ALABAMA HEAD INJURY Task Force

Developing the ideal service delivery system for Alabamians impacted by traumatic brain injury

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

REAP℠ The Benefits of Good Concussion Management

Center for Concussion

REAP℠

Remove/Reduce
Educate
Adjust/Accommodate
Pace

Authored by Karen McAvoy, PsyD

ROCKY MOUNTAIN HOSPITAL *for* CHILDREN

At Presbyterian/St. Luke's

HealthONE

Rocky Mountain Hospital for Children, in Denver, Colorado is pleased to partner with the Alabama Head Injury Task Force (AHITF) in providing The REAP concussion management program to your community.

The REAP approach, developed for Rocky Mountain Hospital for Children's Center for Concussion, offers guidance on a coordinated team approach that will lessen the frustration that the student/athletes, their parents, schools, coaches, certified athletic trainers and the medical professional often experience as they attempt to coordinate care.

For more than thirty years, the mission of the Alabama Head Injury Task Force is to develop the ideal service delivery system for Alabamians who experienced head injury.

The leadership of AHITF has chosen to utilize REAP because it has grown as a training resource over the past five years and is continually updated with the most current research and guidance. In November 2013, the American Academy of Pediatrics released a *Clinical Report on Returning to Learning Following a Concussion* (PEDIATRICS Volume 132, Number 5, November 2013) "based upon expert opinion and adapted from a program in Colorado."

The Alabama Head Injury Task Force, with support from its Concussion in Youth Sports Committee, works with Alabama schools providing education, training, and assistance to monitor a student's progress and facilitate communication among team members including physicians, clinicians, school personnel, parents/ guardians, and the student as s/he recovers from concussion.

Printing and distributing REAP is one important way in which AHITF supports your community. As providers of both the statewide Resource Line and in-person Resource Management, AHITF will integrate the REAP program and the Pediatric Resource Management throughout the state to coordinate the many services needed to support your youth post-injury.

It is our privilege to assist your state in this way.

Reginald Washington, MD, FAAP, FAAC, FAHA
Chief Medical Officer
Rocky Mountain Hospital for Children – HealthONE

REAP℠, which stands for **Remove/Reduce · Educate · Adjust/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 freshman football player to "Second Impact Syndrome" in 2004. The author of REAP, Dr. Karen McAvoy, was the psychologist at the high school when the tragedy hit. As a School Psychologist, Dr. McAvoy quickly pulled together various team members at the school (Certified Athletic Trainer, School Nurse, Counselors, Teachers and Administrators) and team members outside the school (Students, Parents and Healthcare Professionals) to create a safety net for all students with concussion. Under Dr. McAvoy's direction from 2004 to 2009, the multi-disciplinary team approach evolved from one school community to one entire school district. Funded by an education grant from the Colorado Brain Injury Program in 2009, Dr. McAvoy sat down and wrote up the essential elements of good multi-disciplinary team concussion management and named it REAP.

With the opening of Rocky Mountain Hospital for Children in August of 2010, Dr. McAvoy was offered the opportunity to open and direct the Center for Concussion, where the multi-disciplinary team approach is the foundation of treatment and management for every student/ athlete seen in the clinic.

REAP is authored by: Karen McAvoy, PsyD

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Family Team	School Physical Team	School Academic Team	Medical Team

The benefits of good concussion management spelled out in REAP are known throughout communities in Colorado, nationally and internationally. REAP has been customized and personalized for various states and continues to be the "go-to" guide from the emergency department to school district to the office clinic waiting room.

Download a digital version of this publication at alabamatbi.org.

ALABAMA HEAD INJURY Task Force

Developing the ideal service delivery system for Alabamians impacted by traumatic brain injury

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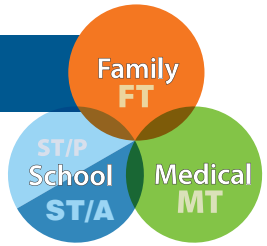
Community-Based, Multi-Disciplinary Concussion Management Team



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 all of the teams. As information is especially pertinent to a certain group, it is noted by a color.

>> Pay close attention to the sections in ORANGE

FT	Family Team	Student, Parents; may include Friends, Grandparents, Primary Caretakers, Siblings and others…	For more specific information, download parent fact sheets from the various **"Heads Up"** Toolkits on the CDC website: cdc.gov/concussion/headsup/pdf/Heads_Up_factsheet_english-a.pdf and cdc.gov/concussions/pdf/Fact_Sheet_ConcussTBI-a.pdf.

>> Pay close attention to the sections in LIGHT BLUE

ST/P	School Physical Team	Coaches, Certified Athletic Trainers (ATC), Physical Education Teachers, Playground Supervisors, School Nurses and others…	For more specific information, download the free **"Heads Up: Concussion in High School Sports or Concussion in Youth Sports"** from the CDC website: cdc.gov/Concussion/HeadsUp/high_school.html

>> Pay close attention to the sections in DARKER BLUE

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

>> Pay close attention to the sections in GREEN

MT	Medical Team	Emergency Department, Primary Care Providers, Nurses, Concussion Specialists, Neurologists, Clinical Neuropsychologists and others…	For more specific information, download the free **"Heads Up: Brain Injury in your Practice"** from the CDC website: cdc.gov/concussion/HeadsUp/Physicians_tool_kit.html

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RockyMountainHospitalForChildren.com and alabamatbi.org

Common Concussion Myths...

TRUE or FALSE?

Loss of consciousness (LOC) is necessary for a concussion to be diagnosed.

False! CDC reports that an estimated 1.6 to 3.8 million sports- and recreation-related concussions occur in the United States each year.[1] Most 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 accidents and bicycle and playground accidents.

TRUE or FALSE?

