



# Concussion Protocol and Treatment

## What is a concussion?

1. A concussion is not a structural anatomic injury, therefore, an MRI or CT scan are normal.
2. A concussion is a mild traumatic brain injury.
3. It is a biomechanical and physiological alteration of the neurons in the brain and creates an energy crisis. There is a massive release of neurotransmitters that interferes with cognitive function, particularly memory and reaction time, which are measured by the ImPACT Program.

## Incidence of Biomechanics of Concussion

1. The incidence of concussion overall in all sports is approximately 9-10%. Sports with a higher incidence of approximately 12-13% include football, hockey, lacrosse, and women's soccer. The brain is not fully mature until age 19, therefore adolescents, particularly females, are more susceptible to concussions and recurrent concussions. Adolescent female athletes that play soccer and lacrosse have some of the highest incidence of concussions.
2. A concussion occurs when de-acceleration causes the softer brain to hit the skull. When the head hits the ground the brain basically hits the front and back of the skull and causes injury. These are not structural or tearing injuries which is why MRI and CT scans are not particularly helpful. They effect the cognitive centers of the brain primarily memory and reaction time.

## ImPACT Concussion Program

1. The ImPACT Concussion Program is a computerized test to measure cognitive function of the brain primarily memory and reaction time. The ImPACT Concussion testing is the most widely used computer concussion evaluation tool in the world. It is used by all the professional teams including the NFL, NHL, MLB, 7,400 high schools, and 1,000 universities. ImPACT testing is 95% accurate in detecting deficits in brain function within hours to days following a concussion.
2. Baseline testing is recommended on all athletes to establish a basis for comparison if a concussion is suspected. Your son or daughter had a baseline ImPACT Study done prior to the competitive season by the athletic trainer. If, and when, a concussion occurs the athletic trainer will repeat a post-concussion ImPACT Study within 24-72 hours. The results of this test will then be compared to the baseline ImPACT Study.
3. The athletic trainer will then either call or text me and I will go online to review the results of the repeat ImPACT Study and compare this to the baseline. Assuming there is a concussion I will notify the trainer. I will then see the athlete in my office for a neurologic examination and to go over the results of the ImPACT test. I will also start the treatment program and probably make some academic accommodations.

## Concussion Program

The treatment for concussion is and always has been rest. This is physical rest but also mental rest. The brain has been injured and it is very important to rest the brain from activity. This includes text messaging, watching videos, playing video games, etc. In addition to this when I see the athlete in the office I will fax an academic accommodation report to your school to be implemented. The athletic trainer and I will work very closely together as a team to manage the concussion. We will repeat the ImPACT test on a weekly basis.

## **Return to Athletics**

There are 3 primary criteria for the athlete returning to his or her sporting activities:

1. The athlete needs to be asymptomatic.
2. The repeat ImPACT studies and test score has to be as good as or better than the baseline.
3. The patient's neurologic exam needs to be normal.

When the athlete meets the criteria, we will then refer the patient to the athletic trainer who will then commence a 5 day progressive return to activity. The progression is very important since at each stage the athlete has to be asymptomatic. The first and second day are primarily aerobic type activities, the third day the athlete returns to non-contact sporting activity, the fourth day full contact athletics and on the fifth day return to competitive sporting events. The ImPACT testing allows us to now have an objective quantifiable testing for us to determine exactly when the concussion is healed and most importantly when it is safe to return the athlete back to competition. Having managed hundreds of concussions prior to this without the ImPACT Program it was very difficult to determine when the athlete's concussion had resolved.