

# Study calls for new approach to studying concussion

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Understanding the puzzling and complex nature of concussion and how to treat it will take a whole new way of approaching the problem, according to new research led by Portland State University.

The researchers advocate the use of systems [science](#) - a discipline that analyzes complex problems as whole systems and integrates research findings from different disciplines.

"Complex systems are those in which the behavior of the whole is not entirely explained by the behavior of its parts," said Erin Kenzie, systems science researcher at Portland State.

"And [traumatic brain injury](#), or TBI, is very complex. It's been called the most complicated disease of the most complex organ of the body," she added. Mild traumatic brain injury is also known as concussion.

In the past decade, systems science has been used to understand conditions such as cardiovascular disease, obesity, drug abuse and depression.

Traditional methods of studying disease are important for understanding small pieces of the puzzle, Kenzie said, but to understand why some people recover quickly from concussion and others do not, requires researchers to also look at the big picture.

Kenzie said the problems in studying [concussion](#) include the fact that

there is no single definition that is accepted across scientific disciplines. There's also disagreement and uncertainty about how to diagnose, evaluate, measure and classify TBI.

"Every clinical trial for TBI treatment to date has failed to demonstrate reliable and safe improvement in outcomes," she said. "Systems science models can be used to develop new ways of classifying TBI, which is critical for designing better studies."

The United States sees as many as 3.8 million cases of TBI a year, mostly concussions. A significant number of patients experience prolonged physical, emotional or cognitive impairments months after the injury.

Kenzie's team included researchers from Oregon Health & Science University, Veterans Affairs Portland Health Care System and Brigham Young University. Their study was published on Sept. 28 by *Frontiers in Neurology*.

**More information:** Erin S. Kenzie et al, Concussion As a Multi-Scale Complex System: An Interdisciplinary Synthesis of Current Knowledge, *Frontiers in Neurology* (2017). [DOI: 10.3389/fneur.2017.00513](https://doi.org/10.3389/fneur.2017.00513)

Provided by Portland State University

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