Establishing Concussion-Assessment Guidelines: On-Field, Sideline, and Off-Field

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A
n estimated 300,000 concussions occur in sports every year.¹ Currently, there are up to 20 grading scales used to assess concussions, most of which are based solely on loss of consciousness or posttraumatic amnesia.² Most concussions do not result in these conditions,¹ however, which leaves assessments to be made based on subjective questioning. Because athletes want to return to activity quickly, they often underreport their symptoms,³-⁵ not knowing that they are putting their lives in potential danger. Therefore, objective assessments are needed in addition to subjective questioning in order to prevent serious conditions such as subdural hematoma, second-impact syndrome, and chronic postconcussive syndrome.⁶ The key to preventing these disastrous outcomes is to establish guidelines for concussion assessment and management that encompass both subjective and objective components to ensure athletes’ safety. The purpose of this column is to present concussion guidelines that can and should be used in any athletic setting.

Concussion guidelines need to be established that combine the comprehensive approach of neuropsychological testing and the speed of a subjective assessment. Guidelines need to be developed for an on-field assessment, a sideline assessment, and an off-field assessment. An on-field assessment is needed to ensure the immediate safety of the injured athlete. A sideline assessment is needed that does not take more than 5–10 min but accurately determines what actions should be taken after a concussion occurs. Finally, an off-field assessment is needed to fully determine the extent of the concussion. Because concussions can have multiple effects, a multifaceted assessment should be used, including subjective questioning, neuropsychological testing, and postural-stability testing.¹-⁴,⁷-⁹ Unfortunately, few clinicians currently use such an approach, even though it has been shown to best detect lingering signs and symptoms.¹ If they do not complete a comprehensive assessment, clinicians could potentially place athletes in dangerous situations.¹ In order to best ensure an athlete’s safety, clinicians should include objective measures to add objectivity to the assessment and decrease the risk of returning an athlete to activity while symptomatic.¹,³-⁷,¹⁰

On-Field Guidelines

The on-field assessment concentrates on ensuring the athlete’s safety. It consists of taking the necessary precautions to make sure that there are no other
significant injuries associated with the concussion. It should include a primary survey to rule out any life-threatening emergencies and a secondary survey to assess for neurologic or orthopedic injuries that require on-field management. If any portion of the on-field assessment yields abnormal results, the athlete should not be moved and immediate medical attention should be given. All medical personnel should understand these guidelines and have practiced them together to ensure effective handling of on-field injuries.

**Sideline Guidelines**

The purpose of the sideline assessment is to determine the severity of a concussion and decide whether or not the athlete needs further medical attention. It should include a thorough history to determine the presence of subjective symptoms, cranial-nerve testing, balance testing, and brief neuropsychological testing. Because of time constraints, tests should be quick but still comprehensive. The Standardized Assessment of Concussion (SAC) and the Balance Error Scoring System (BESS) have both been proven to be quick assessment tools and provide accurate information regarding an athlete’s injury status. Results of these tests can then be used, along with subjective observations, to make return-to-play decisions. Because there are no generally accepted return-to-play guidelines, decisions should be made on an individual basis, but no athlete should be returned to activity while still experiencing any symptoms.

**Off-Field Guidelines**

Before an athlete with a concussion is sent home, the clinician should perform an off-field reassessment in a quiet environment. This will allow both the athlete and the clinician to be free from distractions. At this point, the athlete should also be given a patient information sheet providing instructions to follow and phone numbers to call if the condition worsens. Someone who can call for medical attention if needed should closely monitor the athlete for the next 24 hr.

The athlete should then be reassessed daily after the injury to monitor for complete symptom resolution. As on the sideline, reassessments should include asking about subjective symptoms, balance testing, and neuropsychological testing. Because there are no time constraints, however, balance testing can more sophisticated and neuropsychological testing more comprehensive, if these resources are available. Forceplate systems such as the Neurocom and Chattecx balance systems can detect subtle changes in postural stability after a concussion, but the BESS can still be used as an effective alternative. Neuropsychological testing should be more extensive than just using the SAC, if possible. A battery of tests can be used to assess multiple domains that could be affected by a concussion (see the sidebar). Recently, computerized neuropsychological test batteries such as Immediate Postconcussion Assessment and Cognitive Testing and Concussion Resolution Index have become available to monitor symptom resolution after a concussion. Based on results of these tests and subjective symptoms, a return-to-play decision should be made with the safety of the athlete in mind.

**Putting It All Together**

The primary concern with concussion assessment and management is to ensure the safety of the athlete, both on and off the field. For clinicians to properly ensure athletes’ safety, established guidelines must be followed so that if a situation arises, it can be handled carefully and calmly. Concussion management is a multifaceted process that includes monitoring subjective symptoms, balance testing, and neuropsychological testing. Baseline measurements for all three aspects should be obtained in the preparticipation physical examination, before any at-risk activity.

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**Tests for Neuropsychological Assessment**

- Hopkins’s verbal-learning test
- Symbol digit modalities test
- Reitn trail-making tests
- Stroop color-word test
- Controlled oral word-association test
- Wechsler’s digit-span tests
- Letter-number sequencing task