MedicalXpress

Exercise may increase volume in certain brain areas of patients with schizophrenia

February 1 2010

Potentially beneficial brain changes (an increase in the volume of an area known as the hippocampus) occur in response to exercise both in patients with schizophrenia and healthy controls, according to a report in the February issue of *Archives of General Psychiatry*. The findings suggest that the brain retains some plasticity, or ability to adapt, even in those with psychotic disorders.

Schizophrenia is known to be associated with a reduced volume in the area of the brain known as the hippocampus, which helps regulate emotion and memory, according to background information in the article. "In contrast to other illnesses that may display psychotic features, such as bipolar disorder, schizophrenia is often characterized by incomplete recovery of psychotic symptoms and persistent disability," the authors write. "These clinical features of illness may relate to an impairment of neural plasticity or mechanisms of reorganizing brain function in response to a challenge."

The formation of new neurons is one component of plasticity; previous studies have shown that neuron growth in the hippocampus of healthy individuals can be stimulated by exercise. Frank-Gerald Pajonk, M.D., of The Saarland University Hospital, Homburg, and Dr. K. Fontheim's Hospital for Mental Health, Liebenburg, Germany, and colleagues assessed changes in hippocampal volume in response to an exercise program in both male patients with schizophrenia and men who had similar demographics and physical characteristics but did not have the condition.

Eight participants with schizophrenia and eight controls were randomly assigned to exercise (supervised cycling) three times per week for 30 minutes, whereas an additional eight patients with schizophrenia instead played tabletop football for the same period of time. The game enhances coordination and concentration but does not affect aerobic fitness. All participants underwent fitness testing, magnetic resonance imaging of the hippocampus, neuropsychological testing and other clinical measures before and after participating in the program for 12 weeks.

Following exercise training, hippocampal volume increased 12 percent in patients with schizophrenia and 16 percent in healthy controls. "To provide a context, the magnitude of these changes in volume was similar to that observed for other subcortical structures when patients were switched from typical to atypical antipsychotic drug therapy," the authors write. Conversely, patients with schizophrenia who played tabletop football instead of exercising experienced a 1 percent decrease in hippocampal volume.

Aerobic fitness also increased among all who exercised, and improvement in test scores for short-term memory was correlated with increases in hippocampal volume among patients and healthy controls.

"Further clinical studies are needed to determine if an incremental improvement in the disability related to schizophrenia could be obtained by incorporating exercise into treatment planning and lifestyle choice for individuals with the illness," the authors conclude.

More information: Arch Gen Psychiatry. 2010;67[2]:133-143.

Provided by JAMA and Archives Journals