



# Neuropsychology Assessment from People Suffering from Concussion

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## Commentary

In practical terms, sports clinicians need a simple and valid tool that can be administered in an on-field situation to determine whether an athlete is concussed and hence should be removed from the field of play to be assessed more fully. From the work by Maddocks et al described above it was found that questions of recent and remote memory were the most sensitive measures separating concussed from non-concussed athletes [1]. These questions ("Maddocks' s questions") were prospectively validated in a study of Australian football. In sports where athletes need to be assessed rapidly, often without removing them from the field, such as in football, these questions are an important tool fulfilling the basic requirements outlined above. Standard orientation questions, such as those pertaining to time, place, and person, are less discriminating in the sporting situation than questions on recently acquired memory. Other validated diagnostic tools included the Standardised Assessment of Concussion (SAC) which is a paper and pencil tool assessing orientation, concentration, and immediate and delayed memory. Although it has been validated in sports concussion, it is more time consuming than Maddocks' questions. Whereas assessment of memory is the critical aspect of neuropsychological testing in the setting of concussion diagnosis, the assessment of recovery mandates a different test strategy. This is based not only on the known neuropsychological deficits that exist following concussion but also on the different time frame available for follow up assessment that allows a more detailed assessment to take place [2]. In addition to the clinical symptoms of concussion, a range of neuropsychological deficits may be observed in the recovery phase following a concussive injury. These deficits are usually subtle and mild and include:

2. Memory and learning disabilities,
3. Awakening and diminished information processing ability
4. Reaction time is slowed and reaction variability is large.

Isolated reports have suggested that impairments may be evident on tasks involving visuospatial constructional ability, language, and sensorimotor function. One area of concern that has not been studied in detail is the proposal that following recovery, deficits may still be evident when assessed under conditions of physiological stress [3]. A corollary of this is that any form of neuropsychological testing needs to be sensitive for the changes observed following concussion and be specific for these deficits.

It must be emphasised however, that neuropsychological assessment should not be the sole basis of a return to play decision but rather be seen as an aid to the clinical decision making. In general terms, neuropsychological testing should not be routinely done while the athlete is symptomatic since it adds little to decisions regarding return to play and it may contaminate the testing process by allowing for practise effects to confound the results [4]. The recommended consensus strategy is to wait for the resolution of clinical symptoms (both at rest and with provocative exercise challenge) and then to use the neuropsychological testing as the final step in the return to play strategy.

With regard to the decisions that are most useful in sporting

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