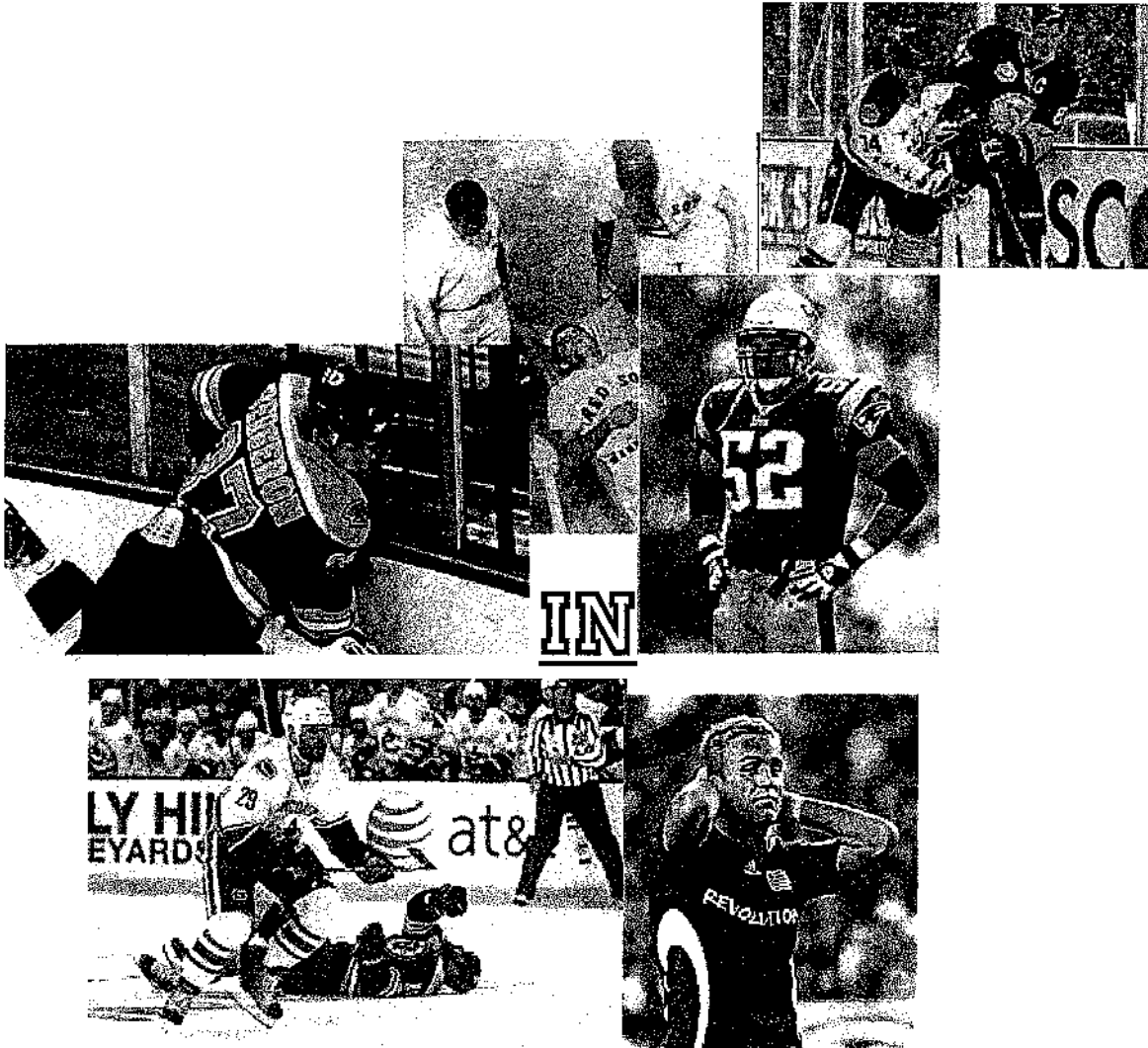


# CONCUSSIONS



# SPORTS

GAME HEALTH PROFESSIONALS

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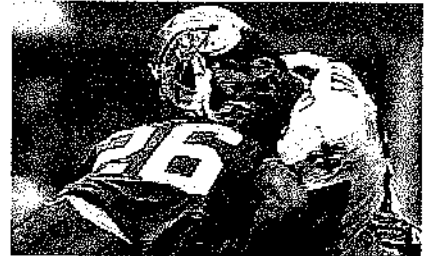
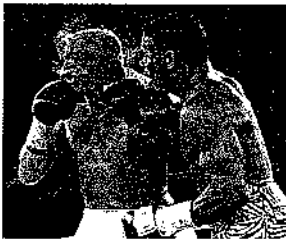
# CONCUSSION OR MILD TRAUMATIC BRAIN INJURY

## *WHAT IS A CONCUSSION?*

A concussion is considered a “mild traumatic brain injury”. It occurs when there is violent direct or indirect impact to the brain. There is damage to the brain at a cellular level. Essentially the pathways and communication within the brain are disrupted. Because the brain controls all the physical, emotional and intellectual components of the body, concussions are manifested with varying symptoms.

