MEG Imaging Improves Concussion Detection

Use of magnetoencephalography (MEG) to create high-resolution brain scans, coupled with computational analysis, could enhance detection of concussions that conventional scans might miss. A new study published in *PLOS Computational Biology* describes how MEG, which maps interactions between regions of the brain, could detect greater levels of neural changes than typical clinical imaging tools such as MRI or CAT scans.

See Also: [DTI Helps Identify Recovery In Concussion Patients](#)

Those imaging tools, along with other self-reporting measures such as headache or fatigue, are typically used to diagnose concussion. However, clinicians note that related conditions such as mild traumatic brain injury, often associated with football player collisions, don't appear on conventional scans.

"Changes in communication between brain areas, as detected by MEG, allowed us to detect concussion from individual scans, in situations where MRI or CT failed," says lead author Vasily Vakorin. The researchers are scientists with the Behavioural and Cognitive Neuroscience Institute based at Simon Fraser University, and SFU's ImageTech Lab, a new facility at Surrey Memorial Hospital. Its research-dedicated MEG and MRI scanners make the lab unique in western Canada.

The researchers took MEG scans of 41 men between 20-44 years of age. Half had been diagnosed with concussions within the past three months. They found that concussions were associated with alterations in the interactions between different brain areas — in other words, there were observable changes in how areas of the brain communicate with one another.

The study shows MEG is able to deliver an unprecedented combination of "excellent temporal and spatial resolution" for reading brain activity to better diagnose concussion where other methods fail.

In addition, relationships between symptom severity and MEG-based classification indicate that these methods may provide important measurements of changes in the brain during concussion recovery.

The SFU scientists say their goal is to refine their understanding of specific neural changes associated with concussions to further improve detection, treatment and recovery processes.

Source: Simon Fraser University
Image Credit: Simon Fraser University

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