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

False! Actually, a concussion is a traumatic brain injury (TBI). The symptoms of a concussion can range from mild to severe and may include: confusion, disorientation, memory loss, slowed reaction times, emotional reactions, headaches and dizziness. You can't predict how severe a concussion will be or how long the symptoms will last 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 and symptoms after the injury. Symptoms during a concussion are thought to be due to an ENERGY CRISIS in the brain cells. At the time of the concussion, the brain cells (neurons) stop working normally. Because of the injury there is not enough "fuel" (sugar/glucose) that is needed for the cells to work efficiently – for playing and for thinking. **While a CT scan or an MRI may be used after trauma to the head to look for bleeding or bruising in the brain, it will be normal with a 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.[2] 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.[3]

>> REAP works on the premise that a **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. REAP can help the Family, School and Medical Teams mobilize immediately to maximize recovery during the entire three week "window of opportunity."

Medical note
from James M. Johnston, Jr. MD, Assistant Professor, Pediatric Neurosurgery, University of Alabama-Birmingham Children's of Alabama

"Use your heads kids and parents! Concussion can present with a wide range of symptoms, including headache, dizziness, nausea, blurred vision, confusion and loss of consciousness. Youth athletes suspected of having a concussion should be removed immediately from the playing field, and must be assessed by a trained physician before being allowed to return to play in the days or weeks following the injury."

Message to Parents

To maximize your child's recovery from concussion, double up on the Rs. REDUCE and REST! Insist that your child rest, especially for the first few days following the 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 returns to 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 Adjust/Accommodate). 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, text messaging, social media and computer screen time
- 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!

When should your child go back to school?
See page 8.

Supplemental information and downloadable forms for parents can be found at RockyMountainHospitalForChildren.com or childrensal.org/concussion.

EVERY Member of Every Team is Important!

Every team has an essential part to play at certain stages of the recovery

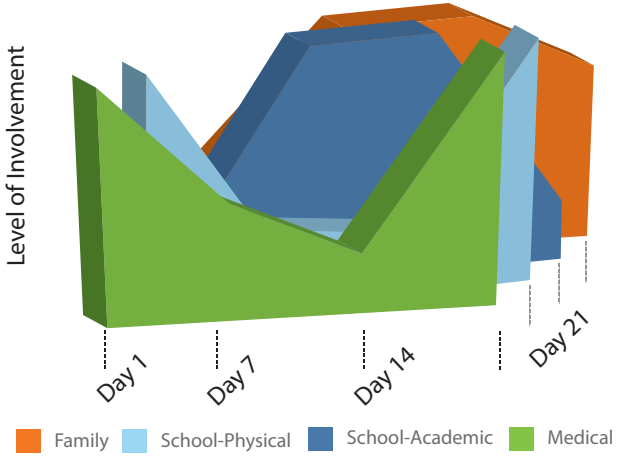
First the School Physical Team (coach, ATC, playground supervisor) and/or the Family Team (parent) have a critical role in the beginning of the concussion as they may be the first to RECOGNIZE and IDENTIFY the concussion and REMOVE the student/athlete from play.

Second The Medical Team then has an essential role in DIAGNOSING the concussion and RULING-OUT a more serious medical condition.

Third for the next 1 to 3 weeks the Family Team and the School Academic Team will provide the majority of the MANAGEMENT by REDUCING social/home and school stimulation.

Fourth when all FOUR teams decide that the student/athlete is 100% back to pre-concussion functioning, the Medical Team can approve the Graduated Return to Play (RTP) steps. See the PACE page.

Finally when the student/athlete successfully completes the RTP steps, the Medical Team can determine final "clearance."



The FOUR teams pass the baton from one to the other (and back again), all the while communicating, collaborating and adjusting the treatment/management.

Communication and Collaboration = Teamwork!

Multi-Disciplinary Teamwork = the safest way to manage a concussion!

A "Multi-Disciplinary Team" Team members who provide multiple perspectives of the student/athlete AND Team members who provide multiple sources of data

Who will be on the Family Team (FT)? Who from the family will watch, monitor and track the emotional and sleep/energy symptoms of the concussion and how will the Family Team communicate with the School and Medical Teams?

Who will be on the School Team — Physical (ST-P)? Who at the school will watch, monitor and track the physical symptoms of the concussion? Who is the ST-P Point Person?

Who will be on the School Team — Academic (ST-A)? Who at the school will watch, monitor and track the academic and emotional effects of the concussion? Who is the ST-A Point Person?

Who will be on the Medical Team (MT)? How will the MT get information from all of the other teams and who with the MT will be responsible for coordinating data and updates from the other teams?

>> REAP suggests the following timeframe:

