GUIDELINE 2I
SPORTS-RELATED CONCUSSION

June 1994 • Revised July 2004, 2009, July 2010, July 2011, July 2013

In April 2013, the NCAA Sport Science Institute hosted a Concussion Task Force composed of concussion experts (scientists, physicians, clinicians) whose charge was to study concussion in college sports and to develop a consensus, when possible, on concussion definition, epidemiology, pathophysiology, management and long-term ramifications. When a consensus was not possible, the NCAA Concussion Task Force members made recommendations for further study that could provide a pathway for consensus. The Concussion Task Force members reviewed in particular three peer-reviewed journal articles that had been recently published: (1) "Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012"; (2) "American Medical Society for Sports Medicine position statement: concussion in sport"; (3) "Summary of evidence-based guideline update: Evaluation and management of concussion in sports." The first two articles are consensus driven, and the third article is evidence-based. Despite differing methodologies and authors, there was a common thread of agreement regarding sports-related concussion diagnosis and management. Notably, for the first time, there was universal agreement in the peer-reviewed literature that athletes should not return to play on the same day in which they suffer a concussion.

The Concussion Task Force members did not recommend any changes to the NCAA Concussion Management Plan, which is outlined on pages 64-65 under "NCAA Concussion Policy and Legislation" and "Best Practices for a Concussion Management Plan."

CONCUSSION DEFINITION

The consensus definition from the 4th International Conference on Concussion in Sport (Zurich 2012) is that concussion is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces. These guidelines further describe common features that incorporate clinical, pathologic and biomechanical injury constructs that may be used in defining the nature of a concussive head injury, including:

- Direct blow to the head, face or neck or an impulsive force transmitted to the head.
- Rapid onset of short-lived impairment of neurological function that resolves spontaneously. In some cases, symptoms and signs may evolve over a number of minutes to hours.
- Functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.
- Grades set of clinical symptoms that may or may not involve loss of consciousness.

As noted in the definitions box below, there is not one uniform definition of concussion.

It is also noteworthy that concussion is sometimes used interchangeably with mild traumatic brain injury and at other times is considered one of several possible manifestations of traumatic brain injury. Importantly, the absolute guide for mild traumatic brain injury is a Glasgow Coma Scale of 13-15.

SPORTS PARTICIPATION DEFINITIONS AND CONCUSSION EPIDEMIOLOGY

Concussion incidence varies among sports. The American Academy of Pediatrics published a classification of sports by contact in 2001. Then in 2013, the American Academy of Neurology's statement described contact and collision sports as those in which athletes purposely hit other athletes or inani-

CONCUSSION DEFINITIONS

American Academy of Neurology
Pathophysiologic disturbance in neurologic function characterized by clinical symptoms induced by biomechanical forces, occurring with or without loss of consciousness. Standard structural neuroimaging is normal, and symptoms typically resolve over time.

American Medical Society for Sports Medicine
A traumatically induced transient disturbance of brain function involving a complex pathopysiological process. Concussion is a subset of mild traumatic brain injury (MTBI), which is generally self-limited and at the less-severe end of the brain injury spectrum.

Zurich
A brain injury. Concussion is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces.

