

## Time to Re-think the Zurich Guidelines?

### A Critique on the Consensus Statement on Concussion in Sport: The 4th International Conference on Concussion in Sport, Held in Zurich, November 2012

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The consensus statement on concussion in sport, commonly referred to as the Zurich Guidelines,<sup>1</sup> has become one of the cornerstone references regarding the diagnosis and management of this syndrome. The guidelines process has increased medical and public awareness of this significant condition. However, the current construct of concussion as delineated in these guidelines is increasingly untenable. The problems with the guidelines include a lack of diagnostic specificity, management strategies that are not evidence based, and rehabilitation goals that are not attainable. Given these problems, the Zurich Guidelines cannot be endorsed.

The concussion zeitgeist is embroiled in controversy. Sensational media reports regarding chronic traumatic encephalopathy, class action litigation, and allegations of conflict of interest against prominent concussion researchers, all mar the landscape surrounding this syndrome. In this environment, sport organizations and team health care providers seek to protect athletes through the application of best practices in the diagnosis and management of concussion. However, the Zurich Guidelines, when taken as they are written, make this endeavor more difficult. With no preamble, the guidelines assert that any one of a constellation of ubiquitous symptoms should be diagnosed as a brain injury if the individual has experienced an impulsive force to the head or neck, or in lay terms, a head shake. The persistence of any of these common symptoms is sufficient to prohibit the individual from attending work or school.

A fundamental difficulty with the consensus statement on concussion in sport is the definition of this syndrome. Concussion is defined as a brain injury.<sup>1</sup> We believe that the syndrome as currently understood does not have to involve the brain. The diagnostic criteria established by the Zurich symposium require the “shaking” of the patient’s head, followed by the presence of only 1 symptom from a 22-item Likert scale. The process of head shake, followed by nonspecific symptoms, such as “don’t feel right, fatigue, more emotional, irritability, or sadness,”<sup>2</sup> are sufficient to prompt the clinician to suspect concussion and institute treatment. The treatment algorithm requires absence from work, school, and sport.<sup>1</sup> This definition, although providing high sensitivity, creates too large an entry portal into the clinical diagnosis of brain injury. This lack of specificity has the deleterious consequences of diagnosing individuals with whiplash, affective disorders, or inner ear pathology as having a brain injury. All patients with these conditions would meet the diagnostic criteria for concussion if they have had any concurrent head shaking. Complicating matters, the misattribution of extracranial symptoms to the brain can cause unnecessary fear and anxiety.<sup>3</sup>

The guidelines acknowledge that physical examination, central nervous system imaging, and other neuropsychological tests cannot always diagnose concussion accurately, and so clinicians must rely upon the self-report of symptoms.<sup>1</sup> This is problematic in 2 ways. First, it is clearly documented that concussed athletes may underreport their symptoms.<sup>4</sup> They have also admitted to intentionally not reporting concussion symptoms to continue playing.<sup>5</sup> Second, the average score on the concussion Likert scale in uninjured patients is not zero, but rather between 3 and 10.<sup>6</sup> It is evident that the Zurich algorithm opens up a dangerous situation where the misattribution of nonspecific symptoms to a specific diagnosis of brain injury could occur in individuals who do not have that condition. Any clinician regularly assessing patients

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in this milieu has seen the consequent anxiety, ruminations, and deleterious consequences this misattribution can have.

