

# Vanderbilt Sports Medicine

## Concussion Management Guidelines

The following guidelines have been developed to aid the Vanderbilt Sports Medicine staff in the evaluation and management of the Vanderbilt University intercollegiate student-athlete who has sustained a concussion. These guidelines are derived from current evidence-based practice and are recommended as a minimum standard of care, allowing the Sports Medicine staff to manage concussions individually as the situation warrants. The progression of a student-athlete with a diagnosed concussion will include cognitive and physical exertion in a stepwise process to ensure a safe return to full participation in academics and athletics.

### Concussion Management Healthcare Providers

- The following healthcare professionals will be utilized in the management of concussion: Team Physician, Certified Athletic Trainer, Neurosurgeon\*
- \*other healthcare providers may be consulted on a case by case basis at the discretion of the Team Physician

### Baseline Testing and Procedures

#### Concussion Baseline [performed BIENNIALY\*]

- Concussion Baseline Report Form [Appendix A]
- Post-Concussion Symptom Scale (PCSS) (C. Randolph et al 2009) [Appendix B]
- Modified Balance Error Scoring System (M-BESS) (Riemann & Guskiewicz 2000) [Appendix C]
- ImPACT® Baseline Neurocognitive Testing [Appendix D]

*\*A new baseline will be obtained every two years. If a concussion is sustained during season; a new baseline will be obtained prior to the next playing season, traditional or non-traditional.*

#### Concussion Education [performed ANNUALLY]

- NCAA Educational Material for Student-Athletes [Appendix E]
- Concussion Acknowledgement and Signature Form: Student-Athlete [Appendix F]
- NCAA & Vanderbilt University Educational Material for Coaches/Athletics Support Staff [Appendix G]
- Concussion Acknowledgement and Signature Form: Coaches/Athletics Support Staff [Appendix H]
- Concussion Acknowledgement and Signature Form: Medical Provider [Appendix I]

### Time of Injury

- Concussion Injury Report Form [Appendix J]
- Post-Concussion Symptom Scale (PCSS)
- Modified Balance Error Scoring System (m-BESS)
- Educate the student-athlete on the importance of cognitive rest which includes limiting or removing cell phone use/texting, video games/television, and attending classes/academic work (d'Hemecourt 2011; Kissick & Johnston 2005; Doolan et al 2012).

### Recommendations

- If the student-athlete is diagnosed with a concussion they will be withheld from competition or practice and not return to activity for the remainder of that day (NCAA Executive Committee Policy April 2010).
- If the student-athlete is asymptomatic under normal conditions and following functional exertion testing the following day, they should be re-evaluated for return to participation.
- If the student-athlete is still symptomatic under normal conditions and/or following functional exertion testing, they should not return to participation until cleared through the subsequent outlined procedures.
- Cognitive rest is an essential component of the recovery process. Academic accommodations may be necessary as part of the treatment plan.

### Post-Concussion Follow-Up [within 24 hours post-injury]

- Medical assessment with Team Physician or the physician's designee (Certified Athletic Trainer).
- Post-Concussion Symptom Scale (PCSS)
- Modified Balance Error Scoring System (m-BESS)
- Determination of the student-athlete's ability to attend class is contingent on symptom evaluation during the post-acute phase. Notify Assistant Director for Student Academic Services if accommodations are warranted.

## Post-Concussion ImpACT® Test Guidelines

- The decision of which phase to ImpACT® test a student-athlete will be at the discretion of the Team Physician on a case by case basis to evaluate neurocognitive function.
- Student-athletes must have completed an ImpACT® test that is reviewed by the Team Physician before being released to Phase 5 full practice participation with contact.

## Phase 0 - Cognitive Exertion

- The student-athlete will follow a supervised return-to-learn process to allow proper cognitive recovery and integration back into their full academic work load. This process will include a team-based approach involving the Team Physician, Athletic Trainer, and the Vanderbilt Academic Support Center staff.
  - Student-athletes who demonstrate a trending decrease in symptomology may be returned to class on an individual basis.
  - Student-athletes that have an increase in symptoms upon returning to class may require adjustments as needed based on symptom exacerbation.
  - For those student-athletes who experience continued symptoms and or prolonged academic difficulties, academic accommodations will be made available on an individual basis through the Vanderbilt Academic Support Center.
    - Under the guidance of Vanderbilt Academic Support Center, additional campus resources are available through the Vanderbilt Equal Opportunity, Affirmative Action, and Disability Services Department.
- Stepwise return to sport progression will proceed to Phase 1 when the student-athlete is **asymptomatic** and has **successfully returned to their full academic work load**.

## Phase 1 - Aerobic Exertion

- Post-Concussion Symptom Scale (PCSS)
- Functional exertion test
  - Bike 20 minutes at seventy percent (70%) of predicted maximum heart rate (PMHR)
  - Rest for 15 minutes
  - Monitor symptoms
  - Incremental Treadmill Test 20 minutes (Leddy et al 2010) *[Appendix K]*
- Stepwise return to sport progression will proceed to Phase 2 if student-athlete is asymptomatic at the current level. If any post concussive symptoms occur, reassess the following day and repeat phase.

## Phase 2 - Functional Testing Progression

- Monitor symptoms
- Initial Functional Exertion: duration approximately 10- 15 minutes with 5 minutes rest post session
  - Scissor step/quick step
  - Jogs
  - Lateral shuffle
  - Backpedal
  - Sprints
- Advanced Functional Exertion: duration approximately 10- 15 minutes with 5 minutes rest post session
  - Sit-ups
  - Burpees
  - Push-ups
  - Sprints
  - Sprints with intermittent push-ups
  - Four corners with 90 degree spin
- Stepwise return to sport progression will proceed to Phase 3 if student-athlete is asymptomatic at the current level. If any post concussive symptoms occur, reassess the following day and repeat phase.

\*\* Student-athlete may begin limited weight lifting if asymptomatic depending on the sport requirements

### **Phase 3 - Sport Specific Exertion**

- Monitor symptoms
- Initial Sport-Specific Exertion: duration approximately 10-15 minutes with 5 minutes rest post session
  - Moderate aerobic exercises specific to sport
  - Monitor symptoms
  - Progression depends on student-athlete remaining asymptomatic
- Intermediate Sport-Specific Exertion: duration approximately 10-15 minutes with 5 minutes rest post session
  - Progressively difficult aerobic exercises specific to sport
  - Monitor symptoms
  - Progression depends on student-athlete remaining asymptomatic
- Advanced: duration approximately 10-15 minutes with 5 minutes rest post session
  - Demanding aerobic exercises specific to sport
  - Monitor symptoms
  - Progression depends on student-athlete remaining asymptomatic
- Sport-Specific Exertion Guidelines
  - Appendix L - Baseball
  - Appendix M - Basketball
  - Appendix N - Bowling
  - Appendix O - Football OL/DL
  - Appendix P - Football RB/TE/LB/WR/DB
  - Appendix Q - Football QB/Special Teams
  - Appendix R - Golf
  - Appendix S - Women's Lacrosse
  - Appendix T - Soccer
  - Appendix U - Softball
  - Appendix V - Swimming
  - Appendix W - Tennis
  - Appendix X - Track & Cross Country
  - Appendix Y - Volleyball
  - Appendix Z - Wrestling
- Stepwise return to sport progression will proceed to Phase 4 if student-athlete is asymptomatic at the current level. If any post concussive symptoms occur, reassess the following day and repeat phase.