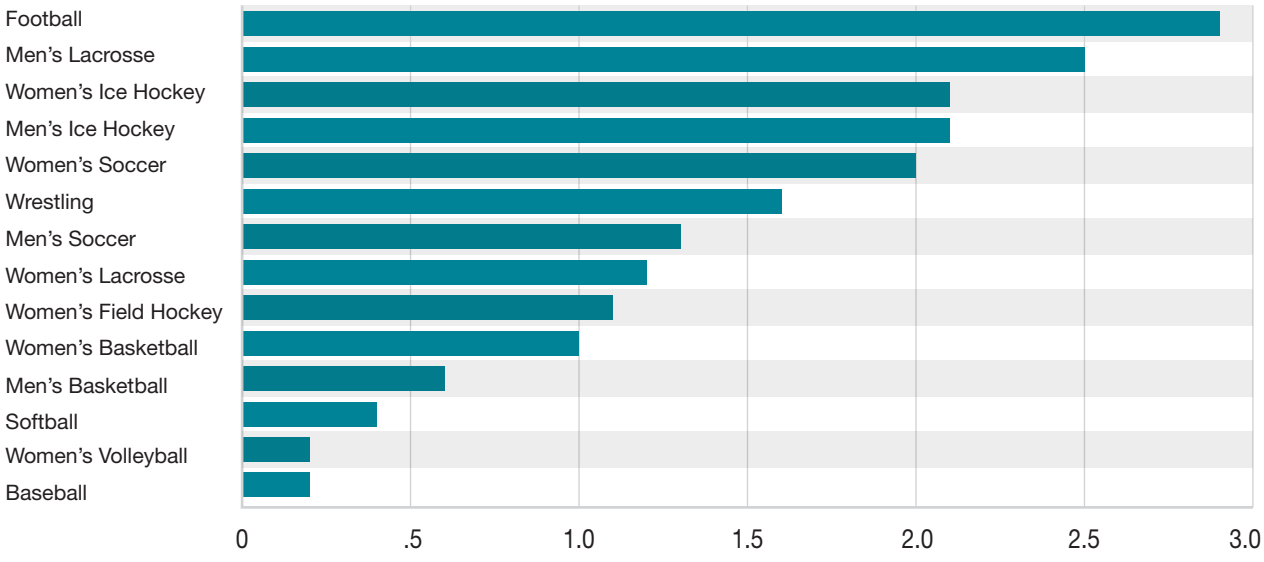
NCAA
A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces.

mate objects. The purposeful collisions put athletes participating in this class of sports at greater risk for concussions. Limited contact sports were described as those in which the force and the frequency of collisions, whether with other athletes or inanimate objects, are decreased. Noncontact sports were described as those in which players do not come in contact with athletes or inanimate objects by force.

The rate of concussion in NCAA sports can be assessed in various ways. Figure 1 demonstrates the rate of competition concussion per 1,000 student-athlete exposures. It is noteworthy that the higher rates occur in contact/collision sports. All meaningfully measurable rates occur in either contact/collision or limited contact/impact sports. It is also noteworthy that women have a higher rate of concussion than men for soccer and basketball. Another way to look at concussion is through annual estimates of the actual number of concussions within the sport, combining both practice and competition sessions. Figure 2 depicts the percentage of concussions from each sport given the total number of concussion in 14 NCAA sports.

Because of the large size of football teams and the higher rate of concussion relative to other sports, concussion incidence is highest in football. In assessing

Figure 1: Rate of competition concussion injury in 14 NCAA sports



Data from 2004-2009. Overall practice and game injury rates for each sport can be found in Appendix C.

the available data, anticipating concussion risk can be made based on the sport; anticipating concussion risk can also be guided by impact expectation. For each sport, it is important to follow the institution's concussion management plan.

The NCAA reviewed various concussion guidelines in addition to the injury data across sports to classify sports by an expectation for impacts and collisions. Unlike the previous two classifications, this classification (Figure 3) lists lower-tier sports as limited contact because athletes are still at risk of a concussion both in sports and daily life.

