVE OF STAGE
1	<b>No physical activity as long as there are symptoms</b> <i>(This step could take days or even weeks)</i>	Complete physical rest	Quiet time with maximum rest	Recovery
	<i>When 100% symptom free for 24 hours proceed to Stage 2. (Recommend longer symptom-free periods at each stage for younger student/athletes) ▼</i>			
2	<b>Light aerobic activity</b>	Walking, swimming, stationary cycling - 10-15 minutes of exercise, no resistance	Solitary play or quiet play alone or with parent	Increase heart rate <i>(light to moderate work-out not requiring cognitive attention or high degree of coordination)</i>
	<i>If symptoms reemerge with this level of exertion, then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion, then proceed to the next stage. ▼</i>			
3	<b>Sport-specific exercise</b>	Skating/running drills, 20-30 minutes - no weightlifting, no head contact	Supervised play, low risk activities	Add movement <i>(increased attention and coordination required)</i>
	<i>If symptoms re-emerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
4	<b>Non-contact training drills</b>	Progression to more complex training drills; may start progressive resistance training	May run/jump as tolerated	Exercise, coordination <i>(mimics athlete's sport without risk of head injury)</i>
	<i>If symptoms re-emerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
5	<b>Full-contact practice</b>	Following medical clearance, participate in normal training activities; full exertion	Normal participation with parental/ adult supervision	Restore confidence and assess functional skills by coaching staff <i>(or family)</i>
	<i>If symptoms re-emerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
6	<b>Return to play</b>	Normal game play	Normal playtime	No restrictions



# Special Considerations

## >> When Symptoms do not Resolve as Expected

Approximately 10% to 20% of concussions do not resolve in one to three weeks. When, and if, symptoms (physical, cognitive, emotional or maintenance) do not resolve as expected, it is suggested that the student/athlete work with their medical professional to pursue a more specialized outpatient evaluation (medical, neuropsychological or psychosocial).

As stated throughout this manual, an uncomplicated concussion will generally resolve within one to three weeks. Except for the most acute phases of the concussion (usually Days 1 or 2), it is not advised for student/athletes to be absent from school due to the concussion. In an extremely rare case in which long-term symptoms of the concussion result in an extended absence from school, it would be best for the student/athlete to be considered for assessment and/or services under a 504 Plan or IDEA /Traumatic Brain Injury.<sup>6</sup> It is beyond the scope of this manual to speak to assessment and programming for brain injury. Many school districts have Brain Injury Teams, which can provide support. Some Departments of Education have a regional TBI Coordinator available for statewide consultation. Educators can find guidelines for brain injury at [www.COkidswithbraininjury.com](http://www.COkidswithbraininjury.com). Other brain injury resources are listed in the RESOURCES section.

## >> Long-Term Monitoring

Studies have had difficulty estimating the true number of students/athletes who may initially recover well from a concussion but suffer later from learning, emotional or behavioral issues. Are those problems related to the earlier concussion? No one can say for sure, but educators suspect there may be some connection — especially in the case of multiple concussions.

The REAP Project provides a model by which families, schools and medical professionals can manage the concussion in the short-term — three weeks. However, it has become clear that REAP provides a more global gift. In the process of managing a concussion for three weeks, the student/athlete becomes known to a multi-disciplinary team. As the student/athlete progresses beyond the concussion, the family,

the school and the medical professional become cognizant of the injury and can track the student/athlete forward.

- >> If physical symptoms return or are exacerbated, immediate medical attention can be sought.
- >> If emotional or personality changes are noted by parents, they can voice their concern to schools or medical professionals.
- >> If learning or behavioral changes are noted by the school, team members will know to question their connection to the recent resolution of the concussion — and can pursue assessment or intervention. In an academic setting, this ability to recognize problems and intervene early is consistent with the federal mandate of “Response to Intervention (RTI).”



### Medical Box

Students who have Attention Deficits, Learning Disabilities, a history of migraine headaches, sleep disorders, depression or other psychiatric disorders may have more difficulty recovering from a concussion.

Students who have had multiple concussions, a recent prior concussion or who are getting symptomatic after less impact may be at risk for long term complications. Research supports the fact that a person who sustains one concussion is at higher risk for sustaining a future concussion.<sup>7</sup>

REAP provides a template by which concussions can be tracked forward. With REAP, good concussion management does not end with the three-week recovery of a single concussion. In the short run, REAP raises awareness — to assure that all students/athletes fully recover, one concussion at a time. In the long run, REAP places responsibility on the community — to assure that, with the knowledge of past concussions, we keep students/athletes safe from the vulnerability of future concussions.

