

Fall/Winter 2008

# GAME PLAN

A Sports Injury Publication of the Brain Injury Association of New Jersey, Inc.

## A CONCUSSION IS A BRAIN INJURY...

## TAKE IT SERIOUSLY.

- *Baseline Testing: What is it telling us?*
- *Baseline Testing: Participating High Schools*
- *Concussion Management Guidelines*



America's youth is our future; safeguard their potential

[www.sportsconcussion.com](http://www.sportsconcussion.com)

[www.bianj.org](http://www.bianj.org)

[www.ugotbrains.com](http://www.ugotbrains.com)



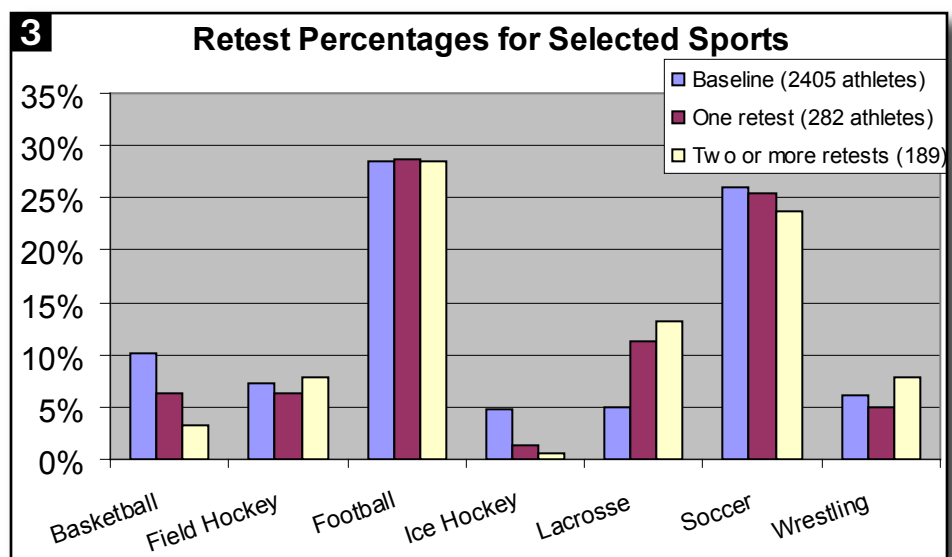
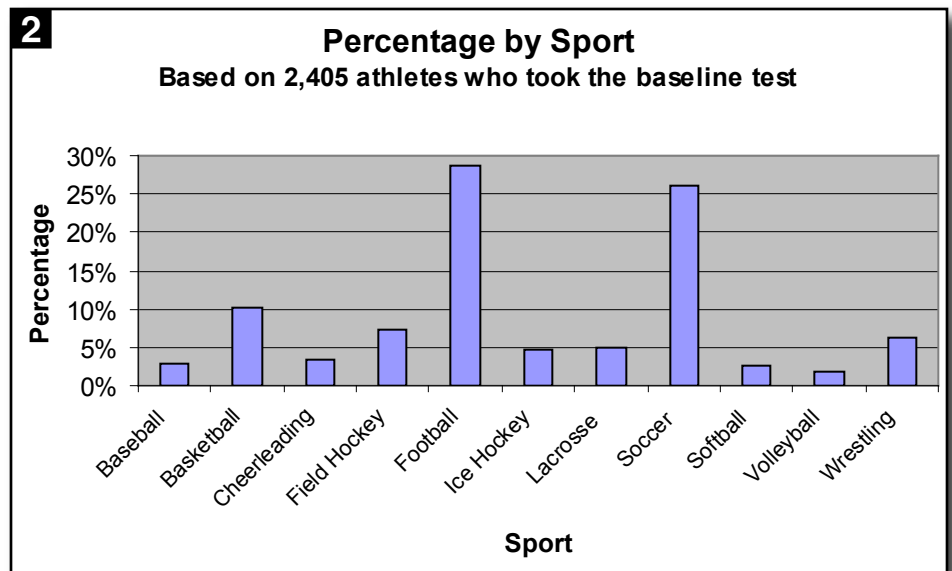
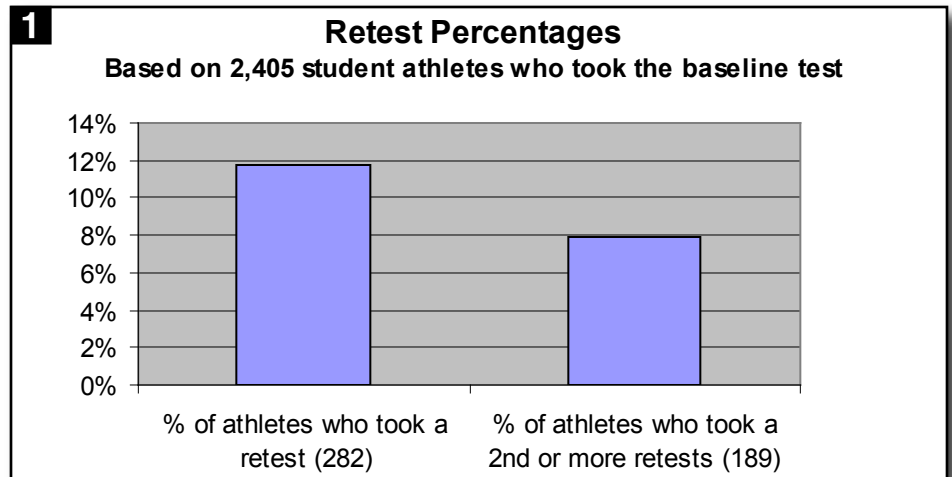
# Baseline Testing: What is it telling us?