	TEAM	Week 1	Week 2	Week 3
FT	**Family Team** Help child understand he/she must be a "honest partner" in the rating of symptoms	• Impose rest. • Assess symptoms daily — especially monitor sleep/energy and emotional symptoms.	• Continue to assess symptoms (at least 3X week or more as needed), monitor if symptoms are improving. • Continue to assess symptoms and increase/decrease stimulation at home accordingly.	• Continue with all assessments (at least 2X week or more as needed). • Continue to assess symptoms and increase/decrease stimulation at home accordingly.
ST/P	**School Team Physical** Coach/ATC/School Nurse *(Assign 1 point person to oversee/ manage physical symptoms)*	• REMOVE from all play/physical activities! • Assess physical symptoms daily, use objective rating scale. • ATC: assess postural-stability (see NATA reference in RESOURCES). • School Nurse: monitor visits to school clinic. If symptoms at school are significant, contact parents and send home from school.	• Continue to assess symptoms (at least 3X week or more as needed). • ATC: postural-stability assessment.	• Continue with all assessments (at least 2X week or more as needed). • ATC: postural-stability assessment.
ST/A	**School Team Academic** Educators, School Psychologist, Counselor, Social Worker *(Assign1 point person to oversee/ manage cognitive/emotional symptoms)*	• REDUCE (do not eliminate) all cognitive demands. • Meet with student periodically to create academic adjustments for cognitive/ emotional reduction no later than Day 2/3 and then assess again by Day 7. • Educate all teachers on the symptoms of concussion. • See ADJUST/ACCOMMODATE section.	• Continue to assess symptoms (at least 3X week or more as needed) and slowly increase/decrease cognitive and academic demands accordingly. • Continue academic adjustments as needed.	• Continue with all assessments (at least 2X week or more as needed) and increase/ decrease cognitive and academic demands accordingly. • Continue academic adjustments as needed. • Assess if longer term academic accommodations are needed (May need to consider a 504 Plan beyond 3+ weeks).
MT	**Medical Team**	• Assess and diagnose concussion. • Assess for head injury complications, which may require additional evaluation and management (Supplemental information for MDs may be found at RockyMountainHospitalForChildren.com). • Recommend return to school with academic adjustments once symptoms are improving and tolerable, typically within 48 to 72 hours. • Educate student/athlete and family on the typical course of concussion and the need for rest. • Monitor that symptoms are improving throughout Week 1 — not worsening in the first 48 to 72 hours.	• Continue to consult with school and home teams. • Follow-up medical check including:comprehensive history, neurologic exam, detailed assessment of mental status, cognitive function, gait and balance.	• Continue to consult with school and home teams. • Weeks 3+, consider referral to a Specialty Concussion Clinic if still symptomatic. **It is best practice that a medical professional be involved in the management of each and every concussion, not just those covered by legislation.**

**Family should sign a Release of Information so that School Team and Medical Team can communicate with each other as soon as possible.*

>> **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.

>> Once a concussion has been diagnosed:

STEP ONE: REMOVE student/athlete from all physical activities.
REDUCE school demands and home/social stimulation.

The biggest concern with concussions in children/teens is the risk of injuring the brain again before recovery. The concussed brain is in a vulnerable state and even a minor impact can result in a much more severe injury with risk of permanent brain damage or rarely, even death. "Second Impact Syndrome" or "SIS" is thought to occur when an already injured brain takes another hit resulting in possible massive swelling, brain damage and/or death[4]. Therefore, once a concussion has been identified, it is critical to REMOVE a student/athlete from ALL physical activity including PE classes, dance, active recess, recreational and club sports until medically cleared.

Secondly, **while the brain is still recovering,** all school demands and home/social stimulation should be REDUCED. Reducing demands on the brain will promote REST and will help recovery.

By the age of 11, Ethan had sustained several concussions, some with loss of consciousness, while playing organized sports or playing at home. He then sustained a significant concussion during football practice, which led to referrals to multiple medical specialists. Ethan's symptoms persisted for several months and included decline in academic performance, frequent and severe headaches requiring him to lie down in a dark room, decline in memory and attention and an increase in frustration. A local traumatic brain injury care coordinator met with the school and family and made classroom observations. Several academic accommodations were provided to Ethan, which included reducing his work load by 50%, extended time to complete certain assignments and take tests, obtain copy of peer notes, no PE and meet weekly with the school counselor or sooner if needed. As symptoms resolved, Ethan's academic performance returned to near pre-injury levels.

FT	Family Team	**REMOVE** student/athlete from all physical activity immediately including play at home (ie. playground, bikes, skateboards), recreational, and/or club sports. **REDUCE** home/social stimulation including texting, social media, video games, TV, driving and going to loud places (the mall, dances, games). Encourage **REST**.
ST/P	School Physical Team	**REMOVE** student/athlete from all physical activity immediately. Support **REDUCTION** of school demands and home/social stimulation. Provide encouragement to **REST** and take the needed time to heal.
ST/A	School Academic Team	**REMOVE** student/athlete from all physical activity at school including PE, recess, dance class. **REDUCE** school demands (see ADJUST/ACCOMMODATE for Educators on pages 9-10). Encourage "brain **REST**" breaks at school.
MT	Medical Team	**REMOVE** student/athlete from all physical activity immediately. **RULE-OUT** more serious medical issues including severe traumatic brain injury. Consider risk factors — evaluate for concussion complications. Support **REDUCTION** of school demands and home/social stimulation. Encourage **REST**.

STEP TWO: EDUCATE all teams on the story the symptoms are telling.
It might be two steps forward...one step back.

After a concussion, the brain cells are not working well. The good news is that with most concussions, the brain cells will recover in 1 to 3 weeks. When you push the brain cells to do more than they can tolerate (before they are healed) symptoms will get worse. When symptoms get worse, the brain cells are telling you that you've done too much. As you recover, you will be able to do more each day with fewer symptoms. If trying to read an algebra book or going to the mall flares a symptom initially, the brain is simply telling you that you have pushed too hard today and you need to back it down… try again in a few days. Thankfully, recovery from a concussion is quite predictable… most symptoms will decrease over 1 to 3 weeks and the ability to add back in home/social and school activities will increase over 1 to 3 weeks. Therefore, learn to "read" the symptoms. They are actually telling you the rate of recovery from the concussion.

NOTE: Home/social stimulation and school tasks can be added back in by the parent/teacher as tolerated. Physical activities, however, cannot be added back in without medical approval (see PACE).

