

# NEWS RELEASE

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## **Persisting brain abnormalities four months post mild traumatic brain injury in children**

**(ALBUQUERQUE)**--- Clinicians who treat children with mild traumatic injury (mTBI or concussions) currently have limited options for understanding the effects of injury on brain structure and function. Therefore, care providers do not really know about when the brain actually heals relative to clinical recovery (when the child says they feel better). A new study suggests that concussions result in changes to the brain's white and grey matter microstructure that are not readily detected using traditional neuroimaging techniques. More importantly, these injuries may persist after the majority of children have reported symptom resolution. These findings may therefore have important implications about when it is truly safe for a child to resume physical activities that may produce a second concussion, potentially further injuring to an already vulnerable brain.

Mild TBI has traditionally been diagnosed in both children and adults based on patient self-report rather than on objective evidence. However, in most other orthopedic injuries, patients are asked to refrain from high-risk activities for an extended period of time post-injury to reduce the risk of re-injury to affected ligaments, tendons and bones. Results from the current study suggest that the same may be true of the brain. Current results also suggest that these objective markers of brain injury improved diagnostic accuracy above and beyond currently used clinical gold-standards.

To reach these conclusions, the researchers studied approximately two hundred children (ages 8—18) who had experienced a concussion within 11 days of injury and again at 4 months. Similarly, a large group of matched healthy controls were recruited to account for changes in the brain during typical development. All participants also underwent a thorough clinical exam to measure both how they were feeling and how they performed on tasks involving attention and memory. The researchers also used diffusion magnetic resonance imaging and advanced algorithms to better model how concussions change the way that water travels in brain tissue following an injury. For example, water may easily pass through a normal straw, but becomes restricted when the straw is bent or crimped. Diffusion magnetic resonance imaging is non-invasive and does not require the use of ionizing radiation, rendering it perfectly safe for repeated scans, an important consideration in pediatric medicine. These findings are similar to

previous reports, but the current study was conducted in a much larger group of both injured and healthy children to increase generalizability of findings.

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**For the full publication please see the following link:**

<https://academic.oup.com/brain/advance-article/doi/10.1093/brain/awac221/6612695>

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### **About The Mind Research Network (MRN)**

The Mind Research Network (MRN) – [www.mrn.org](http://www.mrn.org) – is an independent non-profit organization dedicated to the discovery and advancement of clinical solutions for the prevention, diagnosis, and treatment of mental illness and other brain disorders. Headquartered in Albuquerque, New Mexico, MRN consists of an interdisciplinary association of scientists located at universities, national laboratories and research centers around the world and is focused on imaging technology and its emergence as an integral element of neuroscience investigation. MRN is a Division of Lovelace Biomedical Research Institute. <https://www.lovelacebiomedical.org/>