



Neuropsychological Testing in Sports Concussion

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Neuropsychological testing is one of the tools used in a concussion evaluation. The testing typically involves assessing the student-athlete's attention, memory, speed of thinking, and reaction time. These functions have been shown to be sensitive to the effects of a concussion, and can be one important indicator that the brain is not working normally. The testing that is administered before an injury occurs is called "baseline neuropsychological testing" and can serve as a point of comparison for the testing that is conducted after the injury (post-injury testing) to gauge recovery, along with a careful assessment of symptoms.

There are various formats that neuropsychological testing can be administered – on a computer or through paper and pencil testing. Both formats are actively used by neuropsychologists. Each format has its advantages and disadvantages. Many sports teams and leagues are using the computerized testing format to allow a greater number of student-athletes to obtain the pre-injury baseline in an efficient manner. Computerized formats allow testing to be done in groups. Baseline neuropsychological testing should never be conducted at home or without careful supervision and oversight of a trained professional. While the computer format may give one the appearance of greater ease and automaticity, this is a false impression. Children, adolescents and adults require careful instruction and proctoring during the testing in order to obtain valid results. There are many ways these neuropsychological tests can be rendered invalid, requiring significant training, knowledge and experience with neuropsychological testing to reduce this possibility.

It is important to find a trained professional in your area who is experienced with the administration and interpretation of neuropsychological tests. These tests are sophisticated clinical measures of neuropsychological that require careful oversight. There are many reasons a student-athlete's neuropsychological test performance can be abnormal. As part of the 2008 Zurich international consensus meeting, Drs. Echemendia, Herring & Bailes wrote a paper entitled, "Who should conduct and interpret the neuropsychological assessment in sports-related concussion?" First, they recognize that the decision to return an athlete to play following sports-related brain injury is complex and requires the analysis of several sources of data. Neuropsychological testing is only one of those sources of data – and should never be used in isolation to render a final return to play decision. Dr. Echemendia and colleagues state "Neuropsychologists possess the training and skill sets necessary to provide unique expertise in the assessment of cognitive functioning and post-injury neurocognitive and psychological assessment. Baseline neuropsychological testing is a technical procedure that can be conducted by technicians under the supervision/guidance of a neuropsychologist. Post-injury assessment requires advanced neuropsychological expertise that is best provided by a clinical neuropsychologist." (Br J Sports Med 2009;43(Suppl I): p.i32).

Some school districts offer neuropsychological testing for free while in other communities a sports medicine clinic or hospital may offer the testing for a small fee. Parents, sports organizations and school systems should ensure that the neuropsychological testing is being offered by properly trained and credentialed professionals.