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

COGNITIVE
How a Person Thinks

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

EMOTIONAL
How a Person Feels Emotionally

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

SLEEP/ENERGY
How a Person Experiences Their Energy Level and/or Sleep Patterns

Fatigue	Drowsiness
Excess sleep	Sleeping less than usual
Trouble falling asleep	

Do not worry that your child has symptoms for 1 to 3 weeks; it is typical and natural to notice symptoms for up to 3 weeks. You just want to make sure you are seeing slow and steady resolution of symptoms every day. To monitor your child's progress with symptoms, chart symptoms periodically (see TIMEFRAME on page 5) and use the Symptom Checklist (see APPENDIX). In a small percentage of cases, symptoms from a concussion can last from weeks to months. (See SPECIAL CONSIDERATIONS on page 13.)

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."[5]

Consensus Statement on Concussion in Sport: the 4th International Conference on Concussion in Sport, Zurich 2012.

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 may be a sign that a more serious medical condition is developing in the brain.

SEEK IMMEDIATE MEDICAL ATTENTION!

STEP THREE: ADJUST/ACCOMMODATE for PARENTS.

AFTER YOUR CHILD HAS RECEIVED THE DIAGNOSIS OF CONCUSSION by a healthcare professional, their symptoms will determine when they should return to school. As the parent, you will likely be the one to decide when your child goes back to school because you are the one who sees your child every morning before school. Use the chart below to help decide when it is right to send your child back to school:

STAY HOME- BED REST

If your child's symptoms are so severe that he/she cannot concentrate for even 10 minutes, he/she should be kept home on total bed rest - no texting, no driving, no reading, no video games, no homework, limited TV. It is unusual for this state to last beyond a few days. Consult a physician if this state lasts more than 2 days.

MAXIMUM REST = MAXIMUM RECOVERY

STAY HOME – LIGHT ACTIVITY

If your child's symptoms are improving but he/she can still only concentrate for up to 20 minutes, he/she should be kept home — but may not need total bed rest. Your child can start light mental activity (e.g. sitting up, watching TV, light reading), as long as symptoms do not worsen. If they do, cut back the activity and build in more REST.

NO physical activity allowed!

TRANSITION BACK TO SCHOOL

When your child is beginning to tolerate 30 to 45 minutes of light mental activity, you can consider returning them to school. **As they return to school:**

- Parents should communicate with the school (school nurse, teacher, school mental health and/or counselor) when bringing the student into school for the first time after the concussion.
- Parents and the school should decide together the level of academic adjustment needed at school depending upon:
  - ✔ The severity of symptoms present
  - ✔ The type of symptoms present
  - ✔ The times of day when the student feels better or worse
- When returning to school, the child MUST sit out of physical activity – gym/PE classes, highly physically active classes (dance, weight training, athletic training) and physically active recess until medically cleared.
- Consider removing child from band or music if symptoms are provoked by sound.

>> GOING BACK TO SCHOOL

Brickelle is a sixth grade private-school student, who sustained a concussion in PE when she was struck in the face and then in the back of the head with a basketball. When Brickelle's mother picked her up from school, Brickelle stated, "I just don't feel right". Despite seeking specialized medical care, Brickelle experienced several months of headaches, anxiety, nausea, confusion, difficulty concentrating and remembering, and difficulty sleeping. Academic accommodations were implemented which included a shortened school day, reduced assignments with extra time to complete assignments, taking rest breaks by putting her head on her desk or going to the counselor's office, no attending assemblies or activities with loud noises. Brickelle said that the accommodation that helped her the most was attending school for half days because she was so exhausted. Her mother said that the resource that helped her the most was being referred to a Rehab Medicine physician and a traumatic brain injury care coordinator, so that she could learn what to do to support Brickelle.

Medical Box

"A concussion is what happens when there's been an injury to the head, usually from a blow, like colliding with another athlete. We can't see any damage if we take pictures of the brain, but we know there's a concussion because of the athlete's symptoms. The tricky part is that symptoms can vary widely and may be subtle. The symptoms may be dramatic like passing out, vomiting, or trouble remembering what happened. They can also be harder to notice, like difficulty concentrating, feeling sad, or trouble falling asleep. That's why it's so important to get help from a trained healthcare provider early after a concussion happens. The healthcare provider will help make a plan for recovery. Rest from sports and activities, as well as rest from mental activities, like school, is an important tool in treating concussions. The healthcare provider will work with the athlete to make a plan on how soon they can get back to school and back in the game!

- Sara J. Gould, MD, MPH, Emergency Medicine and Orthopedics, Children's of Alabama

STEP THREE: ADJUST/ ACCOMMODATE for EDUCATORS

School Team Educators

Alternate challenging classes with lighter classes (e.g. alternate a "core" class with an elective or "off" period). If this is not possible, be creative with flexing mental work followed by "brain rest breaks" in the classroom (head on desk, eyes closed for 5-10 minutes).

Medical Box

The newest research shows that neuropsychological testing has significant clinical value in concussion management. The addition of neuropsychological tests is an emerging best practice. However, limited resources and training are a reality for school districts. 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 adjustments/accommodations

Areas of concern	Suggested Accommodations for Return-to-Learn (RTL)
Fatigue, specifically Mental Fatigue	> Schedule strategic rest periods. Do not wait until the student's over-tiredness results in an emotional "meltdown." > Adjust the schedule to incorporate a 15-20 minute rest period mid-morning and mid-afternoon. > It is best practice for the student to be removed from recess/sports. Resting during recess or PE class is strongly advised. > Do not consider "quiet reading" as rest for all students. > Consider letting the student have sunglasses, headphones, preferential seating, quiet work space, "brain rest breaks," passing in quiet halls, etc. as needed.
Difficulty concentrating	> Reduce the cognitive load — it is a fact that smaller amounts of learning will take place during the recovery. > 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? > Be careful not to tax the student cognitively by demanding that all learning continue at the rate prior to the concussion.
Slowed processing speed	> Provide extra time for tests and projects and/or shorten tasks. > Assess whether the student has large tests or projects due during the 3-week recovery period and remove or adjust due dates. > Provide a peer notetaker or copies of teacher's notes during recovery. > Grade work completed — do not penalize for work not done.
Difficulty with working memory	> Initially exempt the student from routine work/tests. > Since memory during recovery is limited, the academic team must decide: What is the most important concept(s) for the student to know? > Work toward comprehension of a smaller amount of material versus rote memorization.
Difficulty converting new learning into memory	> Allow student to "audit" the material during this time. > 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. > Ease student back into full academic/cognitive load.
Emotional symptoms	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. Watch for secondary symptoms of depression — usually from social isolation. Watch for secondary symptoms of anxiety — usually from concerns over make-up work or slipping grades.