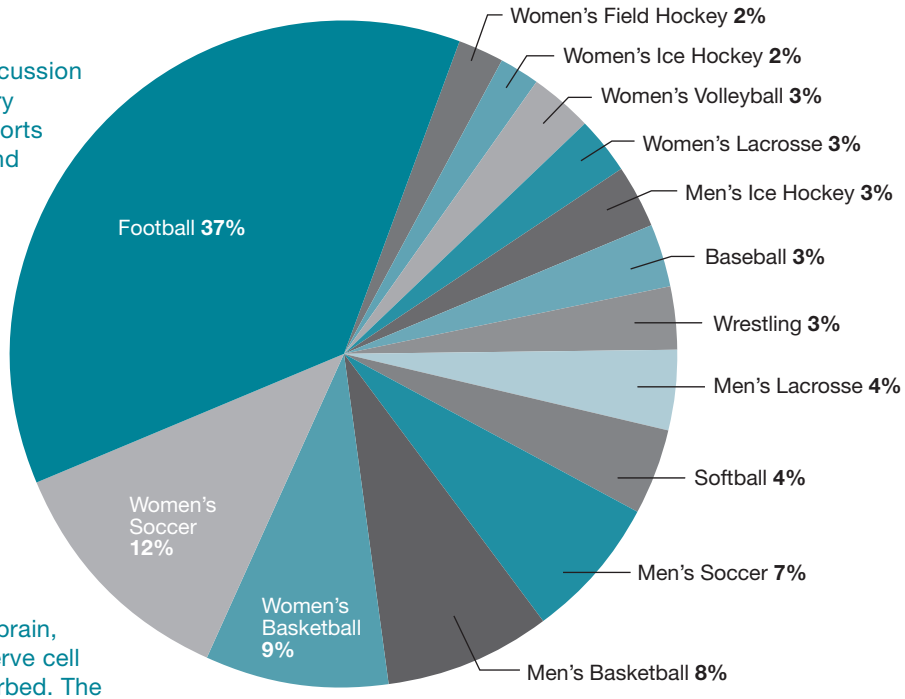
CONCUSSION PATHOPHYSIOLOGY

Concussion is not a static event, but is rather a pathophysiological process that may evolve over minutes, hours and days. Following a biomechanical linear or rotational impact to the brain, either directly or indirectly, the nerve cell and/or nerve axon become perturbed. The threshold of this impact is not known with certainty, and can vary between individuals, and even within the same individual.

Once an individual receives a traumatic impact that exceeds the nerve cell's ability to adapt, the pathophysiological process begins. This process includes an interruption of the normal balance of chemicals such as potassium and calcium inside and outside the nerve cell. Restoring this balance requires extra energy, but part of the pathophysiologic process is also a decrease in blood flow to the brain. Thus, there is a mismatch between brain energy need and brain energy availability, sometimes referred to as an "energy crisis." If the chemical balance is not restored, then there may be ongoing brain dysfunction that can include inflammation, changes in physical structure of the cell, and even nerve cell death.

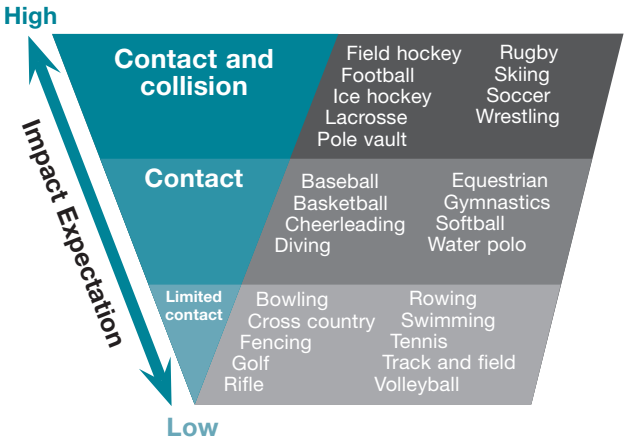
In most cases, the brain energy crisis is restored within seven to 10 days. This seven- to 10-day period is known as the "metabolic recovery phase." Upon completion of the seven- to 10-day metabolic recovery phase, brain blood flow, brain energy availability, and brain chemical balance have returned to normal. If someone receives a concussion during the metabolic recovery phase of a prior concussion, the temporal resolution of the subsequent concussion will be further delayed. Whereas potassium and glutamate dysfunc-

Figure 2: National annual estimate of concussions for practice and competition in 14 NCAA sports



Data from 2004-2009.

