

The Role of Neuropsychological Evaluation in the Clinical Management of Concussion

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KEYWORDS

- Mild TBI • Postconcussion syndrome • Neuropsychological assessment
- Traumatic brain injury

KEY POINTS

- Because the etiology of persistent symptoms after concussion is often complex and multifactorial, neuropsychologists are well-positioned to understand and help manage such symptomatology.
- When unexpected difficulties are apparent or recovery is not progressing as expected, neuropsychological evaluation can help to identify factors serving to prolong recovery.
- After neuropsychological evaluation, interventions specifically tailored to address factors that may be prolonging recovery can help to improve functioning and minimize distress.

INTRODUCTION

Although most people recover quickly and completely after a single, uncomplicated mild traumatic brain injury (TBI) or concussion, a minority of patients experience persistent postconcussive symptoms. The etiology of such symptomatology is often complex and multifactorial, involving both injury and noninjury factors. Neuropsychologists, who have expertise in development, psychology, and brain injury,

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are well-positioned to understand and help manage such symptomatology. As such, neuropsychological evaluation is now widely recognized as an important component in the clinical management of individuals who sustain concussive injuries.¹⁻³

NATURAL CLINICAL HISTORY

To manage any clinical condition, a clear understanding of its natural clinical history is imperative. Methodologically sound studies have now converged to paint a picture of what can be considered the “typical” recovery after concussion. In the first hours to days after injury, the neurobehavioral effects can be impressive, with pronounced postconcussive symptomatology reported, as well as changes apparent on objective cognitive and balance tests.⁴ Problems are typically self-limiting and resolve gradually for the majority of individuals in the initial days to weeks. When using objective performance-based tests, most methodologically rigorous studies fail to identify significant differences between concussed and control groups within 7 to 10 days in high school athletes⁵ and older athletes and within 2 to 3 months in nonathlete children and adults.⁶⁻¹¹ In contrast, when examining outcomes using subjectively reported symptoms, a minority of patients display more persistent problems.¹²

RISK FACTORS FOR PROLONGED RECOVERY

Both injury and noninjury factors have been found to play a role in persistent symptomatology. In general, injury-related variables (ie, the direct neurologic effects of concussion) account for more variance in the first weeks after the injury, and non-injury-related variables account for more variance in subsequent periods.¹³ One factor that has been found to increase the risk of persistent problems is more severe mild TBI, such as injury characterized by intracranial pathology or need for hospitalization.¹⁴⁻¹⁸ However, the effect of injury-related factors tends to diminish over time,¹⁹ and many “postconcussive” symptoms are not driven by injury-related neurologic factors.

One set of non-injury-related variables that account for persistent problems after concussion are personality factors, including how an individual responds to stressful events. Specific personality traits and coping strategies can affect how one might understand and respond to a concussive injury.²⁰ In both adults and children, ineffective coping can serve to maintain symptoms and make one vulnerable to a prolonged recovery.²¹⁻²³

Many patients expect that they will experience postconcussive symptoms and will have prolonged symptoms after an injury occurs, a phenomenon characterized by Mittenberg and colleagues²⁴ as “expectation as etiology.” This expectation of negative outcome then results in errors of attribution with regard to benign symptoms and events. For example, a simple lapse of attention may be attributed to the effects of a concussion, while disregarding preinjury functioning or normal inattention. Therefore, in some cases, it is the expectation that symptoms will be prolonged that causes the prolonged recovery.²⁵

The “good old days” bias has been recognized as another factor that influences symptom report after concussion. Patients and caregivers may underestimate the level of past concerns and attribute any current concerns to the injury. This bias has been well-demonstrated in adults²⁶ and was recently found in many parents of children after concussion.²⁷

Preexisting behavioral and learning problems,²⁸⁻³⁰ family functioning,³¹ and caregiver adjustment¹⁹ have been all been shown to contribute additionally to the variance in rates of recovery and in the prediction of symptom outcomes. Comorbidities, such as posttraumatic stress disorder, pain, and mood problems, are also important to

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