STEP THREE: ADJUST/ACCOMMODATE for EDUCATORS continued.

Typically, student's symptoms only require 2 to 3 days of absence from school. If more than 3 days are missed, call a meeting with parents and seek a medical explanation.

Teachers, please consider categorizing work into:

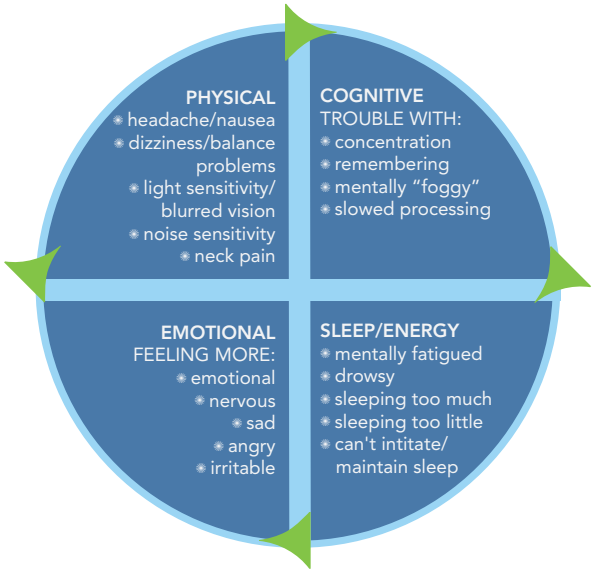
Work REMOVED	Consider removing at least 25% of the workload.
NEGOTIABLE	Consider either **"adjusting"** workload (i.e. collage instead of written paper) **OR** **"delaying"** workload...however, be selective about the workload you postpone.
Work REQUIRED	Consider requiring no more than 25% of the workload.

Academic adjustments fall within the pervue of the classroom/school. They are NOT determined by a healthcare professional. The teacher has the right to adjust up or down academic supports as needed, depending upon how the student is doing daily. Medical "release" from academic adjustments is not necessary.

PHYSICAL:
- "Strategic Rest"scheduled 15 to 20 minute breaks in clinic/quiet space (mid-morning; mid-afternoon and/or as needed)
- Sunglasses (inside and outside)
- Quiet room/environment, quiet lunch, quiet recess
- More frequent breaks in classroom and/or in clinic
- Allow quiet passing in halls
- REMOVE from PE, physical recess, & dance classes without penalty
- Sit out of music, orchestra and computer classes if symptoms are provoked

EMOTIONAL:
- Allow student to have "signal" to leave room
- Help staff understand that mental fatigue can manifest in "emotional meltdowns"
- Allow student to remove him/herself to de-escalate
- Allow student to visit with supportive adult (counselor, nurse, advisor)
- Watch for secondary symptoms of depression and anxiety usually due to social isolation and concern over "make-up work" and slipping grades. These extra emotional factors can delay recovery

Symptom Wheel
Suggested Academic Adjustments



Read "Return to Learning: Going Back to School Following a Concussion" at nasponline.org/publications/cq/40/6/return-to-learning.aspx

COGNITIVE:
- REDUCE workload in the classroom/homework
- REMOVE non-essential work
- REDUCE repetition of work (ie. only do even problems, go for quality not quantity)
- Adjust "due" dates; allow for extra time
- Allow student to "audit" classwork
- Exempt/postpone large test/projects; alternative testing (quiet testing, one-on-one testing, oral testing)
- Allow demonstration of learning in alternative fashion
- Provide written instructions
- Allow for "buddy notes" or teacher notes, study guides, word banks
- Allow for technology (tape recorder, smart pen) if tolerated

SLEEP/ENERGY:
- Allow for rest breaks –in classroom or clinic (ie."brain rest breaks = head on desk; eyes closed for 5 to 10 minutes)
- Allow student to start school later in the day
- Allow student to leave school early
- Alternate "mental challenge" with "mental rest"

Interventions:

Keep in mind, brain cells will heal themselves a little bit each day. Students should be able to accomplish more and more at school each day with fewer and fewer symptoms. Therefore, as the teacher sees recovery, he/she should require more work from the student. By the same token, if a teacher sees an exacerbation of symptoms, he/she should back down work for a short time and restart it as tolerated.

Data collection:

How the student performs in the classroom is essential data needed by the healthcare professional at the time of clearance. Schools should have a process in place by which a teacher can share observations, thoughts, concerns back to the parents and healthcare professional throughout the recovery. Healthcare professionals should REQUIRE input from teachers on cognitive recovery before approving the Graduated Return-to-Play steps. (See Teacher Feedback Form in APPENDIX.) Parents should sign a Release of Information at the school and/or at the healthcare professionals office for seamless communication between school teams and medical team.

Supplemental forms are available at www.alabamatbi.org

How do I get back to my sport?
A.K.A. How do I get "cleared" from this concussion

While 80 to 90% of concussions will be resolved in 3 to 4 weeks, a healthcare professional, whether in the Emergency Department or in a clinic, cannot predict the length or the course of recovery from a concussion. In fact, a healthcare professional should never 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. 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:

>> Is the student/athlete 100% symptom-free at home?