Figure 3: Impact expectation by sport



SIGNS AND SYMPTOMS OF CONCUSSION

Physical
- Headache
- Nausea
- Vomiting
- Balance problems
- Fatigue
- Sensitivity to light
- Numbness/tingling
- Dazed
- Stunned

Cognitive
- Feeling mentally "foggy"
- Feeling slowed down
- Difficulty concentrating
- Difficulty remembering
- Forgetful of recent information and conversations
- Confused about recent events
- Answers questions slowly

Emotional
- Irritable
- Sad
- More emotional
- Nervous

Sleep
- Drowsiness
- Sleeping more than usual
- Sleeping less than usual
- Difficulty falling asleep

American Medical Society for Sports Medicine 2013 Position Stand

tion resolves within minutes, it may take six to 10 days for calcium perturbation and cerebral blood flow to normalize. This correlates with clinical symptomatology, which is discussed next.

CLINICAL MANIFESTATIONS OF CONCUSSION

Because the definition of concussion is not uniform and because there are no clearly defined genetic predispositions, serum/brain biomarkers, or definitive neuroimaging classifications of concussion, it is critical to be well versed in clinical manifestations of concussion. Unlike many other medical conditions (e.g. breast cancer, myocardial infarction) in which there are numerous identified predispositions, biomarkers and imaging criteria, concussion remains largely defined by its clinical presentation, which can be varied, subtle and easily overlooked. Concussion results from a brain pathophysiological process, but the brain location (or locations), and the extent of brain injury can vary considerably from concussion to concussion. Thus, concussion manifestations can range from mild visual obscurations (e.g., "seeing stars") to profound amnesia, incoordination and even loss of consciousness. There are no clear prognostic factors for the many varied concussion manifestations. The above table lists signs and symptoms of concussion, as included in the American Medical Society of Sports Medicine Position Stand (AMSSM, 2013).

As noted in the signs and symptoms table, concussion symptoms and signs are varied. Also, many symptoms are nonspecific (e.g., headache, difficulty concentrating), and need to be placed in the proper context. For example, a student-athlete may have difficulty concentrating and complain of headache while coping with a tension-type headache (physical and mental stress) or migraine, or after a night of alcohol drinking and sleep deprivation, but that does not mean he or she is suffering with a concussion. However, if the student-athlete develops such symptoms following a traumatic head impact, either directly or indirectly, then concussion is highly probable.

Any athlete who is suspected of suffering with concussion must be evaluated immediately on the field, on the sideline or in a quiet locker room. Many tools exist to aid in the diagnosis of concussion, and it is best to include a combination of symptoms checklist, cognitive testing and balance testing, all within a clinical context. The SCAT2 and SCAT3 combine these variables into one test. There is universal consensus, and NCAA policy, that any athlete who is diagnosed with a concussion must not return to play or practice that day and must be cleared by a health care professional (team physician or his or her designee) before returning to play or practice.

The diagnosis of concussion is influenced by:

1. **Medical Team Awareness.** When there exists a comprehensive program in which all medical team members and athletes are well versed in concussion management, there is a high internal consistency and reliability in diagnosing concussion. Conversely, when the medical team and athletes have not rehearsed concussion management, the internal consistency and reliability for concussion diagnosis diminish considerably.
2. **Athlete Self-Report.** Unfortunately, even well-educated athletes have a high rate of not reporting concussion symptoms. Indeed, studies reveal that 40 to 50 percent of athletes will not report concussion symptoms, especially if they have had

a prior concussion. Reasons vary, and range from a sense of invincibility to fear of losing one's playing position.

3. **Over-Reliance on Computerized Testing.** Concussion diagnosis must be clinical, and cannot be made by computerized testing. Such tests may help make a clinical decision, but are not valid indicators of a diagnosis as a stand-alone tool.

