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Cognitive rest for concussion management lacks data

Raising awareness among pediatricians about how to best manage concussions in children and adolescents is important and more information is beginning to appear in various media. However, reports that encourage "cognitive rest" as the cornerstone of concussion treatment are not yet validated.

Unfortunately, although sports-related concussion is common in childhood, there is a paucity of empirical literature to support rest — cognitive or otherwise — as a management approach. Adding to the confusion, media reports implicate concussion in debilitating neurologic conditions and long-term neurodegenerative conditions; although to date, the evidence here remains speculative based on single case studies or survey data rather than controlled studies.

'Second-impact syndrome'

There are reasons to briefly interrupt a child's participation in contact sports after concussion. Patients may be at greater risk for injury, in general, if balance is affected and it allows time for adequate assessment of the injury. However, management during the past decade has emphasized removal from sports participation to lessen the risk for so-called "second-impact syndrome."

Marc P. DiFazio

This condition reportedly puts the individual at risk for fatal brain edema after a second concussion while still symptomatic from the first. However, critical analysis of the purported syndrome emphasizes the nebulous nature of this condition and even questions its existence. Catastrophic outcomes from sports-related concussion are much more likely to stem from acute intracranial bleeding after single concussions than diffuse edema or back-to-back concussions. Regardless of the exact pathology, death from sports-related head trauma in youth, although tragic in every case, is also several times less likely than death from sports-related cardiovascular events — and even less likely than death from lightning strikes.

Although physical exercise itself has never been implicated in worsening recovery from concussion, complete physical rest is commonly recommended. Additionally, many practitioners now recommend "cognitive rest" to supposedly hasten recovery. Cognitive rest remains ill-defined and usually entails a removal from school and cognitively stressful activities. A return of symptoms (pain, dizziness) upon reintroduction of activity, physical or otherwise, is considered causative of more injury, and further rest is prescribed. Patients are often told to rest until asymptomatic, often resulting in weeks missed from school, sports or extracurricular activities.

Michael W. Kirkwood

Currently, there is no evidence that the brain can be "put to rest" by refraining from such activity, and the increase in symptoms that may be associated with cognitive stress does not imply a worsening of the underlying concussive injury. That is, head pain and other nonspecific symptoms have not been shown to be definitive markers of ongoing cerebral injury. Although cognitive rest certainly sounds logical, brain activity is continuous and is generally uncontrolled by conscious means, and even during sleep intense brain remodeling and activity is evident.

Additionally, there is no good evidence in humans that rest results in brain healing or improved outcomes, and some data actually suggest that activity relatively soon after injury or while symptomatic has no effect on outcomes. Clearly, a standard-of-care guide regarding rest after sports-related concussion does not yet exist.

Negative effects of cognitive rest

Joshua Rotenberg

Some might wonder whether there is really a downside to recommending cognitive rest. The implicit idea in the recommendation for rest is that if this is not followed, problems can be expected. In fact, prospective controlled studies demonstrate that most athletes recover well and relatively quickly with or without rest. More generally, psychoeducation and early reassurance after injury appears to reduce the chance of persistent symptoms after mild traumatic brain injury. This appears to support the clinical impression that patient or parental anxiety after a concussion can exacerbate symptoms and delay a return to typical functioning.

Adolescent obesity leads to midlife morbidity, and correspondingly, middle-aged adults who are obese have increased cardiovascular and neurologic health risks. Additionally, involvement in youth sports has long demonstrated physical and psychological benefits.

Individual approach to assessment

Given the lack of evidence supporting rest or even a symptom-free waiting period subsequent to a concussion, we approach our children and adolescents in a positive and reassuring fashion, avoiding rigid adherence to any particular management strategy. We recommend a return to exercise in a staged fashion, with an allowance for a self-determined escalation in activity, as tolerated. Regarding cognitive stress, we encourage a child's return to school, albeit with temporary accommodations for headache and any cognitive difficulties that may occur. Frequent breaks and forgiveness for time and work missed are strongly recommended to avoid placing more stress on the student.

Children who experience concussion with recalcitrant symptoms or a previous history of neuropsychiatric difficulties are offered early psychological or medical intervention targeting anxiety, depression, fatigue, sleep difficulties or attentional challenges. Children are seen frequently and are encouraged and reassured that most who experience a mild traumatic brain injury have complete resolution within several weeks. We employ a number of indicators to craft an individual approach to assessment, including physical examination, symptom report, balance assessment, neurocognitive screenings, neuropsychological evaluation and screening for previous neuropsychiatric challenges. This approach is typically welcomed by parents, who are often relieved and reassured by the individualized care.