- Use the Symptom Checklist every few days. All symptoms should be at "0" on the checklist or at least back to the perceived "baseline" symptom level.
- Look at what the student/athlete is doing. At home they should be acting the way they did before the concussion, doing chores, interacting normally with friends and family.
- Symptoms should not return when they are exposed to the loud, busy environment of home/social, mall or restaurants.

>> Is the student 100% symptom-free at school?

- Your student/athlete should be handling school work to the level they did before the concussion.
- Use the Teacher Feedback Form (APPENDIX) to see what teachers are noticing.
- Watch your child/teen doing homework; they should be able to complete homework as efficiently as before the concussion.
- In-school test scores should be back to where they were pre-concussion.
- School workload should be back to where it was pre-concussion.
- Symptoms should not return when they are exposed to the loud, busy environment of school.

>> If the school or healthcare professional has used neurocognitive testing, are scores back to baseline or at least reflect normative average and/or baseline functioning?

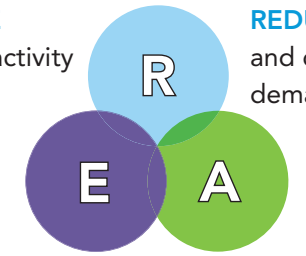
>> If a Certified Athletic Trainer is involved with the concussion, does the ATC feel that the student/athlete is 100% symptom-free?

- Ask ATC for feedback and/or serial administrations of the Symptom Checklist.

>> Is your child off all medications used to treat the concussion?

- This includes over the counter medications such as ibuprofen, naproxen and acetaminophen which may have been used to treat headache or pain.

If the answer to any of the questions is "NO," stay the course with management and continue to repeat:



REMOVE physical activity

REDUCE home and cognitive demands

ADJUST/ ACCOMMODATE home/social and school activities

EDUCATE: Let the symptoms direct the interventions

… for however long it takes for the brain cells to heal!

The true test of recovery is to notice a steady decrease in symptoms while noticing a steady increase in the ability to handle more rigorous home/social and school demands.

PARENTS and TEACHERS try to add in more home/social and school activities (just NOT physical activities) and test out those brain cells!

Once the answers to the questions above are all "YES," turn the page to the PACE page to see what to do next!

STEP FOUR: PACE

FAMILY TEAM Is the student/athlete 100% back to pre-concussion functioning?

SCHOOL ACADEMIC TEAM Is the student/athlete 100% back to pre-concussion academic functioning

WHEN ALL FOUR TEAMS AGREE

that the student/athlete is 100% recovered, the MEDICAL TEAM can then approve the starting of the Graduated RTP steps. The introduction of physical activity (in the steps outlined in order below) is the last test of the brain cells to make sure they are healed and that they do not "flare" symptoms. This is the final and formal step toward "clearance" and the safest way to guard against a more serious injury.

MEDICAL TEAM approves the start of the RTP steps

SCHOOL PHYSICAL TEAM Often the ATC at the school takes the athlete through the RTP steps.

If there is no ATC available, the MEDICAL TEAM should teach the FAMILY TEAM to administer and supervise the RTP steps.

A Graduated Return-to-Play (RTP) Recommended by The 2012 Zurich Consensus Statement on Concussion in Sport*

STAGE	ACTIVITY	FUNCTIONAL EXERCISE AT EACH STAGE OF REHABILITATION	OBJECTIVE OF STAGE
1	**No activity**	Symptom limited physicial and cognitive rest.	Recovery
	When 100% symptom free for 24 hours proceed to Stage 2. (Recommend longer symptom-free periods at each stage for younger student/athletes)		
2	**Light aerobic exercise**	Walking, swimming or stationary cycling keeping intensity <70% maximum permitted heart rate. No resistance training.	Increase heart rate
	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.		
3	**Sport-specific exercise**	Skating drills in ice hockey, running drills in soccer. No head-impact activities.	Add movement
	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.		
4	**Non-contact training drills**	Progression to more complex training drills, e.g., passing drills in football and ice hockey May start progressive resistance training.	Exercise, coordination and cognitive load
	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.		
5	**Full-contact practice**	Following medical clearance, participate in normal training activities.	Restore confidence and assess functional skills by coaching staff
	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.		
6	**Return to play**	Normal game play.	No restrictions

*bjsm.bmj.com/content/47/5/250.full

The healthcare professional should give the responsibility of the graduated RTP steps over only to a trained professional such as an ATC, PT or should teach the parents. A coach, school nurse or PE teacher does NOT need to be responsible for taking concussed student/athletes through these steps.

Research Note: Earlier introduction of physical activity is being researched and may become best practice. However, at this time, any early introduction of physical exertion should only be conducted in a supervised and safe environment by trained professionals.

Special Considerations

>> As we know, 80 to 90% of concussions will resolve within 3 to 4 weeks.

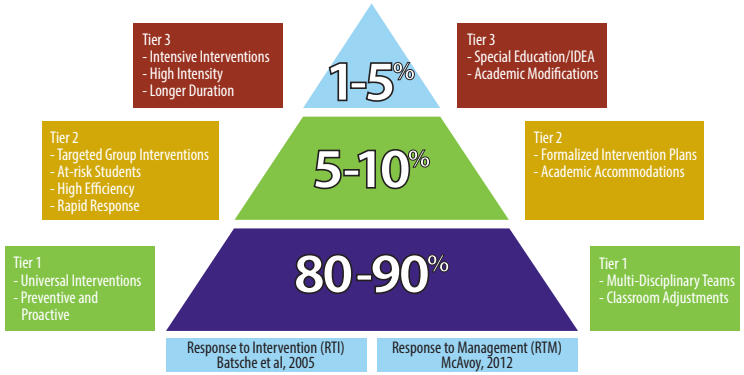
However, there remains the 10 to 20% of student/athletes who have on-going physical, cognitive, emotional or sleep/energy symptoms well beyond the 3 to 4 week mark. In those cases, the parent and medical professionals are advised to look to the school system for existing supports. The 2004 Re-authorization of IDEA (Individuals with Disability Education Act) introduced an educational initiative called "Response to Intervention (RTI)." RTI contends that good teaching and reasonable academic "adjustments" in the general education classroom can help to support 80 to 90% of students with mild/temporary learning or behavioral issues. The same concept holds true for concussions. We have called this "Response to Management (RTM)."