CONCUSSION DIAGNOSIS AND MANAGEMENT

The sideline evaluation of an athlete with a suspected concussion should include an assessment of airway, breathing and circulation (ABCs), followed by an assessment of the cervical spine and skull for associated injury. The sideline evaluation should also include a neurological and mental status examination and some form of brief neurocognitive testing to assess memory function and attention. This can be in the form of questions regarding the particular practice or competition, previous game results, and remote and recent memory, and questions to test the athlete's recall of words, months of the year backwards and calculations. Special note should be made regarding the presence and duration of retrograde or anterograde amnesia, and the presence and duration of confusion. A timeline of injury and the presence of symptoms should be noted. These sideline tests should be performed and repeated as necessary, but do not take the place of other comprehensive neuropsychological tests.

Once an injury occurs and an initial assessment has been made, it is important to determine an immediate plan of action, which may include deciding on whether

GRADUATED RETURN-TO-PLAY PROTOCOL*

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity.	Symptom-limited physical and cognitive rest.	Recovery.
2. Light aerobic exercise.	Walking, swimming or stationary cycling keeping intensity less than 70 percent maximum permitted heart rate. No resistance training.	Increase heart rate.
3. Sport-specific exercise.	Skating drills in ice hockey, running drills in soccer. No head-impact activities.	Add movement.
4. Noncontact training drills.	Progression to more complex training drills, e.g. passing drills in football and ice hockey. May start progressive resistance training.	Exercise, coordination and cognitive load.
5. Full-contact practice.	Following medical clearance, participate in normal training activities.	Restore confidence and assess functional skills by coaching staff.
6. Return to play.	Normal game play.	

* 2013 International Conference on Concussion in Sport. Zurich, Switzerland.

additional referral to a physician and/or emergency department should take place, and determining the follow-up care. The medical staff should also determine whether additional observation or hospital admission should be considered.

Follow-up care and instructions should be given to the athlete, including ensuring that the athlete not be left alone for an initial period of time. Athletes who have suffered concussion should avoid alcohol or other substances that will impair their cognitive function, and also avoid aspirin and other medications that can increase their risk of bleeding.

Conventional imaging studies such as MRI and CT scans are usually normal in concussions, and they contribute little to concussion evaluation but should be employed whenever suspicion of an intracerebral or structural lesion (e.g., skull fracture) exists. If an athlete experiences prolonged loss of consciousness, confusion, seizure activity, focal neurologic deficits or persistent clinical or cognitive symptoms, then additional emergency evaluation is indicated.

The diagnosis of concussion is clinical. In other words, there are no laboratory tests, biomarkers, or computerized cognitive tests that make a diagnosis. Concussion diagnosis is based on the clinical presentation of symptoms and signs that have been discussed in this guideline. Concussion is best diagnosed by a clinician with experience in managing athletes with concussion. Several recent publications have endorsed the use of neurocognitive or neuropsychological (NP) testing as an important cornerstone of concussion evaluation. It is likely that NP testing of memory performance, reaction time, and speed of cognitive processing, regardless of whether administered by paper-and-pencil or computerized method, is useful in helping to identify the presence of concussion. These tests provide a reliable assessment and quantification of brain function by examining brain-behavior relationships. NP tests are designed to measure a broad range of cognitive function, including speed of information processing, memory recall, attention and concentration, reaction time, scanning and visual tracking ability, and problem-solving ability. Several computerized versions of these tests also have been designed to improve the availability of these tests, and make them easier to distribute and use. Ideally, these tests are performed before the season as a “baseline” with which post-injury tests can be compared. Despite the utility of NP test batteries in the assessment and treatment of concussion in athletes, several questions remain unanswered. Computerized NP testing should be interpreted by health care professionals trained and familiar with the type of test and the individual test limitations, including a knowledgeable assessment of the reliable

change index, baseline variability and false-positive and false-negative rates. NP testing should be used only as part of a comprehensive concussion management strategy and should not be used in isolation. Further research is needed to understand the complete role of neuropsychological testing.