Resources

Centers for Disease Control (CDC)	www.CDC.gov www.cdc.gov/concussion/HeadsUp/online_training.html	1-800-CDC-INFO
Brain Injury Assn. of NYS	www.bianys.org	1-800-444-6443
LEARNet	www.projectlearn.net	1-800-444-6443
NYS Department of Health	www.health.ny.gov (type TBI in search box)	518-473-1143
NYS Public High School Athletic Assn.	www.nysphsaa.org	518-690-0771
NYS Education Dept.	www.nysed.gov	518-474-3852
NYS Athletic Trainers' Assn.	www.gonysata2.org	
Public Schools Athletic League (NYC Schools)	www.psal.org	718-707-4204
New York State Association of Independent Schools	www.nysais.org/	518-694-5500
Brainline Kids	www.brainline.org	703-998-2020
SUNY Youth Sports Institute	www.youthsportsny.org	877-828-8811
>> All questions or comments and requests for inservices/trainings can be directed to:	ACTive Athletic Concussion Training for Coaches	brain101.ocasinc.com/4000

• Karen McAvoy, PsyD  
 Director of the Center for Concussion  
 Rocky Mountain Hospital for Children  
 Rocky Mountain Youth Sports Medicine Institute  
 Centennial Medical Plaza at Dove Valley  
 14000 E. Arapahoe Rd., Suite #300  
 Centennial, CO 80112  
 Phone: 720.979.0840 Fax: 303.690.5948  
 Karen.McAvoy@HealthONEcares.com

**This manual is provided for information purposes and is not intended as a substitute for medical consultation with a qualified health care professional. We cannot be held responsible for any adverse effect that may arise from the use of or reliance on this manual.**

REFERENCES

- Collins, MW, Lovell, MR, Iverson, GL, Ide, T, Maroon, J. Examining concussion rates and return to play in high school football players wearing newer helmet technology: A three-year prospective cohort study. *Neurosurgery* 2006; 58:275-286
- Field M, Collins MW, Lovell MR, Maroon J. Does age play a role in recovery from sports-related concussion? A comparison of high school and collegiate athletes. *J Pediatrics*. 2003; 142(5):546-53.6.
- Langlois JA, Rutland-Brown W, Wald MM. The epidemiology and impact of traumatic brain injury: a brief overview. *J Head Trauma Rehabil*. 2006; 21:375-78.2.
- Cantu RC. Second impact syndrome. *Clin Sports Med*. 1998; 17:37- 44.
- McCrorry, P., Meeuwisse, W., Johnston, K., Dvorak, J., Aubry, M., Molloy, M., Cantu, R. Consensus Statement on Concussion in Sport: The 3rd International Conference on Concussion in Sport Held in Zurich, November 2008. *J Athl Train*. 2009; 44(4):434-448.
- Wrightslaw, Section 504 and IDEA: Basic Similarities and Differences, Rosenfeld, SJ. www.wrightslaw.com/advoc/articles/504\_IDEA\_Rosenfeld.html.
- Guskiewicz KM, McCrea M, Marshall SW, Cantu RC, Randolph C, Barr W, Onate JA, Kelly JP: Cumulative effects associated with recurrent concussion in collegiate football players: The NCAA Concussion Study. *JAMA* 290: 2549—2555, 2003.

>> **Special thanks to...**  
 Grandview High School and Cherry Creek School District for their part in the development of REAP

- >> **REAP thanks:**
- The REAP Advisory Team:  
 Sue Kirelik, MD, Cheryl Melick, MD, Suzanne Rosenberg, MD, Brooke Pengel, MD, Don Gerber, Psy.D, Ann Glang, PhD, Michael Koester, ATC, MD
  - REAP Pilot School Districts:  
 Cherry Creek School District, Denver Public Schools, Aurora Public Schools, Littleton Public Schools
  - Craig Hospital
  - The TNT (TBI Networking Teams) Steering Committee
  - Kelli Jantz, Shannon Jantz, the Jantz/Snakenberg families
  - Ciera Lund and the Lund family
  - The Colorado TBI Trust Fund



# Your Student has a Concussion

Date \_\_\_\_\_

>> Student's Name \_\_\_\_\_

As a teacher, **you are a very important part** of the Multi-Disciplinary Team who helps to manage this concussion. **Here is some information that will be very helpful to you:**