>> In RTI and RTM, we maximize the student/athlete's recovery by focusing on good academic "adjustments" in the general education classroom.

The 10 to 20% of students who struggle beyond the general education classroom may need a small amount of "targeted intervention" called academic "accommodation." Academic "accommodations" may be provided via a Health Plan, a Learning Plan, a 504 Plan[6] or an RTI Plan. It is still hoped that the accommodations for learning, behavior or concussions are temporary and amenable to intervention but may take months (instead of weeks) for progress to show. Lastly, with RTI and RTM, in the rare event that a permanent "disability" is responsible for the educational struggle, the student may be assessed and staffed into special education services (IDEA) and provided an IEP (Individualized Education Plan). This would constitute an extremely small number of students with a concussion.

The multi-disciplinary teams need to continue to work together with the student/athlete with protracted recovery. Parents and medical professionals need to seek medical explanation and treatment for slowed recovery; educators need to continue to provide the appropriate supports and the school physical team needs to continue to keep the student/athlete out of physical play.

Concussion Management Guidelines [8]



Adjustments/Accommodations/ Modifications

DAYS TO WEEKS: Academic Adjustments
Informal, flexible day-to-day adjustments in the general education classroom for the first 3 to 4 weeks of a concussion. Can be lifted easily when no longer needed.

WEEKS TO MONTHS: Academic Accommodations
Slightly longer accommodations to the environment/ learning to account for a longer than 4+ week recovery. Helps with grading, helps justify school supports for a longer time.

MONTHS TO YEARS: Academic Modifications
Actual changes to the curriculum/placement/instruction

Medical Box

Students who have Attention Deficits, Learning Disabilities, a history of migraine headaches, sleep disorders, depression or other mental health 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.[7]

Retirement from sport: If the burden of one concussion or each successive concussion is significant, the family, school and medical teams should discuss retirement from sport.

Resources

Alabama Head Injury Task Force	www.alabamatbi.org	205-290-4590
Alabama Department of Rehabilitation Services	www.rehab.alabama.gov	1-800-441-7607
Alabama Head Injury Foundation	www.ahif.org	205-823-3818
Alabama High School Athletic Association	www.ahsaa.com	334-263-6994
Alabama Department of Education	www.alsde.edu	
UAB Sports Medicine at Children's of Alabama	www.childrensal.org/uabsportsmedicine	205-934-1041
Kohl's ThinkFirst	www.childrensal.org/thinkfirst	205-638-9100
Centers for Disease Control (CDC)	CDC.gov www.cdc.gov/concussion/HeadsUp/online_training.html	1-800-CDC-INFO
National Athletic Trainers Association	www.nata.org www.journalofathletictraining.org	214-637-6283
National Federation of State High School Associations	www.nfhs.org	317-972-6900
Free, online coach-training sessions	www.nfhslearn.org	

>> Please Note:
This publication is not a substitute for seeking medical care.

REAP is available for customization in your state.

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>> Special thanks to...
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- Kelli Jantz, Shannon Jantz, the Jantz/Snakenberg families
- Ciera Lund and the Lund family

This manual is available in Spanish upon request.

This program is part of HealthONE's Rocky Mountain Hospital for Children.

Symptom Checklist

Name: _____ Assessment Date: _____

Date of Injury: _____

SYMPTOMS								
		Time of Injury	2-3 Hrs	24 Hrs	48 Hrs	72 Hrs	Daily	Weekly
		SEVERITY RATING						
Pathways	Symptoms		Mild	Mild	Moderate	Moderate	Severe	Severe
A	I feel like I'm going to faint	0	1	2	3	4	5	6
V	I'm having trouble balancing	0	1	2	3	4	5	6
	I feel dizzy	0	1	2	3	4	5	6
	It feels like the room is spinning	0	1	2	3	4	5	6
O	Things look blurry	0	1	2	3	4	5	6
	I see double	0	1	2	3	4	5	6
H	I have headaches	0	1	2	3	4	5	6
	I feel sick to my stomach (nauseated)	0	1	2	3	4	5	6
	Noise/sound bothers me	0	1	2	3	4	5	6
	The light bothers my eyes	0	1	2	3	4	5	6
C	I have pressure in my head	0	1	2	3	4	5	6
	I feel numbness and tingling	0	1	2	3	4	5	6
N	I have neck pain	0	1	2	3	4	5	6
S/E	I have trouble falling asleep	0	1	2	3	4	5	6
	I feel like sleeping too much	0	1	2	3	4	5	6
	I feel like I am not getting enough sleep	0	1	2	3	4	5	6
	I have low energy (fatigue)	0	1	2	3	4	5	6
	I feel tired a lot (drowsiness)	0	1	2	3	4	5	6
Cog	I have trouble paying attention	0	1	2	3	4	5	6
	I am easily distracted	0	1	2	3	4	5	6
	I have trouble concentrating	0	1	2	3	4	5	6
	I have trouble remembering things	0	1	2	3	4	5	6
	I have trouble following directions	0	1	2	3	4	5	6
	I feel like my thinking is "foggy"	0	1	2	3	4	5	6
	I feel like I am moving at a slower speed	0	1	2	3	4	5	6
	I don't feel "right"	0	1	2	3	4	5	6
	I feel confused	0	1	2	3	4	5	6
	I have trouble learning new things	0	1	2	3	4	5	6
E	I feel more emotional	0	1	2	3	4	5	6
	I feel sad	0	1	2	3	4	5	6
	I feel nervous	0	1	2	3	4	5	6
	I feel irritable or grouchy	0	1	2	3	4	5	6