### **Phase 4 - Return to Limited Drills and Non-Contact Practice**

- Monitor symptoms
- Non-contact training drills dependent upon sport
- Stepwise return to sport progression will proceed to Phase 5 if student-athlete is asymptomatic at the current level. If any post concussive symptoms occur, reassess the following day and repeat phase.
- Consult Team physician for full clearance

### **Phase 5 - Return to Full Practice Participation with Contact**

- Post-Concussion Symptom Scale (PCSS)
- Completion of Phase 5 without the recurrence of symptoms would result in release to full contact participation without restriction.

## References

- Baker, JG, et al. Principles of return to learn after concussion. *International J Clinical Practice*. November 2014; 68(11):1286-1288.
- Brown, NJ, et al. Effect of cognitive activity level on duration of post-concussion symptoms. *Pediatrics*. 2014;133(2):e299-e304
- d'Hemecourt P. Subacute symptoms of sports-related concussion: outpatient management and return to play. *Clin Sports Med*. 2011; 30: 63-72.
- Doolan A, Day D, Maerlender A, Goforth M, Brolinson P. A review of return to play issues and sports-related concussion. *Ann Biomed Eng*. 2012; 40(1): 106-113.
- Halstead, ME, et al. Returning to learning following a concussion. *Pediatrics*. 2013; 10.1542/peds.2013-2867.
- Johnston K, Bloom G, Ramsay J, Kissick J, Montgomery D, Foley D, Chen J, Ptito A. Current concepts in concussion rehabilitation. *Curr Sports Med Rep*. 2004;3:316-323.
- Kissick J and Johnston K. Return to play after concussion. *Clin J Sport Med*. 2005; 15(6): 426-431.
- Leddy J, Baker J, Kozlowski K, Bisson L, Willer B. Reliability of a graded exercise test for assessing recovery from concussion. *Clin J Sport Med*. 2010; 21(2): 89-94.
- National Collegiate Athletic Association. 2011–2012 NCAA Sports Medicine Handbook. 22nd ed. Indianapolis, IN: National Collegiate Athletic Association; 2012.
- McAvoy, K. Providing a continuum of care for concussion using existing educational frameworks. *Brain Inj Prof*; [Internet] 2012; 9(1): 26-7. <http://issuu.com/bipmagazine/doc...>
- McCrorry P, Meeuwisse WH, Aubry M, et al. Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012 *Br J Sports Med*. 2013;47:250–258.
- McCrorry P, Meeuwisse W, Johnston K, Dvorak J, Aubry M, Molloy M, Cantu R. Consensus statement on concussion in sport: the 3rd international conference on concussion in sport held in Zurich, November 2008. *Br J Sports Med*. 2009; 43(Suppl 1):i76-i84.
- Piland SG, Robert WM, Ferrara M, Peterson C. Evidence for the factorial and construct validity of a self-report concussion symptoms scale. *J Athl Train*. 2003;38(2):104-112.
- Randolph C, Millis S, William BB, McCrea M, Guskiewicz KM, Hammeke TA, Kelly JP. Concussion symptom inventory : an empirically derived scale for monitoring resolution of symptoms following sport-related concussion. *Archives of Clinical Neuropsychology*. 2009; 24, 219-229.
- Riemann BL, Guskiewicz KM. Effects of mild head injury on postural stability as measured through clinical balance testing. *J Athl Train*. 2000;35(1):19-25.

Vanderbilt Athletic Training  
 Concussion Baseline Report Form

Name \_\_\_\_\_ Medical Record Number \_\_\_\_\_ Sport \_\_\_\_\_  
 Date \_\_\_\_\_ BP \_\_\_\_/\_\_\_\_ Pulse \_\_\_\_\_

**Patient History**

Please list any concussions or head injuries you have had:

Date _____	Were you knocked out:	Yes / No	Did you have memory loss:	Yes / No
Date _____	Were you knocked out:	Yes / No	Did you have memory loss:	Yes / No
Date _____	Were you knocked out:	Yes / No	Did you have memory loss:	Yes / No

What were your major symptoms with earlier concussions and how long did they last?

Symptom _____	Duration _____
Symptom _____	Duration _____
Symptom _____	Duration _____

Have you ever been diagnosed with or treated for:

<input type="checkbox"/> Headaches	<input type="checkbox"/> ADHD	<input type="checkbox"/> Migraine Headaches	<input type="checkbox"/> Anxiety / Depression
<input type="checkbox"/> Meningitis	<input type="checkbox"/> Seizures	<input type="checkbox"/> Brain Surgery	<input type="checkbox"/> Alcohol / Drug Abuse
<input type="checkbox"/> Dyslexia	<input type="checkbox"/> Autism	<input type="checkbox"/> Learning Disability	

Have you ever:

<input type="checkbox"/> Had speech therapy	<input type="checkbox"/> Repeated a grade	<input type="checkbox"/> Taken Special Education classes
---	---	--

Has anyone in your family had:

<input type="checkbox"/> Alzheimer's Disease	<input type="checkbox"/> Dementia	<input type="checkbox"/> Migraine Headaches
--	-----------------------------------	---

**Research Acknowledgement**

I understand that:

\_\_\_\_\_ These tests are baseline tests only. This means that they will only be used to get a "normal" baseline in case I need to be tested for a future concussion. Vanderbilt may use results from this testing for research purposes. Before any results from my testing are used for research, any personal information that could link me to these results will be completely removed.

Initial \_\_\_\_\_

\_\_\_\_\_ If I have a concussion during the athletic season, and if I have ImPACT™ or BESS testing, Vanderbilt may use results from this testing for research purposes. Before any results from my testing are used for research, any personal information that could link me to these results will be completely removed.

Initial \_\_\_\_\_

\_\_\_\_\_ Print Name \_\_\_\_\_ Sign Name \_\_\_\_\_ Date \_\_\_\_\_

VANDERBILT UNIVERSITY  
 MEDICAL CENTER

Name \_\_\_\_\_ Medical Record Number \_\_\_\_\_ Sport \_\_\_\_\_

**Symptom Checklist** *(To be completed by patient)*

Symptom	None	Mild		Moderate		Severe	
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance Problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Sleeping more than usual	0	1	2	3	4	5	6
Sleeping less than usual	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervousness	0	1	2	3	4	5	6
Feeling more emotional	0	1	2	3	4	5	6
Numbness or tingling	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling mentally foggy	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Visual Problems	0	1	2	3	4	5	6
<b>Total Symptom Score</b>							