## *HOW DOES A CONCUSSION OCCUR?*

It occurs when a person has a direct hit to the head. This can be the result of an object like a helmet, stick, ball or puck directly hitting the head. Falls onto hard objects such as a bench, floor, field or ice can also



result a traumatic direct impact to the brain. Another

common way for a concussion to occur is when a person moving at a fast speed comes to an abrupt stop. This is seen in tackles, checking or falling into unmovable objects such as boards or stands. In this case, there may be no direct impact to the head. There is however, an abrupt deceleration of the body. While the body may stop in its tracks, the brain continues to lunge forward, hitting the inside of the skull. Typically the brain bounces back and forth, twisting and hitting the opposite sides of the skull. This is called a “coup, countercoup” injury. It is like shaking an egg with the yolk getting swished around inside. Obviously, the same “shaking” of the brain occurs with a direct impact



and is usually more violent. But this explains why athletes get concussions without hitting their heads directly.

## SYMPTOMS OF CONCUSSIONS

### ***HOW DOES THE PLAYER KNOW HE OR SHE HAS A CONCUSSION?***

Don't rely on the player to know if he or she has a concussion. Sometimes they may realize it but it is not uncommon for them **not** to recognize the symptoms as a concussion. Coaches, other players, referees and parents need to all be aware of the common symptoms of a concussion.

### ***WHEN DO THE SYMPTOMS MANIFEST THEMSELVES?***

Typically, a player will have at least some of the symptoms immediately. Common symptoms can be confusion, headaches, nausea and vomiting, short term memory loss, amnesia of the event, and loss of consciousness. Symptoms however can be delayed and not become prevalent for several hours. Concussive symptoms can also evolve over several days.

### ***ARE CONCUSSIONS CATEGORIZED OR GRADED BY SEVERITY?***

Severity is based on the history, symptoms and physical exam. When available, neurocognitive testing such as ImPACT testing is used as a valuable adjunct to the evaluation and management of concussions. In the past a grading system was used but was found very unreliable in correlating to the severity of the concussion.

### ***HOW ARE THE SYMPTOMS CATEGORIZED?***

Presently symptoms are broken down into four categories: physical, cognitive, emotional and sleep. Concussions can manifest themselves with varying combinations of these symptoms. Depending on what symptoms occur can give an idea of what parts of the brain are involved.

### SYMPTOMS OF CONCUSSIONS.

COGNITIVE	PHYSICAL	EMOTIONAL	SLEEP
Difficulty thinking clearly	Headache Fuzzy or blurry vision	Irritability	Sleeping more than usual
Feeling slowed down	Nausea or vomiting (early on) Dizziness	Sadness	Sleep less than usual
Difficulty concentrating	Sensitivity to noise or light Balance problems	More emotional	Trouble falling asleep
Difficulty remembering new information	Feeling tired, having no energy	Nervousness or anxiety	

Information from CDC

## **INITIAL MANAGEMENT OF THE CONCUSSION**

### ***WHAT SHOULD BE DONE IF A CONCUSSION IS SUSPECTED?***

Remove the player from the game or practice and do not allow him or her to return that day. Returning to play could result in a second injury to the athlete or exacerbate a potential head injury. Seek a medical evaluation in order to determine the extent of the concussion. **PLAYERS SHOULD NEVER RETURN TO PLAY UNTIL THE CONCUSSION HAS COMPLETELY HEALED AND THE PLAYER HAS BEEN CLEARED TO PLAY BY MEDICAL PERSONNEL TRAINED IN CONCUSSION MANAGEMENT.**

### ***SHOULD THE PLAYER BE SEEN IMMEDIATELY BY THEIR DOCTOR OR IN THE EMERGENCY DEPARTMENT?***

Not necessarily. Many factors go into whether a player should be seen immediately by medical personnel. How bad are the symptoms? Was there a real loss of consciousness? Are the symptoms getting worse? Do the parents feel uncomfortable with caring for the patient and feel the player should be seen by medical personnel? Are there other concerns such as neck or facial injuries? There is no exact answer and if you as the parent or the player want to be seen, seek medical care. Never overestimate the power of parental instincts!