Other: _____

Pathways of concern: A=Autonomic V=Vestibular O=Oculomotor H=Headache (Migraine &Non-Migraine) C=Cervicogenic N=Neck Strain S/E=Sleep/Energy Cog=Cognitive E=Emotional

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Teacher Feedback Form

Date _____

>> Student's Name _____

Date of Concussion _____

Student: you have been diagnosed with a concussion. It is **your responsibility to gather data from your teachers** before you return to the doctor for a follow-up visit. A day or two before your next appointment, go around to all of your teachers (especially the CORE classes) and ask them to fill in the boxes below based upon how you are **currently functioning** in their class(es).

Teachers: Thank you for your help with this student. Your feedback is very valuable. We do not want to release this student back to physical activity if you are still seeing physical, cognitive, and emotional or sleep/energy symptoms in your classroom(s). If you have any concerns, please state them below.

1. Your name 2. Class taught	Is the student still receiving any academic adjustments in your class? If so, what?	Have you noticed, or has the student reported, any concussion symptoms lately? (e.g. complaints of headaches, dizziness, difficulty concentrating, remembering; more irritable, fatigued than usual etc.?) If yes, please explain.	Do you believe this student is performing at their pre-concussion learning level?
			❑ Yes ❑ No Date: Signature:
			❑ Yes ❑ No Date: Signature:
			❑ Yes ❑ No Date: Signature:
			❑ Yes ❑ No Date: Signature:

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Jake Snakenberg Fund

Dedicated to the Memory of Jake Snakenberg
April 19, 1990 - September 19, 2004

In the fall of 2004, Jake Snakenberg passed away from "Second Impact Syndrome." As a result of Jake's death, with the support of Jake's family and a team of dedicated health professionals, REAP and the Center for Concussion exist today.

Donations to the Jake Snakenberg Fund will allow us to continue printing and distributing REAP manuals to Colorado communities. In addition, it will support the Center for Concussion in their ongoing efforts to educate coaches and parents on concussion recognition and management in children and adolescents. Your donation will also help support research on youth concussions.

To make a donation to the Jake Snakenberg Fund
Mail a Check Payable to:
Rocky Mountain Children's Health Foundation
Attn: Jake Snakenberg Fund
2055 High Street, Suite 240, Denver, CO 80205

Donate Online: www.givingfirst.org/RMCHF
Questions Please Contact:
Luanne Williams at 303.830.6829
Luanne.Williams@RMChildren.com
For additional information visit RMChildren.org

Rocky Mountain Children's Health Foundation
Health ONE

THIS PROGRAM IS ENDORSED BY:

Alabama Head Injury Task Force — Developing the ideal service delivery system for Alabamians impacted by traumatic brain injury

AHiF — Alabama Head Injury Foundation

ADRS — Alabama Department of Rehabilitation Services

Children's of Alabama®

ALABAMA MANDATES:

- Each local school system and community sport or recreational organization must develop guidelines as well as educational materials (e.g., forms) to distribute to youth athletes and their parents or guardians. Materials must cover the nature and risk of concussion and brain injury, especially with with continuing to play after a suspected concussion or brain injury.
- A concussion and head injury information sheet must be reviewed, signed, and submitted by the youth athletes and their parents or guardian prior to any practice or competition.
- Each local school system and community sport or recreational organization must ensure that coaches undergo annual training to learn how to recognize concussion symptoms and to seek proper medical treatment.
- Each local school system and community sport or recreational organization must establish, by rule, their training requirements and, to the extent possible, ensure that all coaches complete the training before the beginning of the team practice.
- If a youth athlete is suspected of having a concussion or brain injury during practice or competition, they must:

  1) be immediately removed from play,
  2) not return to play the day of the injury, and
  3) not return until they have been evalutated and received written clearance to return to play by a licensed physican.

Special thanks goes to the Alabama Head Injury Task Force (AHITF) and the Sports Concussion Committee of the AHITF, the Alabama High School Athletic Association and the Alabama Head Injury Foundation for their support in passing legislation that created the Alabama Sports Concussion Law.

Sports Concussion Committee Purpose: To improve recognition of Concussive Injuries in sports

Committee Goals:

- To reduce the occurrence of sports related concussions through increased public and professional awareness, training, safety practices, and policies.
- To reduce the potential adverse impact of sports related concussions through improved recognition, assessment and management of concussion.

This project is supported in part by grant H21MCO6738 from the Department of Health and Human Services (DHHS) Health Resources and Services Administration, Maternal and Child Health Bureau.

All questions or comments and requests for trainings can be directed to: Maria Crowley, Alabama State Head Injury Coordinator; Alabama Department of Rehabilitation Services; P.O. Box 19888; Homewood, AL 35209; 205-290-4590; maria.crowley@rehab.alabama.gov.

ALABAMA HEAD INJURY Task Force

Developing the ideal service delivery system for Alabamians impacted by traumatic brain injury

Alabama Head Injury Task Force

Phone: 205-290-4590
Email: info@alabamatbi.org

Rocky Mountain Hospital *for* Children
At Presbyterian/St. Luke's
HealthONE

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.

Rocky Mountain Youth Sports Medicine Institute

YouthSportsMed.com RockyMountainHospitalForChildren.com