The clinical diagnosis of concussion is aided by comparing baseline cognitive and balance tests, such as the NP tests noted above, with post-incident tests. These baseline tests are in flux, including SCAT III, which has not been validated clinically. In addition, investigators are evaluating eye movement, vestibular reaction, and voice recognition tests, among others, that may serve as an adjunct in the clinical diagnosis of concussion. NCAA Best Practices for a Concussion Management Plan states that at a minimum, baseline assessments of athletes should consist of the use of a symptoms checklist and standardized cognitive and balance assessments such as SAC, SCAT, SCAT II, and Balance Error Scoring System (BESS). The clinical diagnosis of concussion is ultimately made when a discerning clinician notes an inciting event (e.g., blow to the head), which is followed by symptoms and signs that are consistent with concussion and that are not indicative of other brain injury.

Once concussion is diagnosed, the cornerstone of concussion management is physical and cognitive rest until the acute symptoms resolve, followed by a supervised graded program of exertion before medical clearance and return to play. Once an athlete is completely asymptomatic, the return-to-play progression should occur in a step-wise fashion with gradual increments in physical exertion and risk of contact. After a period of remaining asymptomatic, the first step is an "exertional challenge" in which the athlete exercises for 15 to 20 minutes in an activity such as biking or running; this leads to an increase in heart rate with some sweating. If he/she does not experience any symptoms in conjunction with this first exercise challenge, this can be followed by a steady increase in exertion, followed by a return to sport-specific activities that do not put the athlete at risk for contact. Examples include dribbling a ball or shooting, stickwork or passing, or other agilities. This allows the athlete to return to the practice setting, albeit in a limited role. Then, the athlete can be progressed to practice activities with limited contact and finally full contact. There are not universally accepted guidelines for how quickly to move from one exercise stage to the next; in general, it is recommended that each rehabilitation stage take 24 hours before progressing to the next stage, and such progression should be individualized. Final clearance for a return to play should be provided by a physician or a physician's designee.

There are no standardized guidelines for returning the athlete to school. If the athlete develops increased symptoms with cognitive stress, student athletes may require academic accommodations such as a reduced workload, extended test-taking time, days off or a shortened school day. Returning the student to school, even if the day is shortened, can be considered when the student can tolerate cognitive activity or stimulation for approximately 30 to 45 minutes. This arbitrary cutoff is based on the observation that a good amount of learning takes place in 30- to 45-minute increments. Given that most concussions resolve within three weeks of the injury, adjustments may often be made in the individual classroom setting without formal written plans such as a 504 plan or individualized education program (IEP).

Preinjury mood disorders, learning disorders, attention deficit disorders (ADD/ADHD) and migraine headaches complicate diagnosis and management of a concussion. Students may require cognitive rest and may require academic accommodations such as reduced workload and extended time for tests while recovering from a concussion.

POST-CONCUSSION RAMIFICATIONS

There is considerable controversy with regard to long-term implications of concussion. On one end of the spectrum, some claim that repeated concussions cause a neurodegenerative brain disease called chronic traumatic encephalopathy or CTE. On the other end of the spectrum, some claim that there are no significant long-term sequelae of concussion. The murky evidence lies somewhere in between.

Post-Concussion Syndrome. Post-concussion syndrome refers to prolonged concussion symptoms following concussion. It is not truly a "syndrome" because there is no core of consistent symptoms and there is no clear correlation with type or severity of concussion, biomarkers, or genetic/personality predisposition. Symptoms may be neurologic (e.g., dizziness, light sensitivity), cognitive (memory, attention deficits) and emotional (depression, anxiety). Post-concussion syndrome is best considered a neuropsychiatric disorder, and it is important to recognize that it

has no bearing on the extent of, or expected recovery from, concussion. Post-concussion syndrome is best managed in a multidisciplinary manner that includes gradual increase in physical and cognitive activity. Management is distinctly different from acute concussion management, and individuals should not simply be relegated to prolonged rest, which may perpetuate the symptomatology.