**Balance Error Scoring System (BESS)** *(To be completed by evaluator)*

<p><b>Errors:</b></p> <ol style="list-style-type: none"> <li>Moving the hands off of the iliac crest</li> <li>Opening eyes</li> <li>Step, stumble, or fall</li> <li>Abduction or flexion of the hip beyond 30 degrees</li> <li>Lifting the forefoot or heel off of the testing surface</li> <li>Remaining out of the proper testing position &gt; 5 sec</li> </ol> <p>Each of the 20 second trials is scored by counting the errors accumulated by the subject. Maximum number of errors for any single condition = 10. (Guskiewicz)</p>	<p><b>Scorecard (#errors):</b></p> <p>Double Leg Stance (feet together): _____</p> <p>Single Leg Stance (non-dominant foot): _____</p> <p>Tandem Stance (non-dominant foot in back): _____</p> <p>Which foot was tested: <b>TOTAL</b> _____</p> <p><input type="checkbox"/> Left   <input type="checkbox"/> Right</p>
--	---

**Comments:**

Evaluator \_\_\_\_\_ Date \_\_\_\_\_

**Post-Concussion Symptom Scale (PCSS)**

Address each symptom based on how you have felt on an average 24 hour period during the last 7 days. Rate your symptoms on a scale of 0 to 6. Zero (0) means you have never experienced the symptom, 1 means you experienced the symptom briefly, 3 means the symptom has been present for about half of the preceding 24-hour period, and 6 means the symptom has been continuous through preceding 24 hour period(Piland et al 2003).

<b>Symptom Checklist (To be completed by patient)</b>							
<b>Symptom</b>	<b>None</b>	<b>Mild</b>		<b>Moderate</b>		<b>Severe</b>	
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance Problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Sleeping more than usual	0	1	2	3	4	5	6
Sleeping less than usual	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervousness	0	1	2	3	4	5	6
Feeling more emotional	0	1	2	3	4	5	6
Numbness or tingling	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling mentally foggy	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Visual Problems	0	1	2	3	4	5	6
<b>Total Symptom Score</b>							

**Modified Balance Error Scoring System (m-BESS)**

Significantly higher postural instability in Mild Head Injury subjects revealed through the clinical test battery with 3 stances on firm surface elicited significant differences through day 3 post injury, and may be a useful clinical procedure to assist in return to play decisions (Bell et al 2011, Riemann & Guskiewicz 2000).

- Athlete Position
  - Shoes off
  - Roll pant legs above ankles
  - Feet narrowly together
  - Hands on the iliac crests
  - Eyes closed
- Test Procedures / Patient Instructions
  - Test begins when the patient closes his/her eyes
  - Patient is instructed to make any necessary adjustments in the event that they lost their balance and to return to the testing position as quickly as possible
- Test #1- Double Leg Stance (feet together)
- Test #2- Single Leg Stance (non-dominant foot; free leg should be bent to 90 degrees)
- Test #3- Tandem Stance (non-dominant foot in the rear; weight evenly distributed)
  - 20 seconds per test
  - Each test is performed on a firm surface
- Balance Errors
  - Hands lifted off of iliac crests
  - Opening eyes
  - Step, stumble, or fall
  - Moving hip into more than 30 degrees of flexion or abduction
  - Lifting forefoot or heel
  - Remaining out of testing position for more than five (5) seconds
- BESS Scoring
  - The number of balance errors (1 point per error) on each of the three (3) tests is added together for a total BESS Score.
  - If a subject commits multiple errors simultaneously, only one error is recorded.
  - Maximum number of errors for any single condition is ten (10).
  - If subject cannot maintain testing procedure for a minimum of five (5) seconds, they are assigned the highest possible score, ten (10), for the testing condition.

<b>Balance Error Scoring System (BESS) (To be completed by evaluator)</b>	
<p><b>Errors:</b></p> <ol style="list-style-type: none"> <li>1. Moving the hands off of the iliac crest</li> <li>2. Opening eyes</li> <li>3. Step, stumble, or fall</li> <li>4. Abduction or flexion of the hip beyond 30 degrees</li> <li>5. Lifting the forefoot or heel off of the testing surface</li> <li>6. Remaining out of the proper testing position &gt; 5 sec</li> </ol> <p>Each of the 20 second trials is scored by counting the errors accumulated by the subject. Maximum number of errors for any single condition = 10. (Guskiewicz)</p>	<p><b>Scorecard (#errors):</b></p> <p>Double Leg Stance (feet together): _____</p> <p>Single Leg Stance (non-dominant foot): _____</p> <p>Tandem Stance (non-dominant foot in back): _____</p> <p>Which foot was tested: <b>TOTAL</b> _____</p> <p><input type="checkbox"/> Left   <input type="checkbox"/> Right</p>





## ImPACT Concussion Testing Instructions

**Notes:**

-If using a laptop, be sure to use a mouse rather than the track pad. Using track pad instead of the mouse will skew the results of reaction time tests

- If using a laptop, make sure the laptop is plugged in and charging

- Make sure all other programs are closed, this includes other internet windows that are not part of the ImPact website

1. Open your web browser and go to: [www.impacttest.com](http://www.impacttest.com)
2. Click on "**Customer Login**"
3. Enter your email in the email section
4. For password, type your assigned password from ImPact
5. Click on the "**Start New Test**" icon
6. In the drop down box next to: "*Please pick the organization you would like the test taker to be tested under*" Select your sport
7. Click on the "**Launch Baseline Test**" tab. This is the first tab on the left.
8. Select the language to be tested in
9. From this point, follow instructions as prompted on screen
  - a. The first area to fill out is the "*Sport and Health History*" including:
    - i. General information
    - ii. Education
    - iii. Sport
    - iv. Concussion History
    - v. Other Medical History
  - b. The second section is the "*Current Symptoms and Conditions*"
    - i. This is to be filled out as you feel right now, while taking the test
  - c. The third and final section is the "*Neurocognitive Testing*" section
    - i. Follow the instructions for each section within the testing

# CONCUSSION

A FACT SHEET FOR STUDENT-ATHLETES

## WHAT IS A CONCUSSION?

A concussion is a brain injury that:

- Is caused by a blow to the head or body.
  - From contact with another player, hitting a hard surface such as the ground, ice or floor, or being hit by a piece of equipment such as a bat, lacrosse stick or field hockey ball.
- Can change the way your brain normally works.
- Can range from mild to severe.
- Presents itself differently for each athlete.
- Can occur during practice or competition in ANY sport.
- **Can happen even if you do not lose consciousness.**

## HOW CAN I PREVENT A CONCUSSION?

Basic steps you can take to protect yourself from concussion:

- Do not initiate contact with your head or helmet. You can still get a concussion if you are wearing a helmet.
- Avoid striking an opponent in the head. Undercutting, flying elbows, stepping on a head, checking an unprotected opponent, and sticks to the head all cause concussions.
- Follow your athletics department's rules for safety and the rules of the sport.
- Practice good sportsmanship at all times.
- Practice and perfect the skills of the sport.

