SPORTS MEDICINE

CONNECTICUT CHILDREN'S MEDICAL CENTER

Understanding Mild Head Injury

By

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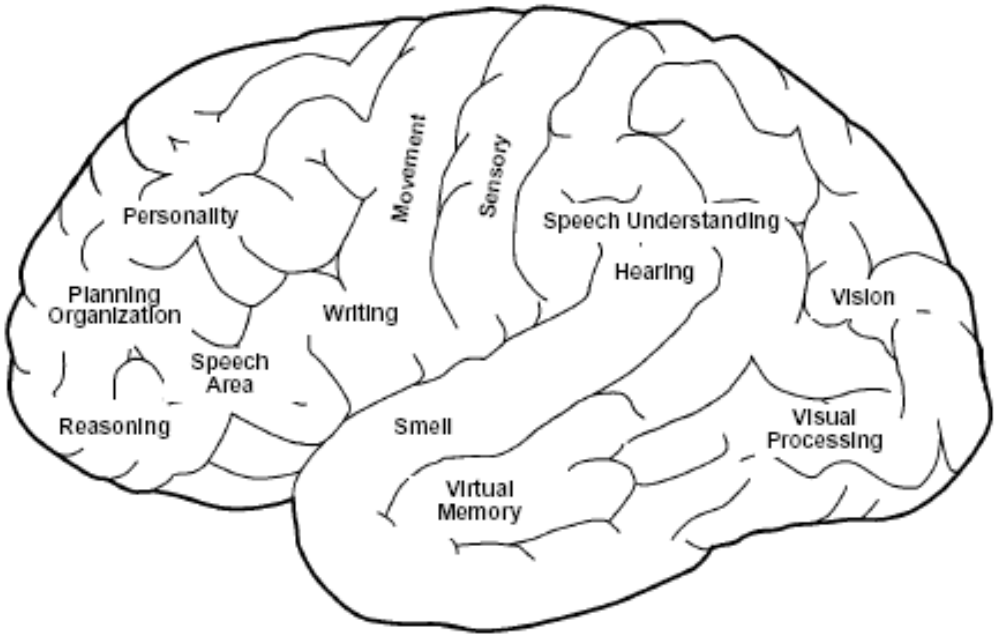

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Mary is a midfielder for her high school soccer team. She plays with a great deal of energy and is considered one of the toughest defenders on her team. Under normal playing conditions she is always around the ball and isn't afraid to challenge anyone for a 50/50 ball. Midway through the first half of a game against a league opponent Mary went in on a 50/50 ball with her usual intensity but this time she got knocked off her feet, hit the ground hard and struck her head.

This is a scene that is played out daily on soccer fields and athletic fields across the country. Many times Mary and players like her will get up, brush off the dirt and continue to play but there are times when instead of getting up and continuing play, they stay down unaware what just happened. They know they hit their head but aren't really sure why they can't get up. They are dizzy, they have a dazed feeling about them and their head hurts. Some times they aren't able to focus, they can't walk straight, and they may not be able to remember where they are and who they are playing. All they are aware of is that things just aren't right. What they soon will learn is that they received a concussion and everything they are experiencing is signs and symptoms of concussion.

So, what are concussions and why are we now paying so much attention to them? We will attempt to answer to these questions, and others.

What is a concussion? Concussions are defined as a brief, transient alteration in mental function. They represent a serious injury that needs to be recognized, diagnosed as to its severity, and treated appropriately.[1] Simply stated, a concussion causes chemical imbalances in the brain to occur. The brain has to then regulate itself to bring the chemical imbalance back to normal. These imbalances cause the brain to work overtime to return itself back to normal. To do this the brain needs blood. However, when the brain is concussed there is a decrease in blood flow to the brain. This inability for the brain get energy from the blood creates an energy crisis. With all the systems in the brain working overtime and a decrease in blood flow the neurons in the brain malfunction which cause the signs and symptoms that people feel when they have a concussion. These concussion symptoms can last briefly or last for a long period of time, while the brain tries to recover. As long as the athlete is still reporting having signs or symptoms it would be dangerous for an athlete to return to play before all their concussion symptoms have resolved. In addition, signs and symptoms have to return to normal while both at rest and with exertion because an increase in blood pressure can bring back the symptoms and all symptoms have to have resolved to safely return to play.

Today concussions are looked at and managed much differently. There has been much research done on the subject of concussion and this research is starting to change the face of concussion management. A most recent advancement has been the advent of computerized neuro-cognitive testing. This technology allows us to take a look at how the brain is functioning. The athlete will report on their current symptoms and complete a battery of tests that will show how the brain is functioning at that moment. This testing is done as an adjunct to other tests that are done in the office and on the field.