Chronic Neurobehavioral Impairment. Cognitive and executive dysfunction has been described following multiple concussions. However, only two Class I studies exist, and these are for jockeys and rugby players. There are seven Class II studies that include boxers, NFL players and soccer players, which demonstrate long-term cognitive impairment. Two studies show an association with apoE4 genotype, suggesting a genetic predisposition, and one study shows an association with a prior history of learning disability. There is one Class III study of NFL players. There is some correlation with magnitude of exposure and chronic neurobehavioral impairment in professional athletes, but the relationship between exposure and chronic neurobehavioral impairment in amateur athletes is uncertain. This may be from a combination of underpowered studies and possible brain adaptations that are different in younger individuals.

NCAA CONCUSSION POLICY AND LEGISLATION

The NCAA Executive Committee adopted (April 2010) the following policy for institutions in all three divisions:
"Institutions shall have a concussion management plan on file such that a student-athlete who exhibits signs, symptoms or behaviors consistent with a concussion shall be removed from practice or competition and evaluated by an athletics health care provider with experience in the evaluation and management of concussions. Student-athletes diagnosed with a concussion shall not return to activity for the remainder of that day. Medical clearance shall be determined by the team physician or his or her designee according to the concussion management plan.

"In addition, student-athletes must sign a statement in which they accept the responsibility for reporting their injuries and illnesses to the institutional medical staff, including signs and symptoms of concussions. During the review and signing process, student-athletes should be presented with educational material on concussions."

NCAA adopted concussion management plan legislation
An active member institution shall have a concussion management plan for its student-athletes. The plan shall include, but is not limited to, the following:
(a) An annual process that ensures student-athletes are educated about the signs and symptoms of concussions. Student-athletes must acknowledge that they have received information about the signs and symptoms of concussions and that they have a responsibility to report concussion-related injuries and illnesses to a medical staff member;
(b) A process that ensures a student-athlete who exhibits signs, symptoms or behaviors consistent with a concussion shall be removed from athletics activities (e.g., competition, practice, conditioning sessions) and evaluated by a medical staff member (e.g., sports medicine staff, team physician) with experience in the evaluation and management of concussions;
(c) A policy that precludes a student-athlete diagnosed with a concussion from returning to athletic activity (e.g., competition, practice, conditioning sessions) for at least the remainder of that calendar day; and
(d) A policy that requires medical clearance for a student-athlete diagnosed with a concussion to return to athletics activity (for example, competition, practice, conditioning sessions) as determined by a physician (e.g., team physician) or the physician's designee.

Effect of violation. A violation of Constitution 3.2.4.17 shall be considered an institutional violation per Constitution 2.8.1; however, the violation shall not affect the student-athlete's eligibility.

Depression. Depression also has been reported as a possible long-term manifestation of repeated concussion. Two Class II studies of retired NFL players note an increased rate of depression in a dose-response manner, and one Class III study of retired NFL players notes a higher depression rate than the general population. There are also studies that show no clear relationship between depression and prior concussion. Of note: about 21 percent of college student-athletes report depression at baseline.

Chronic Traumatic Encephalopathy (CTE). CTE is a progressive neurodegenerative disease whose pathologic hallmark is abnormal tau deposition, with clinical manifestations of mood disorder, neuromuscular incoordination, dementia and death. There are not agreed-upon pathological and clinical criteria for CTE, although it seems clear that CTE is a distinct clinical entity from Alzheimer's disease. In a 2012 publication of CTE case series (Brain), CTE is described as a "progressive tauopathy that occurs as a consequence of repetitive mild traumatic brain injury." In the Zurich 2012 consensus paper, it is noted that "it is not possible to determine the causality or risk factors [of CTE] with any certainty. As such, the speculation that repeated concussion or subconcussive impacts cause CTE remains unproven." The universal consensus in the NCAA Concussion Task Force was that we need to better understand CTE with regard to genetic predispositions and biomarkers. No task force member noted a clear cause-and-effect relationship between concussion and CTE.