## WHAT ARE THE SYMPTOMS OF A CONCUSSION?

You can't see a concussion, but you might notice some of the symptoms right away. Other symptoms can show up hours or days after the injury. Concussion symptoms include:

- Amnesia.
- Confusion.
- Headache.
- Loss of consciousness.
- Balance problems or dizziness.
- Double or fuzzy vision.
- Sensitivity to light or noise.
- Nausea (feeling that you might vomit).
- Feeling sluggish, foggy or groggy.
- Feeling unusually irritable.
- Concentration or memory problems (forgetting game plays, facts, meeting times).
- Slowed reaction time.

Exercise or activities that involve a lot of concentration, such as studying, working on the computer, or playing video games may cause concussion symptoms (such as headache or tiredness) to reappear or get worse.

## WHAT SHOULD I DO IF I THINK I HAVE A CONCUSSION?

**Don't hide it.** Tell your athletic trainer and coach. Never ignore a blow to the head. Also, tell your athletic trainer and coach if one of your teammates might have a concussion. Sports have injury timeouts and player substitutions so that you can get checked out.

**Report it.** Do not return to participation in a game, practice or other activity with symptoms. The sooner you get checked out, the sooner you may be able to return to play.

**Get checked out.** Your team physician, athletic trainer, or health care professional can tell you if you have had a concussion and when you are cleared to return to play. A concussion can affect your ability to perform everyday activities, your reaction time, balance, sleep and classroom performance.

**Take time to recover.** If you have had a concussion, your brain needs time to heal. While your brain is still healing, you are much more likely to have a repeat concussion. In rare cases, repeat concussions can cause permanent brain damage, and even death. Severe brain injury can change your whole life.



## IT'S BETTER TO MISS ONE GAME THAN THE WHOLE SEASON. WHEN IN DOUBT, GET CHECKED OUT.

For more information and resources, visit [www.NCAA.org/health-safety](http://www.NCAA.org/health-safety) and [www.CDC.gov/Concussion](http://www.CDC.gov/Concussion).



Reference to any commercial entity or product or service on this page should not be construed as an endorsement by the Government of the company or its products or services.

# Vanderbilt Sports Medicine

## Vanderbilt University Concussion Acknowledgement Form

As a student-athlete at Vanderbilt University, I acknowledge that I have a direct responsibility to be honest and forthcoming by reporting all injuries or illnesses to the Vanderbilt Sports Medicine staff (athletic trainers or team physicians). I further understand and acknowledge that participation in my sport may result in a head injury or concussion. The Sports Medicine staff at Vanderbilt University has provided me with educational materials regarding concussions and I have read them.

Specifically, I agree the following to be true:

\_\_\_\_ I have read and understand the Concussion Fact Sheet provided to me  
Initial and have been given an opportunity to ask questions about  
concussions and anything I'm not clear about regarding this issue.

\_\_\_\_ A concussion is a brain injury, which I am responsible for  
Initial immediately reporting to my athletic trainer or team physician.

\_\_\_\_ A concussion can affect my ability to perform everyday activities,  
Initial and affect reaction time, balance, sleep, and classroom performance.

\_\_\_\_ If I suspect a teammate has a concussion, I am responsible for  
Initial reporting it to my athletic trainer or team physician.

\_\_\_\_\_  
Student Athlete Printed Name

\_\_\_\_\_  
Student Athlete Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Date

VANDERBILT  UNIVERSITY  
MEDICAL CENTER

# CONCUSSION

A FACT SHEET FOR COACHES

## THE FACTS

- A concussion is a brain injury.
- All concussions are serious.
- Concussions can occur without loss of consciousness or other obvious signs.
- Concussions can occur from blows to the body as well as to the head.
- Concussions can occur in *any* sport.
- Recognition and proper response to concussions when they first occur can help prevent further injury or even death.
- Athletes may not report their symptoms for fear of losing playing time.
- Athletes can still get a concussion even if they are wearing a helmet.
- Data from the NCAA Injury Surveillance System suggests that concussions represent 5 to 18 percent of all reported injuries, depending on the sport.

## WHAT IS A CONCUSSION?

A concussion is a brain injury that may be caused by a blow to the head, face, neck or elsewhere on the body with an “impulsive” force transmitted to the head. Concussions can also result from hitting a hard surface such as the ground, ice or floor, from players colliding with each other or being hit by a piece of equipment such as a bat, lacrosse stick or field hockey ball.

## RECOGNIZING A POSSIBLE CONCUSSION

To help recognize a concussion, watch for the following two events among your student-athletes during both games and practices:

1. A forceful blow to the head or body that results in rapid movement of the head;  
-AND-
2. **Any change** in the student-athlete’s behavior, thinking or physical functioning (see signs and symptoms).