In February 2006 the Brain Injury Association of New Jersey (the Association) announced the availability of matching funds for New Jersey high schools to purchase a three-year subscription for the ImPACT Concussion Management software. 98 schools have applied for and been awarded the matching funds grants. A requirement of the grant is for the Association to have access to data for research purposes. The graphs to your right illustrate some of the results from the data collected through the program.

**Please note:** that when you review the information based on "Sport", the sport was reported by the student at the time of the baseline test. Some students may play additional sports during the school year; however, the data is still categorized under the sport reported at baseline.

Graph 3 raises some interesting questions that will be addressed in subsequent analysis as additional data is available. Future analysis will look at the differences in gender; for example, football and ice hockey (typically men's sports) ratios seem to stay steady or drop, compared to wrestling where the ratio increases.

Men and women participate in the remainder of the sports reported on the graph except for field hockey which is typically a women's sport; notice that the ratios by number of tests/retests varies. Additional data will hopefully analyze a larger sample of athletes and the gender breakdowns by sport may show some interesting trends. Look for the spring issue of GAME PLAN for more baseline testing results and analysis.



# Adolescent Concussions Management Guidelines for Schools

by **Michael A. Lee, MD** and **Vito A. Perriello, Jr., MD**  
(Reprinted with permission from the authors)

Our knowledge of concussions has increased and our treatment has changed substantially in recent years based on new research. Some of the major changes include the awareness that “minor head injuries”, frequently called “bell-ringers or dings”, are in fact concussions; many relatively minor head injuries take longer to heal than previously believed; concussions can occur without loss of consciousness, vomiting or other symptoms. Often times, headache, dizziness, “fogginess”, poor attention span and unusual behavior are the signs of concussions.

Another major change is the knowledge that thinking, “exercising the brain” and nearly all cognitive tasks have the same effect on prolonging concussion symptoms and slowing recovery as does physical exertion. Consequently, the management of even these minor head injuries has changed dramatically. Restricting mental exertion and physical exertion until asymptomatic and then gradually increasing each is the cornerstone of this treatment strategy.

Over the past several years, increasingly larger numbers of adolescents are sustaining concussions. This may partially be due to our greater awareness. While caring for them, it has become evident that concussed individuals need modification of

their school day in order to recover most expeditiously.

At the high school level, returning the student athlete to school is generally the highest priority and the one that carries the lowest risk once symptoms have disappeared. The school nurse, guidance counselor, certified athletic trainer (ATC), athletic staff, psychologist and social worker should be made aware of the student-athlete’s injury and work as a team to coordinate these accommodations. This will ensure a smooth transition to this new activity plan during this difficult period.