BEST PRACTICES FOR A CONCUSSION MANAGEMENT PLAN

In addition to the Executive Committee policy requirements, additional best practices for a concussion management plan include, but are not limited to:

1. Although sports currently have rules in place, athletics staff, student-athletes and officials should continue to emphasize that purposeful or flagrant head or neck contact in any sport should not be permitted and current rules of play should be strictly enforced.
2. Institutions should have on file and annually update an emergency action plan for each athletics venue to respond to student-athlete catastrophic injuries and illnesses, including but not limited to, concussions, heat illness, spine injury, cardiac arrest, respiratory distress (e.g., asthma) and sickle cell trait collapses. All athletics health care providers and coaches (including strength and conditioning staff) should review and practice the plan at least annually.
3. Institutions should have on file an appropriate health care plan that includes equitable access to athletics health care providers for each NCAA sport.
4. Athletics health care providers should be empowered to have the unchallengeable authority to determine management and return to play of any ill or injured student-athlete, as the provider deems appropriate. For example, a countable coach should not serve as the primary supervisor for an athletics health care provider, nor should the coach have sole hiring or firing authority over a provider.
5. The concussion management plan should outline the roles of athletics health care staff (e.g., physician, certified athletic trainer, nurse practitioner, physician assistant, neurologist, neuropsychologist). In addition, the following components have been specifically identified for the collegiate environment:
   a. Institutions should ensure that coaches have acknowledged that they understand the concussion management plan and their role within the plan and that they received education about concussions.
   b. Athletics health care providers should practice within the standards as established for their professional practice (e.g., physician, certified athletic trainer, nurse practitioner, physician assistant, neurologist, neuropsychologist).
   c. Institutions should record a baseline assessment for each student-athlete before the first practice in the sports of baseball, basketball, diving, equestrian, field hockey, football, gymnastics, ice hockey, lacrosse, pole vaulting, rugby, skiing, soccer, softball, water polo and wrestling, at a minimum. The same baseline assessment tools should be used post-injury at appropriate time intervals. The baseline assessment should consist of one or more of the following areas of assessment.
      1) At a minimum, the baseline assessment should consist of the use of a symptoms checklist and standardized cognitive and balance assessments [e.g., SAC; SCAT; SCAT II; Balance Error Scoring System (BESS)].
      2) Additionally, neuropsychological testing (e.g., computerized, standard paper and pencil) has been shown to be effective in the evaluation and management of concussions. The development and implementation of a neuropsychological testing program should be performed in consultation with a neuropsychologist who is in the best position to interpret NP tests by virtue of background and training. However, there may be situations in which neuropsychologists are not available and a physician experienced in the use and interpretation of such testing in an athletic population may perform or interpret NP screening tests.
   d. The student-athlete should receive serial monitoring for deterioration. Athletes should be provided with written instructions upon discharge, preferably with a roommate, guardian or someone who can follow the instructions.
   e. The student-athlete should be evaluated by a team physician as outlined within the concussion management plan. Once asymptomatic and post-exertion assessments are within normal baseline limits, return-to-play should follow a medically supervised stepwise process.
6. Institutions should document the incident, evaluation, continued management and clearance of the student-athlete with a concussion.

For references, visit NCAA.org/SSI.

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RESOURCES

- **NCAA Concussion Fact Sheets and Video for Coaches and Student-Athletes**
  Available at NCAA.org/SSI.
- **Heads Up: Concussion Tool Kit**
  CDC. Available at www.cdc.gov/ncipc/tbi/coaches_tool_kit.htm.
- **Heads Up Video**
  NATA. Streaming online at www.nata.org/consumer/headsup.htm.