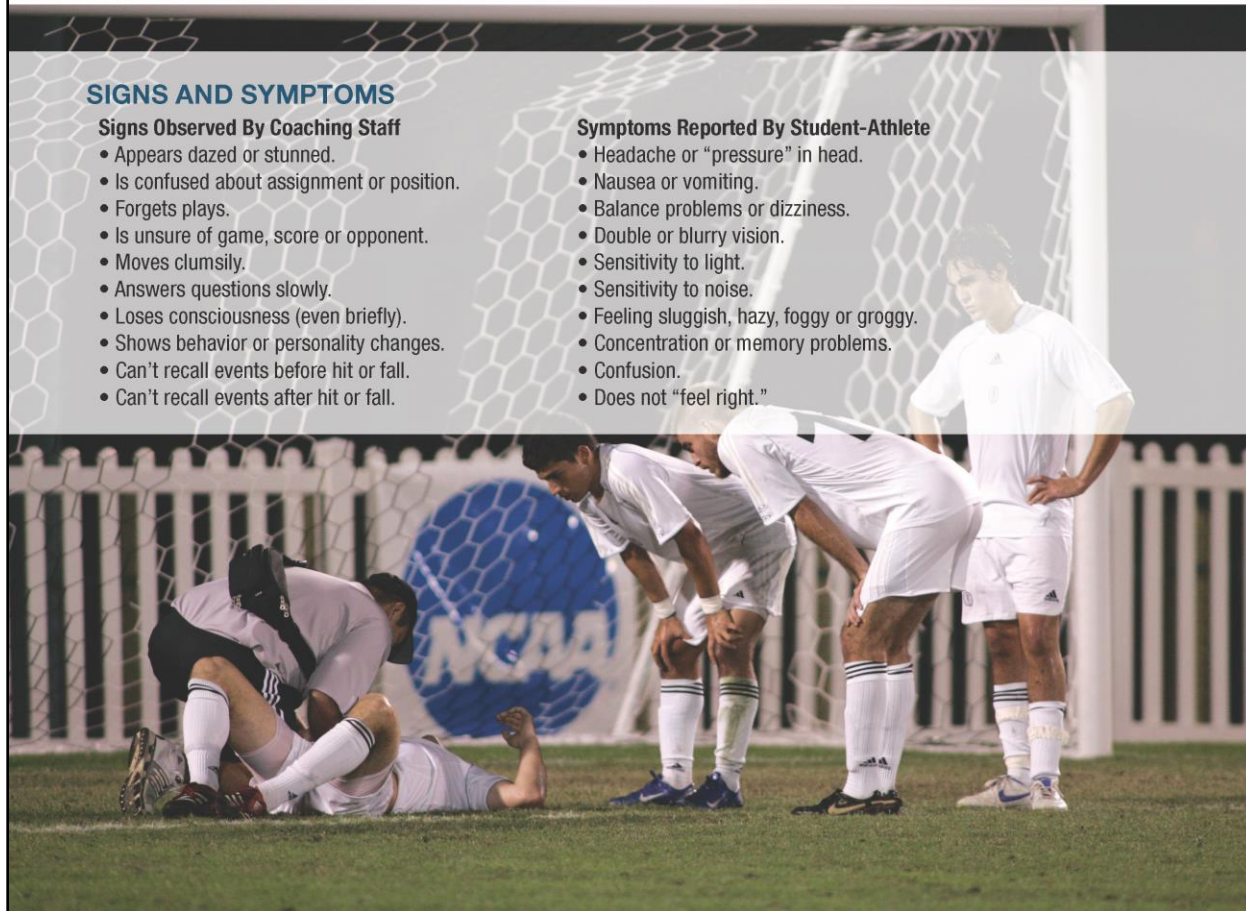
## SIGNS AND SYMPTOMS

### Signs Observed By Coaching Staff

- Appears dazed or stunned.
- Is confused about assignment or position.
- Forgets plays.
- Is unsure of game, score or opponent.
- Moves clumsily.
- Answers questions slowly.
- Loses consciousness (even briefly).
- Shows behavior or personality changes.
- Can’t recall events before hit or fall.
- Can’t recall events after hit or fall.

### Symptoms Reported By Student-Athlete

- Headache or “pressure” in head.
- Nausea or vomiting.
- Balance problems or dizziness.
- Double or blurry vision.
- Sensitivity to light.
- Sensitivity to noise.
- Feeling sluggish, hazy, foggy or groggy.
- Concentration or memory problems.
- Confusion.
- Does not “feel right.”



## Vanderbilt University Concussion Education Coaches & Athletics Support Staff

In addition to the NCAA Concussion Fact Sheet for Coaches, the following information will provide educational insight into the Concussion Management Guidelines utilized for Vanderbilt Athletics. These guidelines are recommended as a minimum standard of care, allowing the Sports Medicine staff to manage concussions individually as the situation warrants. The progression of a student-athlete with a diagnosed concussion will include cognitive and physical exertion in a stepwise process to ensure a safe return to full participation in academics and athletics.

### **Baseline Testing**

#### Concussion Baseline[Biennially]

- Concussion Baseline Report Form
- Post-Concussion Symptom Scale (PCSS)
- Modified Balance Error Scoring System (m-BESS)
- ImPACT<sup>®</sup> Baseline Neurocognitive Testing

#### Concussion Education[Annually]

- NCAA Educational Material for Student-Athletes
  - Concussion Acknowledgement and Signature Form
- NCAA & Vanderbilt Educational Material for Coaches/Support Staff
  - Concussion Acknowledgement and Signature Form

### **Return to Play Protocol**

#### *Phase 0 – Cognitive Exertion*

- Cognitive rest is an essential component of the recovery process; Academic adjustments and accommodations may be necessary
- The time frame for rest and continuation of cognitive activities are dependent upon symptoms
- Each individual will respond uniquely and therefore must be managed on an individual case basis
- Once the student-athlete is asymptomatic for 24 hours while fulfilling full academic work load they proceed to Phase 1

#### *Phase 1 – Aerobic Exertion*

- Stationary Bike testing
- Incremental Treadmill Test

#### *Phase 2 – Functional Testing Progression*

- Initial Functional Exertion- Linear movements only
- Advanced Functional Exertion- Linear and Elevation change incorporated movements
- Weight lifting may resume

#### *Phase 3 – Sport Specific Exertion*

- Increasing aerobic demand during each stage of this phase of exercises specific to sport and position
- Initial Sport-Specific Exertion
- Intermediate Sport-Specific Exertion
- Advanced Sport-Specific Exertion

#### *Phase 4 – Return to Limited Drills and Non-Contact Practice*

- Non-contact training drills dependent upon sport
- Team Physician consultation

#### *Phase 5 – Return to Full Practice Participation with Contact*

- Completion of Phase 5 without symptom recurrence results in release to full participation without restriction

# Vanderbilt Sports Medicine

## Vanderbilt University Concussion Acknowledgement Form: Coaches & Athletics Support Staff

Initial I have read and understand the NCAA Concussion Fact Sheet and Vanderbilt Concussion Education for coaches provided to me and have been given an opportunity to ask questions about concussions and anything I'm not clear about regarding this issue.

After reading the Concussion Fact Sheet, I agree the following to be true:

Initial A concussion is a brain injury.

Initial I realize I cannot see a concussion, but I might notice some of the signs in the student-athlete right away. Other signs and symptoms can show up hours or day after the injury.

Initial If I suspect a student-athlete has a concussion, I am responsible for removing him/her from activity and reporting it to my teams' athletic trainer.

Initial I will not allow any student-athlete to return to play or practice if I suspect that he/she has received a blow to the head or body that resulted in signs or symptoms consistent with concussion.

Initial I will encourage my student-athletes to report any suspected injuries and illnesses to the medical staff, including signs or symptoms of concussions.

Initial Following a concussion the brain needs time to heal. I understand that student-athletes are much more likely to sustain another concussion or more serious brain injury if they return to play or practice before symptoms resolve.

Initial I have read the signs and symptoms listed on the Concussion Fact Sheet.


\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Date

VANDERBILT  UNIVERSITY  
MEDICAL CENTER

# Vanderbilt Sports Medicine

## Vanderbilt University Concussion Acknowledgement Form: Medical Provider

Initial I have read and understand the NCAA Concussion Fact Sheet and Vanderbilt Concussion Management Guidelines.

After reading the Concussion Fact Sheet and Vanderbilt Concussion Management Guidelines, I agree the following to be true:

Initial A concussion is a brain injury.

Initial I realize I cannot see a concussion, but I might notice some of the signs in the student-athlete right away. Other signs and symptoms can show up hours or day after the injury.

Initial If I suspect a student-athlete has a concussion, I am responsible for removing him/her from activity and reporting it to the appropriate medical staff.

Initial I will not allow any student-athlete to return to play or practice if I suspect that he/she has received a blow to the head or body that resulted in signs or symptoms consistent with concussion.

Initial I will encourage my student-athletes to report any suspected injuries and illnesses to the medical staff, including signs or symptoms of concussions.


Initial Following a concussion the brain needs time to heal. I understand that student-athletes are much more likely to sustain another concussion or more serious brain injury if they return to play or practice before symptoms resolve.

Initial I am aware that every freshman/transfer student athlete must be baseline tested prior to participation in sport. Re-baseline assessments will be performed biennially or prior to the next season, traditional or non-traditional, if the student athlete is diagnosed with a concussion during the previous season.