The guidelines do not reconcile this significant lack of specificity in a fulsome manner. It would be very helpful to include a preamble in the guidelines indicating that the symptomatology of concussion is nonspecific and widely present in the general population. Noting the overlap between concussion and other common disorders with respect to causal mechanism and symptoms<sup>7–11</sup> would inject some common sense into the diagnostic consideration. The guidelines do not discuss what a clinician should do if another medical condition could better account for the patient's symptomatology. Does upper cervical zygapophysial tenderness reproducing the headache of the injured athlete indicate a diagnosis of whiplash instead of concussion? Should both diagnoses be applied? If the Hall-Pike maneuver is positive, should benign positional vertigo be the only diagnosis or a concomitant diagnosis? This distinction is very important because there are evidence-based treatments for conditions, such as whiplash and benign vertigo.<sup>9,11–13</sup> Interestingly, the guidelines for the treatment of whiplash<sup>9</sup> differ from those for concussion, even though most whiplash patients would also meet the inclusion criteria for concussion. Any guidelines for this syndrome need to consider non-brain-based conditions that might better account for the clinical picture. The inclusion criteria for a diagnosis of concussion as articulated by Zurich are absurd.

Another major problem with the Zurich Guidelines relates to the management algorithm. The authors continue to state that the cornerstone of concussion management is physical and cognitive rest until the acute symptoms resolve.<sup>1</sup> As in previous iterations of the consensus statement, the authors do not have a citation for their recommendation. Physical and cognitive rest are not defined. The notion of cognitive rest is not intuitively obvious. Rest and the initiation of worklessness have known deleterious consequences.<sup>14</sup>

Another flaw in the consensus guidelines is with regard to the requirement for “asymptomatic” status in the return to play process. Individuals are only allowed to proceed from a rehabilitation stage described as “no activity” where the individual has “symptom limited physical and cognitive rest” to the next stage of light aerobic exercise if they are “asymptomatic.”<sup>14</sup> As previously articulated, the average uninjured individual does not score zero on the 22-item Likert scale suggested by the consensus group. Similarly, individuals with orthopedic injuries or other medical conditions do not score zero on the scale either.<sup>6</sup> Compounding this problem further, there is evidence that exercise itself can prompt symptoms and signs of concussion in uninjured people.<sup>15</sup> As noted by Alla et al,<sup>6</sup> until the idea of “asymptomatic” status is operationally defined, the rehabilitation goals outlined in the management algorithm are unrealistic and unattainable. The guidelines would be well served with another disclaimer in this section that informs clinicians and the general public that the representative symptoms are decidedly nonspecific, not necessarily related to brain injury, and are common in people with a variety of other medical conditions, people who exercise, and the general population.

To follow the current algorithm, we can envision a scenario where an individual shakes their head. They feel sad after their head shake. Based on the guidelines, they are suspected of having a concussion and instructed to pursue a course of physical and cognitive rest. Neither intervention is defined for the patient. The patient is not allowed to return to their normal life until they reach a point of being asymptomatic. Their sadness persists. They might attempt physical exercise, but if they feel fatigued or any other common symptom, they cannot return to school or work. Anecdotal stories of young people being absent from school for 3 months with a sore neck and the misattribution of symptoms to their brain are commonly found in the authors' community. Although physicians experienced in concussion management can probably wade their way through this quagmire without iatrogenically disabling many people, clinicians not versed in this syndrome simply follow the guidelines. In the context of professional sport, agents, lawyers, and opposing team officials all have incentive to the ask the question of the athlete with an “upper body injury” involving impulsive forces to the head and neck, “are you sure you don't have any symptoms, not even one?”

It is time for us to reject this diagnostic and therapeutic algorithm. The medical community need only look to a nonspecific condition like fibromyalgia<sup>16,17</sup> to see the disability that can be promulgated by nonspecific guidelines interfacing with patient hyper vigilance, medical pseudoscience, legal wrangling, and media scrutiny. We need a better way to protect the health of the athletes we serve. A good place to start would be acknowledging that the current syndrome defined as concussion need not involve injury to the brain. More robust inclusion criteria for this condition need to be developed so that people do not receive the label of a brain injury when they have a soft tissue injury to their neck. Realistic and attainable return to function milestones, based on clearly defined parameters, are required. Finally, the concept of “symptoms better accounted for by another condition” needs to be built into the diagnostic algorithm, recognizing conditions such as whiplash, depression, and benign vertigo.

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