### ***ISN'T A CAT SCAN NECESSARY TO DIAGNOSE A CONCUSSION?***

No! Concussions by definition have normal radiographic findings. Concussions are diagnosed by the history and exam. Cat Scans are obtained to exclude other possible issues such as a cerebral bleed or contusion, or a skull fracture.

### ***SHOULDN'T A CAT SCAN BE DONE TO EXCLUDE THESE POSSIBILITIES?***

Again, not necessarily. Most concussions can be managed without cat scans. The decision to get one has to take into account several factors. How serious are the symptoms? Are they getting worse? Is there a real concern for other types of brain injuries? As well, the exposure to radiation needs to be weighted against the benefits of obtaining the CAT scan. Always keep in mind that x-rays and cat scans emit radiation which is cumulative over a person's lifetime. In a young person, a cat scan of the head emits radiation directly on developing brain cells.

### ***WHO SHOULD I FOLLOW UP WITH?***

Call your doctor and make an appointment to be seen within 72 hours. Some physicians manage the concussion and others send the patients to trained concussion specialist. These doctors have more experience in concussion management and are certified in using and interpreting the neurocognitive tests now used in concussion management. The decision as to who you see will most likely depend on your doctor and insurance carrier.

## **HOME MANAGEMENT OF THE CONCUSSION**

### ***WHAT CAN BE DONE TO MANAGE THE CONCUSSION BEFORE THE PLAYER SEES THEIR DOCTOR?***

There are several things that can be done at home which are felt to maximize the healing process. The idea is to rest the brain and not put any stress on it.

- Monitor the athlete's symptoms. The SYMPTOM EVALUATION FORM (table 1) can assist you in this endeavor.
- Get plenty of rest and maintain a regular sleep/awake schedule. The brain likes structured patterns.
- While rest is important, regular daily activity like school, extracurricular activities are also important.
- Early on, avoid going out and hanging out with friends. Later however, socializing is important for the player.
- No video games. This is "Red Bull" to the brain.
- No physical activity.
- No alcohol or drugs.
- Stop any activities such as watching television, computer or reading if they trigger the concussive symptoms.
- No driving a car. You do not want to risk an accident.
- Let the school know immediately about the concussion so that accommodations can be made.

### ***IS THERE ANYTHING THAT CAN BE TAKEN TO HELP THE CONCUSSION?***

- Treat the pain with Tylenol
- Non steroidal medications like Motrin can be used but are relatively contraindicated during the first 72 hours because of the potential for causing bleeding
- Apply ice to scalp contusions and the neck if there is any pain.
- Drink plenty of fluids. Remember, the concussion usually happens during a game or practice and the player is in a physiologically dehydrated state.
- Omega 3 in animal studies has been found helpful. Some universities have started using 2-3 grams of omega 3 each day while the athlete has the concussion. There are no human studies as of yet indicating any benefit to the use of Omega 3.

### ***SHOULD YOU WAKE UP THE PLAYER EVERY HOUR THE FIRST NIGHT AFTER A CONCUSSION?***

There is a misunderstanding on why people are checked on after a head injury. Prior to Cat Scans, frequent evaluations needed to be done to assure the patient was not getting



## **FOLLOW UP CARE**

### ***WHO CAN MANAGE A CONCUSSION?***

Several different types of professionals are caring for concussed individuals. Massachusetts recently mandated that any athlete playing sports under the guise of the Massachusetts Interscholastic Athletic Association (MIAA) must be evaluated and treated by a trainer, midlevel provider or a doctor who is trained in the management of concussions. The law does not state what the qualifications are. Even amongst doctors, there is a wide discrepancy in the understanding and management of concussions.

### ***WHAT CAN WE EXPECT IF WE SEE A DOCTOR?***

This all depends on the doctor. Many are not up to date on the present literature of concussions. Oftentimes they wait till the physical symptoms resolve and then clear the player. Others wait till the symptoms resolve and make the player wait several days more before going back. Both approaches run the risk of the athlete lying about the symptoms because he or she wants to start playing again. It also does not account for the concussed athlete who may be asymptomatic but still has a healing brain.

### ***IF THE SYMPTOMS ARE RESOLVED, WHY CAN'T THE ATHLETE RETURN TO PLAY?***

The analogy is a broken wrist. After a couple of weeks, a broken wrist feels fine. It is in a cast, it has started to heal, and the athlete can most likely use that hand freely. In some cases, he or she can even return to play with the cast on. No one would expect the doctor to remove the cast after a couple of weeks, because an x-ray would show the wrist was healing and still broken. The same holds true with concussions; the physical symptoms can resolve, but the brain can still be healing. Just like a healing wrist, the brain is very susceptible to an injury if it is in a healing state.