\_\_\_\_\_  
Printed Name of Medical Provider

\_\_\_\_\_  
Signature of Medical Provider

\_\_\_\_\_  
Date

VANDERBILT  UNIVERSITY  
MEDICAL CENTER

Vanderbilt Athletic Training  
Concussion Injury Report Form

Name \_\_\_\_\_ Medical Record Number \_\_\_\_\_ Sport \_\_\_\_\_  
Date \_\_\_\_\_ BP \_\_\_\_/\_\_\_\_ Pulse \_\_\_\_\_

New Injury Date \_\_\_\_\_ Activity:  Practice  Competition  Other \_\_\_\_\_  
Mechanism of Injury:  Contact (Player)  Contact (Equipment)  Contact (Ground)  Other \_\_\_\_\_  
Amnesia Present: Yes / No  Anterograde  Retrograde Duration \_\_\_\_\_

Follow-Up Date of Initial Injury \_\_\_\_\_  
Days Post-Injury: 1 2 3 4 5 6 7 8 9 10 11 12 13  
Weeks Post-Injury: 2 3 4 5 6 7 8 \_\_\_\_\_

Symptom Checklist (To be completed by patient)

Symptom	None	Mild		Moderate		Severe	
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance Problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Sleeping more than usual	0	1	2	3	4	5	6
Sleeping less than usual	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervousness	0	1	2	3	4	5	6
Feeling more emotional	0	1	2	3	4	5	6
Numbness or tingling	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling mentally foggy	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Visual Problems	0	1	2	3	4	5	6
Total Symptom Score							

Balance Error Scoring System (BESS) (To be completed by evaluator)

<p><b>Errors:</b></p> <ol style="list-style-type: none"> <li>Moving the hands off of the iliac crest</li> <li>Opening eyes</li> <li>Step, stumble, or fall</li> <li>Abduction or flexion of the hip beyond 30 degrees</li> <li>Lifting the forefoot or heel off of the testing surface</li> <li>Remaining out of the proper testing position &gt; 5 sec</li> </ol> <p>Each of the 20 second trials is scored by counting the errors accumulated by the subject. Maximum number of errors for any single condition = 10. (Guskiewicz)</p>	<p><b>Scorecard (#errors):</b></p> <p>Double Leg Stance (feet together): _____</p> <p>Single Leg Stance (non-dominant foot): _____</p> <p>Tandem Stance (non-dominant foot in back): _____</p> <p>Which foot was tested: <input type="checkbox"/> Left <input type="checkbox"/> Right</p> <p><b>TOTAL</b> _____</p>
--	---

Comments: \_\_\_\_\_

Evaluator \_\_\_\_\_ Date \_\_\_\_\_





**BALKE TEST-TREADMILL**

The Balke Treadmill Test was developed as a clinical test to determine peak VO<sub>2</sub> in cardiac patients, though it can also be used to estimate cardiovascular fitness in student-athletes. For the concussion protocol it will be used to determine if the student-athlete is able to physically exert without symptom exacerbation (Leddy et al 2010).

**Equipment required:** treadmill, stopwatch, heart monitor (optional), electrocardiograph (optional)

**Recommendations**

- Student-athlete is asymptomatic prior to treadmill test
- Test will be stopped immediately if the student-athlete has symptom exacerbation
- Test will be stopped if the athlete becomes too fatigued to continue and the time noted
- Student-athlete should be monitored throughout the entire treadmill test for symptoms and fatigue

**Procedure:**

The student-athlete walks on a treadmill to exhaustion, at a constant walking speed while gradient/slope is increased every one or two minutes. The athletic trainer or physician starts the stopwatch at the beginning of the test and stops it when the subject is unable to continue.

- The treadmill speed is set at 3.3 mph, with the gradient starting at 0%.
- After 1 minute it is raised to 2%, then 1% each minute thereafter.
- Duration is a maximum of 20 minutes unless symptom exacerbation or fatigue occurs.

**SPORTS SPECIFIC EXERCISES – BASEBALL**

• Initial

- 4 Jogging poles
- Throwing 60-90 feet
- Ground Balls/Defensive Work
- Swings Off a Tee in Cages

• Intermediate

- Running Bases
- Long Toss 90-150 feet
- Defensive Specific Drills – Catchers Drills, Infield Drills, Outfield Drills,
- Front Toss or Side Toss in Cages

• Advanced

- Defense Diving, Catchers Blocking
- Live Batting Practice

**SPORTS SPECIFIC EXERCISES - BASKETBALL**

- Initial
  - 10 laps around floor—sprint straight away/slide baseline
  - Sprints full court
  - Start and stops
  - Backpedal
  - lateral Shuffle
  - Power skips
- Intermediate
  - Sprints
  - Defensive zigzag
  - Speed Hurdles
  - Square drill
  - Shooting/post drills—timed
- Advanced
  - Mican drill with weighted ball
  - Intervals 10 x 40 sec duration w/minute rest
    - Each interval contains various movements
  - Lateral shuffle
  - Sprints
  - Change of direction
  - Jumping
  - Backpedal

**SPORTS SPECIFIC EXERCISES - BOWLING**

- Initial
  - Floor throws without ball
  - Floor throws with ball
  
- Intermediate
  - End position throws with ball
  - Half speed approach
  
- Advanced
  - $\frac{3}{4}$  speed approach with ball
  - Approach with throw
  - Progress from bowling frames to entire game

**SPORTS SPECIFIC EXERCISES - FOOTBALL OL/DL**

- Initial
  - Stance/Starts
  - Run Blocking/Run Rush Sets
  - Pass Blocking/Pass Rush Sets
  - Boards/Bags – Footwork and Handwork
  
- Intermediate
  - Cone Drill
  - Run Block/Run Rush vs. Dummies
  - Pass Block/Pass Rush vs. Dummies
  - OL Sandbags/ DL handwork with swims and rips
  
- Advanced
  - Pass Set to Run block on Sled
  - Bag Drill Read – Pass or Run
  - 4-pt Stance vs. Sled
  - Dummy weaves out of stance with hip flips (DL)
  - Push Pull Power Hops (OL)

**SPORTS SPECIFIC EXERCISES - FOOTBALL RB/TE/LB**

- Initial
  - Stance/Starts
  - Pass Routes – Check Down/Flats OR Pass Reads
  - Run Drills/Run Blocking/Run Reads
  - Boards/Bags – Footwork and Handwork
  
- Intermediate
  - Cone Drill
  - Pass Routes w/ Ball OR Pass Read w/Ball
  - Pass Block/Pass Rush vs. Dummies
  
- Advanced
  - Run Block vs. Sled
  - Bag Drills – Step-over/Shuffle
  - Stance vs. Sled

**SPORTS SPECIFIC EXERCISES - FOOTBALL WR/DB**

- Initial
  - Stance/Starts/Reads
  - Run/Pass Block – Footwork (WR)
  - Short Route/ Short Route Read
  
- Intermediate
  - Cone Drill
  - Short Routes w/ Ball
  - Pass Read w/ Ball
  - Long Route Read (DB)
  
- Advanced
  - Long Routes w/ Ball
  - Run Block vs. Dummy (WR)
  - Run Read/Shed Dummy (DB)
  - Pass Block vs. Dummy (WR)
  - Pass Read Block vs. Dummy (DB)