Attending school presents a major problem for student-athletes suffering from a concussion whether it is at the high school or college level. Teachers and professors often believe that the student-athletes are malingering and they can be less than sympathetic when student-athletes are excused from tests, or need extra time for tests and turning in papers.

Team coaches often fail to understand the severity of the injury and may want their athlete, especially the star athlete, to return to play before they are fully recovered. Coaches may be unsympathetic to the needs of the injured student-athlete and may be unaware of Second-Impact Syndrome (SIS) or more

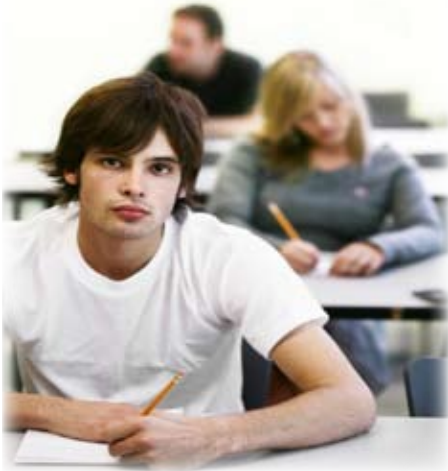


common risks of re-injury and prolonged recovery. The absence of visible signs of injury, such as a cast, brace or bandage, contributes to this misunderstanding by coaches and others. Adolescents with concussions may want to attend school out of fear they will

**Exercise,  
whether it is  
physical or mental,  
will usually increase  
their symptoms**

miss necessary work and get too far behind. They often want to socialize with their friends and continue to participate in their usual activities. If they have a part-time job they may also want to continue their usual work schedule.

Since student-athletes with concussions seem to recover more rapidly with rest, we recommend that activities should be restricted for several days following the injury until they are headache free. Exercise, whether it is physical or mental, will usually increase their symptoms: headache, dizziness, nausea and light-headedness. Most student-athletes will have difficulty with concentration, memory (both



working and short term), and their processing speed—which negatively affects their school learning and performance. In turn, struggling to learn and perform; this “overuses” the brain at a time when it is working hard to recover, and can negatively affect recovery. As a result, the guidelines for returning to school are listed below:



### **No School Initially**

A concussed individual should not return to school until his/her headaches and other symptoms have cleared. At home, the student-athlete should rest. To minimize increased oxygen demands on the injured vulnerable brain cells, athletes should not participate in the following activities: reading, computer use, video games, text messaging, physical exercise, hot tubs, socializing with friends.

Attending movies may cause a marked increase in symptoms if the student-athlete experiences difficulty with light or noise. When student-athletes are headache free, they can begin trying brief periods of reading or studying.

If headaches or other symptoms return they should discontinue the activity and resume rest. They may return to school for gradually

increasing periods of time when they can tolerate a couple of hours of thinking. Some student-athletes may require starting school later in the day in order to sleep longer. They should be driven to school to avoid noise on the bus or the exercise of walking to school.

Student-athletes may attend classes unless they develop symptoms (usually a headache). If they become symptomatic they should go to the nurse’s office, lie down, and skip the next period. (Rest periods often may be necessary when student-athletes first return to school.) If symptoms occur again in the next period, after resting, they should return home.

Math and chemistry classes may need to be avoided initially since they seem to cause more symptoms than other classes. If a student-athlete can only attend school part-time, non-core classes should be avoided in favor of core subjects (English, History, Science and Language).



### **School Nurse’s Role**

After sustaining the concussion, and before the student-athlete returns to school, the nurse should receive a letter from the physician. The letter will describe the student-athlete’s injury and the specific and necessary modifications to the school day. This letter will serve to notify all parties involved that the day must be modified and that the student-athlete is not malingering.

The nurse will serve as a liaison between the teachers, athletic trainers and coaches to facilitate the changes. If no school nurse or athletic trainer is available, the student-athlete’s guidance counselor should be the contact person for the physician.



### **Test Taking**

Most student-athletes are so symptomatic in the early post injury phase they are unable to take tests. If they do attempt to take tests before they are recovered sufficiently, they may become dizzy and nauseous or manifest other post-concussion signs and symptoms that negatively affect their performance. If the student-athlete has taken any tests during the time he/she is recovering and received poor test scores, it is appropriate to ask that these grades be voided or discounted.