### ***WHAT IS CONSIDERED THE STANDARD FOR MANAGING A CONCUSSION?***

Management now takes a three pronged approach; obtaining a thorough history, physical exam and neurocognitive testing. The most used test is ImPact. After the player is felt to be concussion free, a graduated return to play protocol is instituted.

## **ImPACT TESTING**

### ***WHAT IS ImPACT TESTING AND HOW DOES IT HELP IN MANAGING A CONCUSSION?***

ImPact is a neurocognitive test. The test gives us a functional “image” of the brain. For now, it is the concussion’s CAT scan. The test measures different aspects of the brain, in particular, recall, memory, concentration, mental speed and reaction time. When the test is combined with a baseline test, it is a valuable tool to assess the extent of the concussion. Repeat testing also allows for monitoring the progression of the concussion. **It should be emphasized that the test cannot be used alone. History and exam are vital for appropriate management.**

### ***IS ImPACT CONSIDERED A STANDARD FOR MANAGEMENT OF CONCUSSIONS?***

Neurocognitive testing is now considered a vital part of concussion management. There are several tests available but the most commonly used is ImPACT. It is used by all the major professional teams in the United States as well as most of the colleges and universities.

### ***HOW DOES ImPACT TESTING ADD TO THE MANAGEMENT IN TREATING A CONCUSSION?***

The test assists the medical personnel in determining the extent of the concussion. It assesses how the brain is functioning after a player has a head injury. The test works best with a baseline that is taken when the player is concussion free. However standards have been established that can be used when a baseline test is not available. The test also acts as a lie detector. There is a lot of pressure on players to return. It is not uncommon for them to lie about how they feel. In these cases the test may demonstrate that they are not ready to return to play. In other cases, the outward symptoms have resolved but the test shows the brain is still healing. Alternatively, a player may pass the test and still have a concussion. This is seen when the test does not assess the part of the brain involved with the concussion. The most common area is when balance is involved.

### ***WHY WOULD AN ATHLETE LIE ABOUT A CONCUSSION?***

There is a cultural bias with concussions. Since there is no test or imaging that shows the concussion, the injury is not validated. If a player has a broken bone, he gets a cast.....a laceration, stitches.....a muscle strain, a limp..... With concussions the symptoms can clear up but the player still is healing. There is no outward sign of injury. Because of this, there is an unrealistic desire to return. Innocent comments from coaches and teammates make the player feel like he is letting his or her team down. Parents, especially those who do not understand the gravity of concussions may be their child’s worse enemy. After all, it was not very long ago that playing “through” a concussion proved your manhood



## **RETURN TO PLAY PROTOCOL**

### ***WHAT IS A RETURN TO PLAY PROTOCOL?***

This is the final phase before a player can return to full athletic activities. Over the course of four to five days, the athlete increases the amount of physical activity in order to see if the concussive symptoms can be reproduced with progressive increase in exertion. The format is standard in all sports. It should be considered the equivalent of a cardiac stress test. After assuring that the patient does not have a heart attack, a stress test is done to see if the symptoms can be reproduced. In the Return To Play Protocol, we are using physical activity to see if we can reproduce the concussive symptoms.

## **RETURN TO PLAY PROTOCOL**

The goal of a return to play protocol is to advance the players level of activity so as to see if the concussive symptoms are triggered. It is also a method to get the player in to game shape.

- Day 1: Light aerobic activity such as jogging, light skating, bicycle, treadmill for 20 to 30 minutes.
- Day 2: Increase aerobic activity and institute individual sports specific drills.
- Day 3: Advance to more complex drills and increase the pace. The player should now participate in the full practice. No contact and no scrimmaging.
- Day 4: Player participates in a full practice with no contact.
- Day 5: Player participates in a full practice without restriction.

If at anytime the symptoms reoccur, the athlete stops what they are doing and rests a day before repeating the last step they accomplished with out symptoms. After completing step five without symptoms, the player is cleared to return to games.

