CONCUSSION OVERVIEW:

A concussion can occur when a person receives a traumatic force to the head or upper body that causes the brain to shake inside of the skull. The injury is defined as a concussion when there is a change in mental status such as loss of consciousness, amnesia, disorientation, confusion or mental fogginess.

Following a concussion, there is a period of change in brain function that varies in severity and length with each individual. During this time the brain is vulnerable to more severe or permanent injury. If the person sustains a second concussion during this time period, the risk of more serious brain injury increases.

Chronic traumatic encephalopathy (CTE), the degenerative brain disease caused by (repeated) head trauma, was initially diagnosed in professional boxers. Diagnosing CTE in athletes from other sports has gained increased attention as researchers learn more. Those of us who are responsible for the welfare of student-athletes have an obligation to follow the research closely, to use the most sophisticated assessment tools in the training room, and to continue to communicate with governing authorities and the public regarding the best thinking of our medical professionals.

Mainstream neurodiagnostic techniques, such as CT scan and MRI, though invaluable in discerning more serious intracranial pathology (e.g. skull fracture, hematoma), are generally insensitive in measuring the subtle effects of concussion. Symptoms indicative of brain impairment can be understated and may go unnoticed by the athlete, team medical staff, parents, and/or coaches.

Therefore, Amherst uses additional neurodiagnostic tools for assessing and monitoring concussive events. At the forefront of proper concussion management is the implementation of baseline and/or post-injury neurocognitive testing. Such evaluation can help to objectively assess the concussed athlete's post-injury condition and track recovery for safe return to play, thus preventing the cumulative effects of concussion. Varsity athletes in contact sports, as well as all club rugby and wrestling participants, are required to undergo baseline neurocognitive testing prior to competition.

TESTING MECHANISMS:

*SAC Testing:* The SAC (Standard Assessment of Concussion) is a brief screening instrument designed for the neurocognitive assessment of concussion that takes about 5 minutes to administer. The SAC includes measures of orientation, immediate memory, concentration and delayed recall. The SAC scores these constructs on a 30 point scale. This test is used as a sideline measure of concussion and the score is compared to a preseason base line score.

*ImPACT:* ImPACT (Immediate Post-concussion Assessment and Cognitive Testing) is a computerized neurological test battery developed specifically for the evaluation of sports concussions. It is currently being used by the NFL, Major League Baseball, USA Hockey, US Soccer, and hundreds of high schools and colleges around the country including many of the schools that Amherst competes against. Amherst began using this tool several years ago to assess student-athletes’ post concussion status. The ImPACT test is composed of 6 modules and a symptom questionnaire:
Module 1: (Word Discrimination)
- Evaluates attentional processes, verbal recognition, and memory.
- 12 words are listed and then the question is asked “Was _____ one of the words?” After Module 6 is completed, the same questions are asked again to test delayed recall.

Module 2: (Design Memory)
- Evaluates attentional processes, visual recognition, immediate and delayed recall.
- Designs are shown and then the question is asked “Was _____ one of the designs?”

Module 3: (Xs and Os)
- Evaluates visual working memory, visual processing speed, and visual memory.
- Instructions are given – “right click when you see a circle and left click when you see a square” then a memory question is given (e.g., Xs are given in a pattern and then the question is asked “Was _____ the pattern?”

Module 4: (Symbol Matching)
- Evaluates visual processing speed, learning and memory.
- The student-athlete is shown a variety of symbols with corresponding numbers (e.g., ^3), they are then given the symbol and asked to click on the appropriate number. He/she is then asked to remember the list of symbols and numbers.

Module 5: (Color Matching)
- Evaluates reaction time and impulse control.
- Student-athletes are first tested for color blindness.
- Student-athlete is shown a color word in colored ink (e.g., “blue” written in red ink), he/she is then to click on the work only when the color and word match.

Module 6 (Three Letters)
- Evaluates working memory and visual motor speed.
- Student-athlete is first asked to click on numbers 1-25 in reverse order.
- Upon completion of this task, 3 letters appear on the screen.
- Student-athlete is then asked to click on numbers 1-25 in reverse order.
- Upon completion of this task they are asked to recall the 3 letters in the appropriate order.

The symptom questionnaire is merely a subjective checklist of the student-athletes symptoms at the time of the test. The test has been repeatedly checked for validity and reliability and has been corrected as needed. For further information, please refer to the ImPact website: www.impacttest.com.
Amherst’s use of the ImPACT Test: It is important to note that this test is meant to assist and supplement the medical staff’s judgment with regard to returning an athlete to play. In addition to having the student-athlete who has sustained a head injury take the ImPACT Test, Amherst medical staff takes a detailed history of the incident in question as well as previous history of head injury. Sports Medicine personnel question the athlete about issues surrounding their daily routine (e.g. are they sleeping well; are they having trouble concentrating in class; has their appetite changed; do they have headaches...). Our medical staff assesses them clinically (e.g. assess their pupil reaction, test their balance and coordination; assess their basic memory and cognitive function), and when appropriate, they exercise-test them.

A return to play decision is based on the evaluation of all of this information and is made with the best professional judgment that returning an athlete to participation is medically prudent and in the student’s best interest. ImPACT helps medical staff to identify deficits and make appropriate decisions about when it is safe for an athlete to return to play. The biggest risk of returning an athlete to athletics before their concussion is completely resolved is the athlete’s susceptibility to “second impact syndrome.” Second Impact syndrome results from acute, potentially fatal, brain swelling that occurs when a second concussion is sustained before complete recovery from a previous concussion.

The Amherst Sports Medicine staff of certified athletic trainers adheres to the most up-to-date protocols in assessing, treating and monitoring all injuries; with particular attention to head, neck and spine injuries. These protocols are reviewed regularly in conjunction with Amherst Health Services Director Dr. Warren Morgan. The College also employs a team physician, Dr. David Doctor ’82. Medical decisions relative to athletes are the exclusive purview of medical staff.