

MNI researchers locate neurological basis of depression following sports concussion

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Researchers at the Montreal Neurological Institute of McGill University have identified the neurological basis of depression in male athletes with persisting post-concussion symptoms. The study, published in this week's issue of *Archives of General Psychiatry*, has important clinical implications for the treatment of individuals who have suffered a cerebral concussion.

Depression is one of a number of persisting symptoms experienced by athletes following sports concussion. The prevalence of depression in the general population is around 5%, whilst the prevalence of depression in head trauma patients can reach an astounding 40 %.

“Until now, very little was known about the neurological basis of the depression frequently reported by athletes following concussion,” says Dr. Alain Ptito, neuropsychologist and researcher at the MNI, and lead investigator for the study. Traditional testing methods for concussion yielded normal results with no obvious cognitive or neurological deficits. Persistent complaints have been perceived as subjective and ill-defined without neurological basis. Injury to the brain following concussion takes place at a microscopic level and is therefore difficult to measure in a patient.

Using enhanced brain imaging technology, researchers are now able to gain new insights into the damage caused by concussion. “Using functional MRI (fMRI), a computerized imaging technique that measures blood oxygen levels, we were able to detect areas of the brain

with abnormal neural activity,” explained Dr. Ptito. Dr. Ptito and colleagues tested fifty-six male athletes, 40 with concussion and 16 healthy controls. Using a depression index, 16 of the concussed subjects had no symptoms of depression, 16 expressed mild depression and 8 had moderate symptoms of depressions. Concussed athletes with depression showed reduced brain activity in regions known to be implicated in depression, specifically, the dorsolateral prefrontal cortex and striatum and attenuated deactivation in medial frontal and temporal regions. We discovered that concussed subjects with depression presented with the same pattern of brain activation as that seen for patients with major depression.”

Other studies have shown a link between a history of brain injury and probability of developing major depression later in life. Therefore understanding the pathology of depression in concussed subjects has important implications for early intervention and successful outcomes.

Source: Montreal Neurological Institute and Hospital

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