

# What's a concussion? Review identifies four evidence-based indicators

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A research review identifying the clinical indicators most strongly associated with concussion is an important first step in the process of developing evidence-based guidelines for concussion diagnosis, prognosis, and treatment, according to a new report published by [Neurosurgery](#), official journal of the Congress of Neurological Surgeons.

Based on analysis of the best available research data, a multidisciplinary panel of experts has identified a set of four indicators with the "highest and most consistent prevalence" among patients with possible [concussion](#). "This is the initial step toward developing a scientifically based approach to recognition and management of concussion—a process that is critically important in reducing the impact of concussion and brain injury on the lives of patients and the public," comments Nelson M. Oyesiku, MD, PhD, Editor-in-Chief of *Neurosurgery*.

## Four evidence-based indicators of concussion...

The expert panel followed a systematic process to identify studies providing information on symptoms and observable factors associated with concussion. Out of more than 5,000 publications, only 26 met standards for minimizing risk of bias, and other criteria required for inclusion. The lead author of the new report is Nancy Carney, PhD, of Oregon Health & Science University, Portland, who is also the Director of Research for the Brain Trauma Foundation. The project was funded by the US Army Contracting Command, with additional funding from

the Brain Trauma Foundation.

Based on 11 independent patient samples, the panel identified four indicators of concussion in awake individuals

- Observed and documented disorientation or confusion immediately after a blow to the head
- Impaired balance within one day after injury
- Slowed reaction times within two days after injury
- Impaired verbal learning and memory within two days after injury

The studies also provided information on the results of cognitive tests over time. The proportion of tests given to individuals diagnosed with concussion that showed abnormal function ranged from 58 percent on the first day to eight percent at one week after injury.

In the one study meeting quality and inclusion standards that was included in the report, the most commonly reported symptoms were headache, dizziness, blurred vision, and nausea. However, because this information comes from just one study, the crucial question about the "signature symptoms" of concussion remains unanswered.

## **...Set the stage for developing evidence-based guidelines**

Concussion is a common and familiar problem, yet one that has been defined in different ways. Since there's no objective test or universally accepted definition, establishing a set of indicators based on the best available research is an important first step to developing evidence-based concussion guidelines.

The new analysis provides "an evidence-based foundation" from which to develop a set of evidence-based guidelines for the diagnosis, prognosis (outcome prediction) and treatment of concussion. The panel acknowledges some important limitations of their work, including the fact the studies were mainly performed in athletic populations. More studies of patients with possible concussion in the emergency department and military settings are needed.

To develop a more specific definition of concussion, research is needed that clearly distinguishes between potentially concussive injury and true concussion. In order to take the next step and develop evidence-based diagnostic criteria, more data are needed about the association between signs, symptoms, and deficits of true concussion.

"It is important to understand that the findings in this report are limited by the nature and quality of the available scientific studies. Clearly, more research is needed in order to derive a comprehensive and evidence-based picture of concussion" Dr. Carney comments. The expert panel also makes recommendations for improving the design of future concussion studies, including the use of comparison groups; taking measurements at fixed and relevant time points; reporting distinct signs, symptoms, and deficit, including their relationships to each other; and following standards to minimize bias and confounding.

Provided by Wolters Kluwer Health

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