## SYMPTOM EVALUATION: WEEK ONE

NAME: \_\_\_\_\_

	0 HRS	2-3 HR	24 HRS	48 HRS	72 HRS	DAY 4	DAY 5	DAY 6	DAY 7
<b>DATE</b> / /20									
<b>PHYSICAL</b>									
HEADACHES									
VOMITING									
FATIGUE									
NUMBNESS/TINGLING									
SENSITIVITY TO LIGHT									
SENSITIVITY TO NOISE									
VISUAL PROBLEMS									
BALANCE PROBLEMS									
DIZZINESS									
<b>THINKING</b>									
FEELING MENTALLY FOGGY									
PROBLEMS CONCENTRATING									
PROBLEMS REMEMBERING									
FEELING SLOW/RUN DOWN									
<b>EMOTIONAL</b>									
IRRITABILITY									
SADNESS									
FEELING MORE EMOTIONAL									
NERVOUSNESS									
<b>SLEEP</b>									
DROWSINESS									
SLEEPING MORE THAN USUAL									
SLEEPING LESS THAN USUAL									
TROUBLE FALLING ASLEEP									
<b>TOTAL SCORE</b>									

SYMPTOM SCORE: (0-6) 0: doesn't exist. 6: most severe.

Total the scores to monitor the trend. 0 HRS = the initial symptom score. Monitor symptoms until they have completely resolved.

<b>RED FLAGS: Call your doctor or go to your emergency department if you suddenly experience any of the following</b>			
Headaches that worsen	Look very drowsy, can't be awakened	Can't recognize people or places	Unusual behavior change
Seizures	Repeated vomiting	Increasing confusion	Increasing irritability
Neck pain	Slurred speech	Weakness or numbness in arms or legs	Loss of consciousness

## SYMPTOMS EVALUATION WEEK TWO - SEVEN

**NAME:** \_\_\_\_\_

	DAY 10	DAY 14	DAY 17	DAY 21	DAY 24	DAY 28	WEEK 5	WEEK 6	WEEK 7
<b>DATE</b> /     /20									
<b>PHYSICAL</b>									
HEADACHES									
VOMITING									
FATIGUE									
NUMBNESS/TINGLING									
SENSITIVITY TO LIGHT									
SENSITIVITY TO NOISE									
VISUAL PROBLEMS									
BALANCE PROBLEMS									
DIZZINESS									
<b>THINKING</b>									
FEELING MENTALLY FOGGY									
PROBLEMS CONCENTRATING									
PROBLEMS REMEMBERING									
FEELING SLOW/RUN DOWN									
<b>EMOTIONAL</b>									
IRRITABILITY									
SADNESS									
FEELING MORE EMOTIONAL									
NERVOUSNESS									
<b>SLEEP</b>									
DROWSINESS									
SLEEPING MORE THAN USUAL									
SLEEPING LESS THAN USUAL									
TROUBLE FALLING ASLEEP									
<b>TOTAL SCORE</b>									

## CONCUSSION RESOURCES

National Federation of High School Coaches

<http://nfhslearn.com/electiveDetail.aspx?courseID=15000>

CDC Concussion Information

<http://www.cdc.gov/TraumaticBrainInjury/>

ImPACT

<http://impacttest.com/>

ESPN SUDDEN IMPACT SYNDROME

YOUTUBE: <http://www.youtube.com/watch?v=f0xJT53SZqQ>

PBS SUDDEN IMPACT SYNDROME

YOUTUBE: <http://www.youtube.com/watch?v=V12Zqmd3Btc>

## CONCUSSION MANAGEMENT



SIGNATURE HEALTHCARE  
BROCKTON HOSPITAL  
DAN MUSE, MD  
KEN LAWSON, MD  
CERTIFIED ImPACT CONSULTANTS  
508-941-7971

# GAME HEALTH PROFESSIONALS

*athletic success through education, safety and prevention of injuries*

**A COMPREHENSIVE PROGRAM THAT PROVIDES EDUCATION AND SKILLS IN THE AREA OF SPORTS HEALTH FOR COACHES PARENTS AND PLAYERS**

## **CONCUSSION EDUCATION AND BASELINE TESTING**

- ★Baseline testing can be done at the programs site. All we need is a wireless connection!
- ★A Comprehensive discussion on concussions with information packets for players, parents and coaches are available

## **CONCUSSION MANAGEMENT.....**

- ★If a concussion does occur, we can arrange a referral to physicians certified as ImPact consultants.

## **CPR.....**

- ★Programs can chose to be certified via The American Heart Association or The Sudden Cardiac Arrest Association.

## **USE OF AUTOMATIC DEFIBRILLATORS.....**

- ★We will train players, coaches and parents in the use of the Automatic External Defibrillator and assist you in any purchases your program may want to make.

## **PREVENTION AND MANAGEMENT OF SPORTS INJURIES.....**

- ★Certified trainers and physicial therapists are available to discuss how to prevent and manage sports injuries.

## **NUTRITION.....**

- ★We are what we eat and the appropriate nutrition assures top performance and enjoyment.

**FOR MORE INFORMATION**

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**(781) 530-7233**