SAT, ACT, AP, and GRE tests may need to be postponed and some student-athletes may need to obtain permission beforehand for extra time while taking these examinations. Final examinations may need to be delayed until school breaks, the next semester or during the summer.



When student-athletes do return to school they may need to have untimed tests due to their decreased processing speed. Taking tests should be spaced out and limited to no more than one per day. Tests may need to be taken in a quiet place, free of distraction, since some post-concussion student-athletes have characteristics like ADHD (Attention-Deficit Hyperactivity

Disorder), such as distractibility and difficulty with concentration.

Unfortunately, there may be some student-athletes with prolonged symptoms who will need to miss an extended period of school during the recovery. Teachers should take this into account when assigning grades. Possible solutions for this problem include: exempting student-athletes from tests, especially if they have done well previously, or assigning grades for that period of time, based on their previous work.

### **Papers, Projects and Homework**

Term papers and projects may need to be delayed and spaced out. Extensions for work should be given. Extra time for homework may be necessary. Preprinted class notes or copies of class notes are often helpful. Recordings may be helpful for student-athletes with reading difficulty due to their symptoms. Having someone read material to student-athletes may be of benefit. Some student-athletes may need tutors to help them with schoolwork, including test preparation and organization.

### **PHYSICAL ACCOMMODATIONS**

**Elevators:** Initially, student-athletes should not walk up stairs if there are elevators in the school. An elevator pass should be given unless the student-athlete becomes light-headed or dizzy when riding the elevator.

**Noise:** If noise is not well tolerated by these student-athletes they should be excused from music class. It is recommended they sit in a quiet spot during lunch (not in the noisy cafeteria) and should avoid assemblies, school dances or sports events. It may also be helpful for these student-athletes to leave class a few minutes early to go to the next class in order to avoid the

noise in the hall. Construction noise at school may also increase symptoms.

**Light:** Student-athletes, especially those with injuries to the back of the head, can have difficulty with light. Bright fluorescent lights or watching movies in a dark room may cause or increase symptoms such as headaches. They may need to wear sunglasses in and out of school. If light is a problem, student-athletes may have difficulty driving at night due to the glare of headlights. Activities with strobe lights should be avoided.

**Preferential Seating:** Student-athletes who develop ADHD-type (Attention-Deficit Hyperactivity Disorder) symptoms following their concussions are advised to sit in the front of classrooms and to sit away from windows and doors to avoid distractions.



**Gym Class and School Sports Team:** Both should be avoided initially. Attending a team's practice or game can increase

symptoms due to the noise, light and "rough-housing" with their friends.

Student-athletes might sustain another head injury if they are inadvertently struck with a ball. As they recover, they may attend—but not participate in—practice and games as long as the symptoms do not increase.

**Return-to-play:** An athlete is allowed to start an exercise program when they are not taking pain medication and are both symptom free and have normal neurocognitive test results (if available). They may walk the first day, jog the following day and run the third day (*see guidelines from the last International Conference on Concussions in Prague*).

When the steps are completed without symptoms, they may practice sport specific drills with their team and then finally, full participation, including contact, is allowed. This is usually a five-day process. Some athletes who have missed many weeks of play may need to recondition before returning to sports.

**Student-Athletes with Prolonged Absences:** Approximately 10% of student-athletes with concussions have symptoms lasting over a month and they are considered to have a Complex Concussion (the newest terminology) or what in the past was described as Post-concussion Syndrome or (PCS).

Some student-athletes may need to have a 504 plan adopted and some student-athletes who cannot tolerate the active school environment may require home tutoring. The guidance counselor may be asked to expedite some of these accommodations.

**🏀 Psychiatric Issues:** Some student-athletes may develop depression either as a result of the injury or because they are unable to attend school and participate in sports. They may become irritable and more emotional than usual. Support for this problem may be addressed by the psychologist, guidance counselor, or social worker on the school staff.

### **SUMMARY**

While many clinicians do not allow concussed individuals to return to physical exertion after sustaining a concussion, they are allowed to return to school with the admonition “if your symptoms increase you need to discontinue the activity.” This is difficult for most adolescents to follow once they are in school attending classes and socializing with their friends.

To prevent worsening of symptoms and possible prolonged recovery in concussed individuals, both mental and physical exertion is not recommended during the early stages of recovery. We recommend a return to school once the symptoms have cleared.