We hope that professional discourse among pediatric specialists will result in a data-driven approach to management of this common neurologic problem. Allowing anecdotes, popular beliefs or the media to dictate how we address this very frequent and long-standing sports-related complication is imprudent. Recommendations to avoid sports participation or exercise are potentially dangerous — given that more than 20% of children are obese — and as such are at greater risk for neurologic and cardiovascular complications during the lifespan, according to a 2012 study by Dattilo and colleagues.

Pediatricians should encourage exercise and sports participation while offering prudent counseling regarding concussion and brain protection throughout the life span.

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PERSPECTIVE

We thank Dr. DiFazio and colleagues for their editorial about cognitive rest as a treatment following concussion. Approximately 75% to 80% of traumatic brain injuries are mild and there is robust evidence that these seemingly minor injuries result in poor neurocognitive outcomes in an important proportion of pediatric patients.

We agree with Dr. DiFazio's group that there is equivocal evidence supporting, and significant controversy surrounding, 'second-impact syndrome,' and that this potential risk of death is extremely rare. However, we do not identify fatality risks due to second-impact syndrome as the driving force behind the recommendation for cognitive and physical rest following concussion. Instead, our focus is on the far more common morbidity and short-term disability following concussion due to metabolic mismatch and associated symptoms in the acute phase immediately following the injury.

In this early phase, activities that place demands on brain metabolism (ie, physical exercise, learning or recreational activities such as school, video games and texting) divert metabolic resources away from the healing process. Research on pediatric concussion has demonstrated increased energy demand with decreased cerebral blood flow immediately following these injuries. Due to the time course of this physiologic process, treatment in the acute phase differs from management in the chronic stages of concussion. Patients with acute injury are more likely to seek emergency medicine and general pediatric care prior to referral to a subspecialist for more persisting symptoms from concussion. It is during the early initial acute phase post-injury when cognitive rest may be helpful in light of our current understanding of the pathophysiology of concussion.

While we agree that the evidence surrounding the effectiveness of this treatment is still emerging, there are data supporting cognitive and physical rest immediately following concussion. Animal studies of exercise following traumatic brain injury demonstrate worse outcomes with early exercise, and better outcomes with later exercise. Other research on children with concussion shows increased symptoms and poorer cognitive testing performance with cognitive and physical disability in the early phase following injury, and improved performance with reduced symptoms following cognitive rest.

Rather than being prescriptive about the absolute duration and of cognitive rest, we emphasize that it is variable, personalized to each specific child and directed by the elicitation of symptoms. We follow a gradual approach to "return to learn" with subsequent "return to play," whereby patients and their families can continue a self-paced approach to

recovery. Patients can progress to the next step in their recovery if symptoms resolve, and revert to a prior step if symptoms are elicited. Our steps, modeled after the Zurich Return to Play guidelines, include a graded re-entry into cognitive activity.

Rest can vary from a day to a week or more, and is highly individualized. However, after the acute phase a few weeks following injury, cognitive rest has not been demonstrated to be helpful, and may actually be counterproductive. Rather, patients in this stage benefit from active rehabilitation including directed vestibular therapy as well as a graded aerobic therapy program. Of note, as our recommendation for cognitive rest is not synonymous with bed rest, includes a graded return to cognitive activity and is not meant to last indefinitely, we do not think a reasonable period of rest following injury would at all contribute to the emerging obesity epidemic as the authors suggest. Our aim in sports medicine is to return patients back to full participation in sports and other activities as safely and expeditiously as possible given our current understanding of pediatric and adolescent concussion.

We believe prescribing a combination of appropriate initial rest with a progressive increase in activity in the acute phase, followed by active rehabilitation would in fact minimize the duration of symptomatology, while facilitating a timely return to both cognitive and physical activity.

We agree with the authors that there is a great amount of needed research on this topic, including identifying the optimal time of rest and risk factors for poor outcomes. We fully support ongoing biomolecular and animal research focused on pathophysiology, biomechanical study of injury mechanisms, epidemiologic analysis of existing patient data, and clinical trials of various treatments in order to further the field of mild traumatic brain injury management. We would encourage that, while further data emerges, recommendations should focus on a “moderate” standpoint, whereby neither strict cognitive and physical rest for a pre-determined time, nor immediate resumption of physical or cognitive activities are recommended following injury. Instead, providers should first ‘do no harm’, and allow, during the acute phase of injury, the brains of acutely concussed children to rest for a reasonable duration that is primarily driven by individual symptomatology, with appropriate rehabilitation for children with chronic, prolonged symptoms.

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