**SPORTS SPECIFIC EXERCISES - FOOTBALL QB/SPECIAL TEAMS**

- Initial
  - Quarterbacks
    - Stationary Throwing
    - Run Play Footwork
    - Pass Drop Footwork
  - Specialists
    - Stance and Approach
    - Approach w/ Dry Kick
  
- Intermediate
  - Cone Drill
  - Quarterbacks
    - Rollout Footwork
    - Pass Drop w/ Throws
    - Throws from Knees
  - Specialists
    - Catch and Run
    - Kick without Pressure
  
- Advanced
  - Quarterbacks
    - Pressure Pass Drop w/ Throws
    - Knees to Upright Throws
    - Bucket Throws
  - Specialists
    - Fake Kick/Punt and Run
    - Running Punt
    - Dropped Ball Grab and Punt

**SPORTS SPECIFIC EXERCISES - GOLF**

- Initial
  - Putting stroke without ball contact
  - Short game stroke without ball contact
  
- Intermediate
  - Putting stroke with ball contact (short to long)
  - Short game with ball contact (short to long)
  - Dry swings with irons and drivers without ball contact
  
- Advanced
  - Practice range with irons and driver
  - Follow with putting green scenarios
  - Progress from holes to rounds



## SPORTS SPECIFIC EXERCISES - WOMEN'S LACROSSE

- Initial
  - 2 laps around the field (jog sideling, sprint end line)
  - From end line to restraining line (~30 yards):
  - High knees down, butt kicks back
  - Lateral shuffle down and back
  - Forward power skips down, backward skips back
  - Carioca down and back
  
- Intermediate
  - From end line to restraining line (~30 yards):
  - Sprint down and back, 10 jumping jacks
  - Shuffled down and back, 10 push ups
  - Carioca down and back, 10 burpees
  
- Advanced
  - Box drill
    - Sprint 10 yards, side shuffle left 10 yards, back pedal 10 yards, side shuffle right 10 yards
    - Sprint 10 yards, drop step shuffle left 10 yards, sprint 10 yards, drop step shuffle right 10 yards
    - Sprint 10 yards and rotate to the right 270 degrees in place (will end up making a left hand turn), repeat for completion of 1 box. Progress to 2 boxes in series
  - 1 vs. 1's
    - Attacker
      - Start at the top of the 12m arc, drive to goal and shoot
      - Add use of defender, no bump or contact made
      - Gradually defender can add more pressure
    - Defender
      - Start at the 8m arc and follow an attacker as they drive to goal and shoot
      - Gradually defender can add more pressure as they become comfortable with footwork
      - Allow attacker to incorporate some type of dodge move
    - Midfielder: Both Attacker and Defender 1 vs. 1's simulations

**SPORTS SPECIFIC EXERCISES - SOCCER**

- Initial
  - Jog-sprint-jog width of field (60yds) x4
  - Run-change directions to a backpedal-run width of field x2
  - Agility warm-up (toe touches, skips, carioca, etc.)
  - Covers (passing drills but no headers)
  
  - Goalkeeper
    - 10 yard lateral shuffles for time
    - Goalkeeper power jumps
    - Kneeling dives one side at a time
    - Stationary catches
    - Punts
    - Lay down dive stops
  
- Intermediate
  - T-drills
  - (Constant movement) partner passing – inside foot, top foot, thigh-foot, chest-foot
  - Backpedal – sprint 10yds & pass ( utilize different passing styles)
  - 5yd headers / 10yd headers
  
  - Goalkeeper
    - T-drills (starting from ground)
    - Repetitive kneeling dives back and forth to each side
    - Corner kick clearances
    - Goal kicks with placement
    - Shuffle catches continuously side to side
  
- Advanced
  - Direction drill (large and small grid)
  - T-drills (increase complexity)
  - Cone drill with dribbling, making a move to a sprint (and shoot if forward)
  - Step back and sprint drill with variety of passing (incorporate headers)
  - Forwards: 10 ball repetitive shooting w/ continuous running
  - Midfielders & Defenders: head long ball clearances while sprint & cut back
  
  - Goalkeeper
    - Timed Illinois test
    - Pole agilities with reaction catches
    - Hurdle agilities with reaction catches
    - Standing dives
    - Mix up saves (tips, diving, catching, punching)

**SPORTS SPECIFIC EXERCISES – SOFTBALL**

- Initial
  - 4 Jogging poles
  - Throwing 45-60 feet
  - Ground Balls/Defensive Work
  - Swings Off a Tee in Cages
  
- Intermediate
  - Running Bases
  - Long Toss 60-90 feet
  - Defensive Specific Drills – Catchers Drills, Infield Drills, Outfield Drills,
  - Front Toss or Side Toss in Cages
  
- Advanced
  - Defense Diving, Catchers Blocking
  - Live Batting Practice

**SPORTS SPECIFIC EXERCISES - SWIMMING**

- Initial  
1000 yards w/ in-pool starts
  - 5-100 yard swims using front crawl, 5 – 100 yard swims using preferred stroke
  - If swimmer's preferred stroke is front crawl, then 500 yards should be swum using butterfly and/or breast stroke.
  - Have swimmer focus on breathing during right and left strokes rather than unilateral breathing
  - Use open turns; **do not** have swimmer use flip turns
  
- Intermediate  
1500 yards w/ in-pool starts
  - 500 yards front crawl and 800 yards preferred stroke
    - If swimmers preferred stroke is front crawl, 500 yards should be swum using 1 or more of the following strokes: butterfly, breast, and back stroke
  - 200 yard IM should be swam at end of practice regardless of preferred stroke
  - Incorporate flip turns
  
- Advanced  
2000 yards w/ starting block starts
  - 600 yards front crawl and 1000 yards preferred stroke
    - If swimmers preferred stroke is front crawl, 600 yards should be swum using 1 or more of the following strokes: butterfly, breast, and back stroke
  - 400 yard IM should be swam at end of practice regardless of preferred stroke

**SPORTS SPECIFIC EXERCISES - TENNIS**

- Initial
  - 3 laps around 3 Courts – sprint straight-away, slide baselines
  - Sprints from baseline to net at angles (back left, center, back right)
  - Backpedal from net at angles (front left, front center, front right)
  - Lateral Shuffles across court
  - Line hops (back/forth, side/side, alternating back/forth)
  
- Intermediate
  - Sprints to net for volley
  - Defensive back pedal for overhead
  - Squat Jumps
  - Timed serves (5 in 15 seconds)
  
- Advanced
  - Court zippers w/ line touch
  - Ball-fed backhand, forehand, sprint for volley x 5
  - Defensive position from ground – service returns

## SPORTS SPECIFIC EXERCISES - TRACK &amp; FIELD, CROSS COUNTRY

Begin with a normal warm up for specific event

- **Sprints:**

Goals – Rapid acceleration/deceleration; Rapid vertical level change; Plyometric power; Increased exertion over short distance.