#### References:

Aubry M, Cantu R, Dvorak J, et al: Summary and Agreement Statement of the 1st International Symposium on Concussion in sport, Vienna 2001 Clin J Sports Med 2002; 12:6–11.

Summary and agreement statement of the 2nd International Conference on Concussion in Sport, Prague 2004. Clin J Sport Med 2005;15(2):48–55.

HEADS UP CONCUSSION IN YOUTH SPORTS

U.S Department of Health and Human Services Centers for Disease Control and Prevention

[www.cdc.gov/injury](http://www.cdc.gov/injury)

[www.cdc.gov/ConcussioninYouthSport](http://www.cdc.gov/ConcussioninYouthSport)

**Michael A. Lee, MD** is a pediatrician with Pediatric Health Care Associates in Southport, Connecticut specializing in adolescent and sports medicine. He is a charter member of AMSSM and Medical Director of the Student Health Center at Fairfield University.

**Vito A. Perriello, Jr., MD** is a pediatrician with Pediatric Associates of Charlottesville, LLC in Charlottesville, Virginia. He is the Chairman of the Sports Medicine Advisory Committee of the National Federation of High Schools, Physician Director of Board of Certification of NATA, and on the Executive Board of USA Lacrosse.

## **What's Your Question?**

*A Conundrum: What to do if an athlete's primary care physician clears the athlete to return to play after a minor traumatic brain injury but the certified athletic trainer disagrees?*

Unfortunately there are many primary care physicians (PCP), whether it is pediatricians or family physicians, who are not up to date on the latest guidelines on management of sports related concussions. First and foremost, the school's team physician has the jurisdiction and the right to determine if the athlete can return to activity. Thus a note from the PCP clearing the athlete can be overridden. The Certified Athletic Trainer (ATC) hopefully has a good relationship with the team physician and both are educated properly on the most recent guidelines for management and return to play protocol for concussion in sport.

It is recommended to have the team physician contact the athlete's PCP on the ATC's behalf personally to discuss the student athlete's case tactfully. If the team physician explains to the PCP the reason for concern on allowing the athlete to return to play and then helps educate them on the recent guidelines it can prevent further issues. It is of utmost importance to alert and instruct the PCP's in the community on the proper assessment for diagnosis and management of concussion in sport. In order to return to activity each individual must first be completely asymptomatic at rest. Any persistent symptoms immediately disqualify an individual from returning to play.

Determining when an athlete is able to return to activity safely after sustaining a concussion is based on clinical judgment by trained health professionals with the following criteria: a normal physical and neurologic examination, a return to baseline values on a computerized neuropsychological test if available and completion of the stepwise return to play progression protocol without return of any symptoms. At any time if there is any doubt whether to allow the athlete to return play it is always best to side on the precautionary side and sit them out.

~ **David Gealt, D.O.**

*(A member of the Brain Injury Association of New Jersey's Concussion in Sports Committee)*