How long will I be out? This is a common question that all athletes are concerned with. The best answer is: when you have fully recovered. It is important to understand that concussion is a serious injury and it isn't to be taken lightly. Unlike other sports related injuries, concussions can't be repaired with surgery. If the brain has been severely damaged that damage will be permanent and recovery will be a long drawn out process with no promise of complete recovery. Because of this consequence we are now much more conservative with our management approach. Athletes, parents, and coaches need to be aware that if they suspect a concussion has occurred, rest is the only treatment. This doesn't mean complete bed rest but rest from activities that will over exert the brain and increase symptoms. This may mean that not only is the athlete required to refrain from practice but it may also mean that they decrease their activity at school and at home. Adjusting their school work and limiting the amount of time studying at home will allow the brain to rest. However, this rest may also include refraining from playing video games and backyard play, any activity that will exacerbate symptoms. The brain needs to rest initially and the over stimulation of playing video games isn't rest and can actually exacerbate the symptoms. Someone who has received a concussion should try to rest with minimal exertion. When symptoms have resolved, a slow and progressive return to activity is warranted.

There is one another concern with returning to play too soon. It has been reported that a condition called "Second Impact Syndrome" can occur as a result of receiving a second concussion while the athlete is still symptomatic and healing from a previous concussion.[2] There have been reported incidences of athletes returning to play before they had fully recovered from a concussion and received another blow to the head which resulted in permanent brain damage or even death. This condition is called Second Impact Syndrome and has been reported to be more prevalent in the adolescent age group.[3] It is because of this and other factors that have led us to the current philosophy of concussion management. Treat the concussion until it has completely resolved both at rest and after exertional testing. Then, and only then is return to play recommended. Every individual is different and every concussion is different, even within the same person. So predicting exactly when an athlete will return to play is a difficult question to answer. The only true safe answer is "when the concussion is resolved".

What do you do when you think you have a concussion?

- **Report it, tell your coach and parents**
- **Report it, tell your medical provider or athletic trainer**
- **Get tested with a neuro-cognitive exam**
- **Once returned to normal, have an exertional test to insure symptoms don't return**
- **Use a progressive return to play program to work yourself safely back in to play**

What do you do when you think you have received a concussion? The first thing is, ***Report it***. Tell your

coach that you hit your head and you just don't feel right. Tell him/her what you are feeling and don't return to play. ***Tell your parents***. Let them know what happened. If you are starting to feel better then you should rest, if you start to feel worse you should be taken to the emergency room for an examination. Some of the things that you may feel are: headache, nausea, balance problems or dizziness, double or fuzzy vision, sensitivity to light or noise, feeling sluggish or feeling foggy or groggy, difficulty concentrating or memory problems and confusion.[4] ***Report it to your athletic trainer or your medical provider***. It is important that your medical providers are aware of your injury so they can provide appropriate care. Part of that care should be rest. In addition, ***a referral for a neuro-cognitive exam*** to test brain function should be made. After your signs and symptoms have resolved and your neuro-cognitive exam has returned to normal, you should then be ***exertionally tested*** and a ***progressive return to play plan*** put into place. It is important to understand that you may feel better at rest but as soon as you start to exert yourself your symptoms can return. Therefore, once you feel better at rest, your symptoms are gone, and your neuro-cognitive are within normal ranges, you should have an athletic trainer or medical provider do an exertional test with you to insure your symptoms don't return. This test may involve activities like running, jumping, sprinting, sit-ups, push-ups, and some sport specific activity but <u>not</u> activities that will involve possible contact to the head. If any symptoms return during exertion, you should stop and try progressing again the next day, only if the symptoms have subsided. Once the exertional test is passed without symptoms returning then a slow progression to return to play should be followed. This will involve light non-contact practice and increase slowly to full-contact practice and then game play. This progression should progress over a few days, with the knowledge that, if any symptoms return the progression should be put on hold until the symptoms have resolved and resume at the last level that was symptom free.

Concussions are a serious injury no matter how slight it is thought to be. An athlete of adolescent age needs to be treated more conservatively than the adult athlete. It may take longer for the adolescent to recover from concussion due to the belief that the brain is still developing.[5] But no matter how long the recovery process is, <u>never</u> return to sport participation while still suffering from the affects of a concussion.

Mary left the game under her own power and was diagnosed with a concussion. She missed the rest of that game and sat out the next. Her symptoms resolved and her neuro-cognitive test returned to normal after 6 days. She was allowed to return to play after a progressive return to play protocol. She continued to have an outstanding senior year and went on to have a very successful college career having never received another concussion. She graduated with honors and is leading a life without any lasting affects of her concussion. This is a happy ending. One that we hope all athletes who have received a concussion will have if they are managed correctly.

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[1] Elite Sports Medicine Website, www.elitesportsmedicine.org/head.php , 2004
[2] Cantu RC: Second-impact syndrome. Clinics in Sports Medicine 17:37-44, 1998
[3] Cobb S., Battin B: Second Impact Syndrome. The Journal of Nursing: 20:262-267, 2004
[4] *The American Journal of Sports Medicine* 32:47-54 (2004) "Grade 1 or "ding" Concussions in High School Athletes" Mark R. Lovell, PhD, Michael W. Collins, PhD, Grant L. Iverson, PhD, Karen M. Johnston, MD, PhD and James P. Bradley, MD
[5] Guskiewicz KM et.al. How to Reduce the Severity of Sport Related Concussion and Improve Return to Play Decisions. www.nata.org/newsrelease/archives/000148.htm , 2006