- Concussions are a traumatic brain injury
- It takes a child/adolescent an average of **7 to 21 days to recover** fully from a concussion

- Because of the risk of further brain damage, the **most important and most immediate action** following a concussion is to **reduce PHYSICAL activity** and **Reduce MENTAL activity**
- The symptoms of a concussion can be seen in your classroom in any of these four ways:

It can affect how a student might FEEL PHYSICALLY: (Physical Symptoms)	It can affect how a student might LEARN: (Cognitive Symptoms)	It can affect how a student might experience SLEEP or ENERGY LEVELS: (Maintenance Symptoms)	It can affect how a student FEELS EMOTIONALLY: (Emotional Symptoms)
<ul style="list-style-type: none"> <li>• Headaches</li> <li>• Dizziness</li> <li>• Disorientation</li> <li>• Sensitivity to lights</li> <li>• Blurry vision</li> <li>• Seeing "double"</li> <li>• Nausea</li> <li>• Sensitivity to noise</li> </ul>	<ul style="list-style-type: none"> <li>• Feel mentally "foggy"</li> <li>• Easily confused</li> <li>• Feel "slowed down"</li> <li>• Slowed speech</li> <li>• Difficulty remembering</li> <li>• Difficulty concentrating</li> </ul>	<ul style="list-style-type: none"> <li>• Fatigue</li> <li>• Drowsiness</li> <li>• Excess sleep</li> <li>• Too little sleep</li> <li>• Trouble falling or staying asleep</li> </ul>	<ul style="list-style-type: none"> <li>• Personality change</li> <li>• Inappropriate emotions</li> <li>• Feeling more emotional</li> <li>• Irritable</li> <li>• Sad</li> <li>• Nervous</li> <li>• Lack of motivation</li> </ul>

The majority of students recover quite well from a single concussion with rest and reduction of physical and academic demands. This recovery usually takes place over a period of three weeks. The changes you might see in a student following a concussion are generally temporary. However, if you have any concerns about this student, please report them immediately to:

Name \_\_\_\_\_ Ph \_\_\_\_\_ E-mail \_\_\_\_\_

Name \_\_\_\_\_ Ph \_\_\_\_\_ E-mail \_\_\_\_\_

**Throughout this process, your input on how this student has performed in your classroom is essential.** Please coordinate your on-going feedback with person(s) listed above.

*Thank You!*

## Symptom Checklist

Name: \_\_\_\_\_ Assessment Date: \_\_\_\_\_

Date of Injury: \_\_\_\_\_ Time of Injury 2-3 Hrs 24 Hrs 48 Hrs 72 Hrs Daily Weekly

SYMPTOMS	SEVERITY RATING						
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance Problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble Falling Asleep	0	1	2	3	4	5	6
Sleeping More than Usual	0	1	2	3	4	5	6
Sleeping Less than Usual	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Sensitivity to Light	0	1	2	3	4	5	6
Sensitivity to Noise	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous/Anxious	0	1	2	3	4	5	6
Feeling More Emotional	0	1	2	3	4	5	6
Numbness or Tingling	0	1	2	3	4	5	6
Feeling Slowed Down	0	1	2	3	4	5	6
Feeling like "In a Fog"	0	1	2	3	4	5	6
Difficulty Concentrating	0	1	2	3	4	5	6
Difficulty Remembering	0	1	2	3	4	5	6
Visual Problems	0	1	2	3	4	5	6
Other	0	1	2	3	4	5	6
<b>TOTAL</b>							

Used with permission from/Adapted from the University of Pittsburgh Medical Center and the NATA Graded Symptom Checklist (GSC)

NOTE: Symptom Checklists can be used not only for the initial evaluation but also for each subsequent follow-up assessment until all signs and symptoms have cleared at rest and during physical exertion. In lieu of simply checking each symptom present, the ATC can ask the athlete to grade or score the severity of the symptoms on a scale of 0-6, where 0 = not present, 1 = mild, 3 = moderate, and 6 = most severe.





# Jimmy McLaughlin

12th Grade

My coaches and athletic trainers helped me feel confident about getting back into sports and helped me know when I was symptom free. After my experiences, I was aware of the symptoms of a concussion and knew how to prevent it from happening again. I believe that every school should have concussion screening tests since it would ensure safety for you, and reassurance for your parents, coaches and trainers.