# Baseline Testing Concussion Management Program List of Participating New Jersey High Schools

<p><b><u>BERGEN COUNTY</u></b>            Bergen Catholic            Don Bosco Prep            Glen Rock            Lyndhurst            Northern Highlands Regional            Park Ridge            Pascack Valley            Ramapo            Ridgewood            Tenafly            Wood-Ridge</p> <p><b><u>BURLINGTON COUNTY</u></b>            Cinnaminson            Moorestown            No. Burlington Cty Regional            Pemberton Township            Seneca</p> <p><b><u>CAMDEN COUNTY</u></b>            Cherry Hill West            Haddon Township            Haddonfield Memorial            Triton Regional</p> <p><b><u>CAPE MAY COUNTY</u></b>            Ocean City</p> <p><b><u>ESSEX COUNTY</u></b>            Cedar Grove            Columbia            Glen Ridge            Millburn</p>	<p>Montclair            Newark Academy            Nutley            West Orange</p> <p><b><u>GLOUCESTER COUNTY</u></b>            Pitman</p> <p><b><u>HUNTERDON COUNTY</u></b>            No. Hunterdon Regional            Voorhees</p> <p><b><u>MERCER COUNTY</u></b>            Ewing            Hopewell Valley Central            Lawrence            Notre Dame            Princeton            Princeton Day School            Robbinsville            West Windsor-Plainsboro So.</p> <p><b><u>MIDDLESEX COUNTY</u></b>            East Brunswick            Monroe Township            North Brunswick            Piscataway            Sayreville War Memorial            South Brunswick            St. Josephs            West Windsor-Plainsboro No.</p> <p><b><u>MONMOUTH COUNTY</u></b>            Colts Neck</p>	<p>Freehold Borough            Freehold Township            Howell            Manalapan            Manasquan            Marlboro            Middletown South            Raritan            St. Rose            Wall</p> <p><b><u>MORRIS COUNTY</u></b>            Boonton            Butler            Chatham            Delbarton            Hanover Park            Madison            Montville Township            Parsippany Hills            Pequannock Township            Roxbury            West Morris Mendham            West Morris Central            Whippany Park</p> <p><b><u>OCEAN COUNTY</u></b>            Central Regional            Manchester Township            Ocean City            Pinelands Regional</p> <p><b><u>PASSAIC COUNTY</u></b>            DePaul Catholic</p>	<p>Lakeland Regional            West Milford</p> <p><b><u>SALEM COUNTY</u></b>            Salem            Woodstown</p> <p><b><u>SOMERSET COUNTY</u></b>            Bernards            Bridgewater-Raritan Regional            Franklin            Hillsborough            Immaculata            Montgomery            Ridge            Watchung Hills Regional</p> <p><b><u>SUSSEX COUNTY</u></b>            Lenape Valley Regional            Newton            Sparta</p> <p><b><u>UNION COUNTY</u></b>            Cranford            Governor Livingston            Hillside            Linden</p> <p><b><u>WARREN COUNTY</u></b>            Blair Academy            Warren Hills Regional</p>
--	--	---	--

A Special thank you to Nick Nicholaides, ATC (Athletic Trainer Certified) at Ridgewood High School for his generosity and expertise in speaking with ABC and NBC News about concussion and the Association's matching funds grant program.

## Resources

- **[www.sportsconcussion.com](http://www.sportsconcussion.com)** – A resource for parents, athletic directors, trainers, coaches, teachers and student-athletes. This site provides information on the identification of concussion, the management of concussion and on safe return-to-play issues. Hear from national experts on important topics including:
  - What Really Happens When you are Concussed: Sideline Assessment
  - Impact of Concussion on Learning
  - How does your high school or recreation program manage concussions?
- **[www.ugotbrains.com](http://www.ugotbrains.com)** – A website designed by adolescents for adolescents so that we can all learn about safe driving through the real life stories and experiences of their peers.
- **[www.bianj.org](http://www.bianj.org)** – It is the mission of The Brain Injury Association of New Jersey, Inc. to support and advocate for individuals affected by brain injury and raise public awareness through education and prevention. Our vision is a world where all individuals with brain injury and their caregivers maximize their quality of life, the consequences of all unavoidable brain injuries are minimized and all preventable brain injuries are prevented.

**Brain Injury Association of New Jersey, Inc.**

**825 Georges Road, Second Floor, North Brunswick, NJ 08902 | (732) 745-0200 | Fax: (732) 745-0211 | E-mail: [info@bianj.org](mailto:info@bianj.org)**

**HELPLINE: 1-800-669-4323**



*In The Game > Injured > Return To Play Protocol*

# 4 steps for safe return to play

- 1 When in doubt....sit 'em out
- 2 When signs and symptoms of concussion are present:
  - No physical activity
  - Minimize cognitive/academic activities to levels that are easily tolerated
- 3 When signs and symptoms of concussion are completely gone:
  - Resume physical activity, gradually increasing intensity
  - Gradually increase the intensity of cognitive/academic activities
- 4 IF ANY SYMPTOMS REAPPEAR WHEN RESUMING ACTIVITIES, GO BACK TO STEP 1.

REMEMBER TO ALWAYS CONSULT A MEDICAL PROFESSIONAL WHO HAS KNOWLEDGE ABOUT, AND EXPERIENCE WITH, CONCUSSION.

Postage

Brain Injury Association of New Jersey, Inc.  
825 Georges Road, Second Floor  
North Brunswick, NJ 08902

