

Current and Emerging Rehabilitation for Concussion: A Review of the Evidence



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- Pharmacologic interventions

KEY POINTS

- Concussion rehabilitation policies are largely consensus based.
- Emerging evidence is suggesting that exercise and cognitive activity in a controlled and prescriptive manner may benefit recovery.
- Additional rehabilitation strategies (eg, vestibular, oculomotor, and pharmacologic) also have mounting evidence and should be incorporated by an appropriately trained professional when appropriate.

INTRODUCTION

The clinical signs and symptoms of sport concussion have long been recognized as^{1,2} brought about by an extrinsic force applied directly or indirectly to the head or body.³ Much of the scientific literature surrounding this injury has focused on injury incidence,⁴ assessment tools,^{5,6} and recovery patterns among athletes.⁷ Absent from the literature are reviews of empirical studies assessing the effectiveness of different rehabilitation approaches for concussed patients. Therefore, this article reviews and evaluates the evidence supporting consensus-based standard of care (eg, physical and cognitive rest) and emerging, targeted (eg, vestibular, oculomotor, exertional, pharmacologic) rehabilitation approaches for concussion based on an evolving model of clinical concussion care.⁸

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The concept of physical and cognitive rest as the cornerstone of concussion management was developed by the International Concussion in Sport Group and currently states, “The cornerstone of concussion management is physical and cognitive rest until the acute symptoms resolve and then a graded program of exertion prior to medical clearance and return to play.”³ The rationale for rest asserts that during the acute (1–7 days, possibly longer in youth) postinjury period of increased metabolic demand and limited adenosine triphosphate reserves, nonessential activity draws oxygen and glycogen away from injured neurons. The Concussion in Sport Group recommendation has been interpreted by many clinicians to mean that all concussed athletes should be restricted from all physical and cognitive activity until symptoms resolve, at which point, the athlete could be cleared to begin a return to play progression. This “shut-down” or “dark-closet” approach following concussion is wrought with potential pitfalls for patients, including hyperawareness of symptoms, somatization, social isolation, and other potential comorbid concerns. Citing the risk for prolonged and exacerbated symptoms that may not be directly related to the concussive injury, other medical organizations have recommended that athletes be permitted to engage in limited physical and cognitive activity so long as it does not worsen symptoms.⁹

These 2 perspectives regarding strict rest versus physical and cognitive activity as tolerated are seemingly at odds with each other, in part because there is no agreed on definition of what constitutes rest following a concussion in the literature. Such recommendations are also limited because they do not take into account the individualized nature of the injury, potential risk factors that may influence outcomes, and differential responses to recovery. Moreover, and most importantly, there are no known prospective randomized control trials (RCTs) evaluating rest in concussed athletes immediately following a concussion.¹⁰ In fact, the evidence for physical and cognitive rest is limited, relying on observational studies and studies of patients from sports medicine clinics during the subacute stage.^{11,12} With a dearth of literature to support clinical guidelines, expert consensus has been used in its place.

The premise that rest is the most effective management strategy for all concussed patients assumes that all concussions are alike, yet concussion recovery is known to be influenced by several modifying factors including sex,¹³ concussion history,¹⁴ and age.¹⁵ Even for injuries occurring within these populations, concussions manifest in varied symptoms (eg, headache, dizziness, fogging), cognitive (eg, memory, reaction time, processing speed),¹⁶ psychological (eg, depression, anxiety),¹⁶ and vestibular (eg, dizziness, imbalance, gait, vestibulo-ocular)¹⁷ impairments. As such, this highly individualized injury results in a varied injury presentation, indicating no single rehabilitation strategy will be effective for all patients following concussion necessitating distinct treatment.⁸

PHYSICAL REST

Declines in neurocognitive function and motor control and increases in self-report symptoms following concussion are well documented.^{5,18} Among the most commonly reported symptoms are headache, dizziness, and confusion immediately following a concussion.^{19–25} Other research has reported increased rates of depression and fatigue among the same cohort.²⁶ Between 80% and 90% of concussed individuals will return to preinjury levels of functioning within 2 weeks without intervention, but a small percentage (2.5%) will remain symptomatic 45 days after injury, despite resolution of other objective measures (eg, neurocognitive and balance assessments).²⁷ Therefore, management of athletes falling within and outside the range of normal recovery may require different approaches.

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