- In's/Out's
- 3pt./2pt. Stance Starts → Block Starts
- Weighted Jumps
- Progressive Running

- **Hurdles:**

Goals – Incorporate forward flexion/trunk rotation

- Same as sprints
- Active hurdle stretch drill

- **Jumps [Long, Triple]:**

Goals – Incorporate aerial/landing impact component

- Same as sprints
- Double leg → Single leg jumping progression

- **Jumps [High, Pole-vault]:**

Goals – Incorporate Inversion (Upside Down)

- Same as sprints
- Bridge ups
- Walk overs
- Bar Hangs
- Mat Drills (Tumbling/Landing)

- **Throws:**

Goals – Incorporate Strength/Power Component and Valsalva

- Medball Thrust
- One Arm Toss
- Serratus Punches

- **Distance Track, Cross Country:**

Goals – Running Progression

- Lower intensity exertion over long distance
- Progress Endurance/Time/Intensity of Exertion

## SPORTS SPECIFIC EXERCISES – VOLLEYBALL

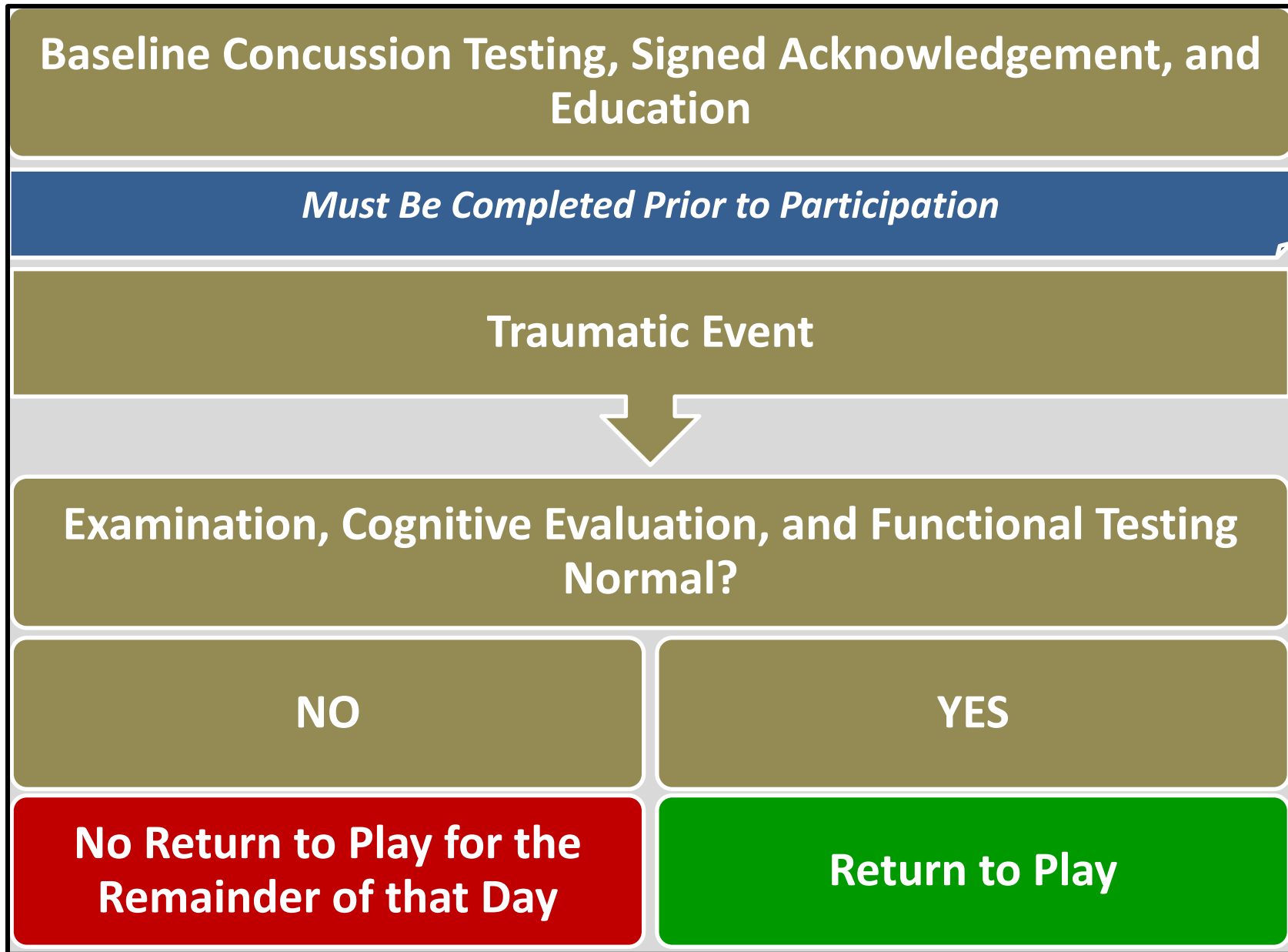
- Initial
  - Jog 4 laps around the court
  - 4 laps of forward sprint, lateral shuffle, backward run, lateral shuffle
  - Agility warm up (skips, carioca, etc)
  - Ground serving
    - Front row players (outsides, middles, setters)
  - Block moves and approaches without a ball
  - Hitting while standing on a box
    - Back row players (defensive specialists, liberos, serve receivers, all-around players)
  - Passing to setter target from a toss, down ball and free ball in a small radius
    - Setters
  - Setting against the wall
  
- Intermediate
  - Peppering with a partner
  - Jump serving, if applicable
    - Front row players
  - Blocking drills with a ball
  - Hitting drills with a ball from full approach at the 10 ft line
    - Back row players
  - Run throughs, no diving
  - Passing from serve receive, no diving
    - Setters
  - Setting from a toss to target spots for hitters
  
- Advanced
  - Front row players
    - Blocking against live hitting
    - Attacking against blockers
    - Block with transition to attack
  - Back row players
    - Defense with diving
    - Serve receive with diving
  - Setters
    - Setting from a pass to targets
    - Transitions from serve to defensive position to digging a ball

**SPORTS SPECIFIC EXERCISES - WRESTLING**

- Initial
  - Jogging 5-10 minutes around mats alternating 1 minute clockwise 1 minute counter clockwise
  - Walk through stand up drill w/o partner
  - Shadow Drilling (slow paced- emphasize proper technique)
  - Takedowns, escapes, carries, sweeps
  - Utilize stationary bike interval sprints for 1-2 minutes to increase/simulate aerobic activity
  - No Throws
  - Push-ups
  - Crunches
  - Burpees
  
- Intermediate
  - CW/CCW jogging w/ 10 intermittent 10 second sprints
  - Explosive stand up drill w/ partner applying minimal resistance
  - Utilize stationary bike interval sprints for 1-2 minutes to increase/simulate aerobic activity
  - Sprawl Drill
  - Shadow Drilling (fast paced)
  
- Advanced
  - CW/CCW jogging w/ 10 intermittent 15 second sprints
  - Explosive stand up drill w/ partner applying moderate resistance
  - 5 hand fight drills for 20 seconds (avoid head contact)
  - Pummel Drill (moderate intensity, avoid head contact)
  - Partner Drills (moderate intensity, no throws)
  - 5 Dummy throws onto soft mat (if available)



## Concussion Management Process



## Management of Athlete with Identified Concussion

