

Slow recovery from concussion? Exercise, breathing practice may improve symptoms

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Breathing practice as well as gradual aerobic exercise may help improve concussion symptoms in teens experiencing slow recovery, according to a preliminary study released today, February 21, 2023, that will be



presented at the <u>American Academy of Neurology's 75th Annual</u> <u>Meeting</u> being held in person in Boston and live online from April 22-27, 2023. The study found that while the two therapies are each beneficial separately, when combined they resulted in even greater improvement in thinking and memory skills, depression and mood.

Slow recovery was defined as taking more than one month for <u>concussion symptoms</u> to resolve. Symptoms can include headache and dizziness, depression and mood problems as well as problems with memory and concentration.

"When someone has a concussion, it can affect the body's <u>autonomic</u> <u>nervous system</u>, and it is increasingly clear that this underlies the inability to tolerate exercise, problems with thinking skills and mood issues in those with persisting symptoms," said study author R. Davis Moore, Ph.D., of the University of South Carolina in Columbia. "Our study used a handheld biofeedback device to help people train their breathing to match their heart rate patterns. This can help balance the autonomic nervous system and manage symptoms."

Heart rate variability represents the range in the amount of <u>time</u> between heartbeats. For example, a person may have a range of 60 to 100 beats per minute. Like <u>brain function</u>, all people have changes in their variability after a concussion, which usually return to normal within a few weeks. However, for those with persisting symptoms, these changes continue as if they are stuck in the time period around the injury.

The study involved 30 teenagers who were injured during sport and recreation and experienced symptoms for more than a month. Participants were divided into three groups and matched on age, gender, physical activity level, and body mass index. The biofeedback group practiced breathing at a slow rate with a computer program for 20 minutes a night, four nights a week. The exercise group completed three



workouts a week, starting at 20 minutes of low intensity aerobic activity, which gradually increased in intensity and duration. The third group did both biofeedback and exercise.

Researchers assessed concussion symptoms, heart rate variability, sleep, mood and thinking and <u>memory skills</u> for all participants at the start of the study and again six weeks later.

Researchers found that although all groups experienced improved sleep, mood, cognition, and autonomic function, those in the combined biofeedback and exercise group reported greater improvements than those in the groups with exercise or biofeedback alone.

Those in the combined biofeedback and exercise group experienced a two times greater reduction in symptom severity compared to people in the exercise group, as well as a 1.3 times greater reduction in <u>symptom</u> severity compared to people in the biofeedback group.

Similarly, the combined group experienced a 1.2 times greater reduction in symptoms of depression compared to the <u>exercise group</u>, and 1.3 times greater reduction than the biofeedback group.

The combined group also experienced more than 1.4 times the reduction in total mood disturbance than exercise or biofeedback alone.

In addition, the combined group had significantly greater improvements in attention and working memory, as well as greater changes in metrics of <u>heart rate variability</u> than the <u>exercise</u> or <u>biofeedback</u> groups alone.

"Managing persistent concussion symptoms is particularly challenging as there are no standard therapies," said Moore. "These therapies are inexpensive, easy to implement, and can be self-administered, making them feasible and accessible for everyone with persistent symptoms."



A limitation of the study was that it did not include a control group of people who received no intervention. Furthermore, the current results are preliminary and future studies are needed with larger groups of people.

Provided by American Academy of Neurology

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