## Jimmy's Mom

I have been a Registered Nurse for 25 years. I am also a school nurse for Guilderland Central School District's Pinebush Elementary. I have four children who are all heavily involved in sports. As we all know, participating in sports does not come without its injuries. My son Jimmy had been involved in football and wrestling since he first started high school. Unfortunately, he suffered a concussion during his sophomore year playing football. His symptoms included a headache and dizziness, but these had subsided until the winter. During the wrestling season, the symptoms resurfaced, and Jimmy had to be excused from all physical activities for an additional two weeks.

After Jimmy's second concussion, he experienced difficulty with refocusing and memory. These difficulties interfered with his academics, causing him to miss two weeks of school. Jimmy's experience has made him become a better athlete, and we now fully understand the need for such programs in caring for school athletes. It was astonishing to see the many individuals who work to establish the framework needed to protect our students and provide them with encouragement to return to playing and learning safely.

Patricia McLaughlin



**JEFFREY R. AVNER, MD**  
Professor of Clinical Pediatrics  
Chief, Pediatric Emergency  
Medicine, Children's Hospital  
at Montefiore, Albert Einstein  
College of Medicine  
New York, NY



**BRIAN P. RIEGER, PhD**  
Director, Concussion  
Management Program & Upstate  
Sports Concussion Center Chief  
Psychologist & Clinical Assistant  
Professor Department of Physical  
Medicine & Rehabilitation SUNY  
Upstate Medical University  
Syracuse, NY



**JENNIFER SEMEL, MD**  
Medical Director, Department  
of Physical Medicine & Rehabilita  
tion, St. Charles Hospital &  
Clinical Professor, Department  
of Physical Medicine & Rehabilita  
tion, SUNY at Stony Brook,  
Stony Brook, NY



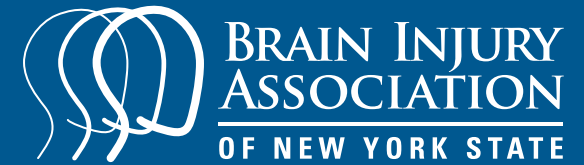
The REAP Project is dedicated in memory of

## Jacob Snakenberg

April 19, 1990    September 19, 2004

To prevent future loss of life due to concussion

Special thanks to the Frasier, Kem and McLaughlin families for sharing the stories of their young athletes in hopes of saving the lives and brains of others.



The Family Advocacy, Counseling, and Training Services Program (FACTS) is a BIANYS program providing support, advocacy, and linkage to community services for individuals who sustained a brain injury prior to age 22 and their families. FACTS Coordinators are located throughout the state. BIANYS has also created LEARNet, an interactive computer-based resource for parents, teachers, clinicians, and students. Access it through [www.bianys.org](http://www.bianys.org) or [www.projectlearn.net](http://www.projectlearn.net).

## CONCUSSION MANAGEMENT AND AWARENESS ACT - Summary

Chapter 496 of the Laws of New York 2011

### Requires:

- Immediate removal from athletic activities of a student believed to have sustained or who has sustained a mild brain injury
- No return until student is symptom free for at least 24 hours; must be evaluated and receive written permission to return by a licensed physician
- All coaches, physical education teachers, nurses and athletic trainers are required, biennially, to complete a course of instruction relating to recognition of symptoms of mild brain injury and monitoring and seeking appropriate medical treatment
- Parents or others in parental relationship must sign permission slip that contains information relating to concussion
- NYS State Education Department, NYS Department of Health and school districts must post information on their websites

### Discretionary:

- School districts are authorized to establish a concussion management team to oversee the implementation of concussion policies and procedures in the district and to be a resource for parents, athletes, and school staff

### Implementation:

- NYS State Education Department, in conjunction with NYS Department of Health to promulgate necessary regulations for implementation
- Effective date: July 1, 2012

This program is part of HealthONE's Rocky Mountain Hospital for Children at Presbyterian/St. Luke's Medical Center and Rocky Mountain Youth Sports Medicine Institute.



At Presbyterian/St. Luke's Medical Center  
The Medical Center of Aurora  
North Suburban Medical Center  
Rose Medical Center  
Sky Ridge Medical Center  
Swedish Medical Center



[RockyMountainHospitalForChildren.com](http://RockyMountainHospitalForChildren.com)

[YouthSportsMed.com](http://YouthSportsMed.com)

[bianys.org](http://bianys.org)

