How exercise benefits people with Down's syndrome

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Exercise is known to have many benefits when it comes to cognitive function—such as improving memory and concentration skills. Research shows this is true for people in many different age groups, and even in

those with conditions which affect their cognitive ability (such as Alzheimer's disease).

But until recently, it wasn't known whether exercise also had cognitive benefits for people with Down's syndrome—a genetic condition that affects development and learning.

So our research set out to discover whether a prescribed walking program could improve both physical and cognitive health in people with Down's syndrome. We found that exercising a few times a week not only improved physical health in people with Down syndrome, it also improved their cognitive function.

Changes assessed

The MinDSets study was a collaboration between our research team at Anglia Ruskin University and the Canadian Down Syndrome Society. We recruited 83 participants (43 men and 40 women) from across North America, Asia, Europe and Africa. Participants were aged 19 to 42 years old. Activity monitors were given to participants to measure their physical and cognitive health throughout the eight-week study period.

Physical fitness was assessed at the start and end of the study using a six-minute walk test. The greater the distance a participant could walk in six minutes, the better their physical fitness.

Cognitive health was assessed using a series of tests which looked at short-term memory, concentration, decision-making skills and speed of decisions.

Participants were then divided into four different groups. The first group did a 30-minute walk three times a week. The second group did 20 minutes of brain training games six days a week. The third group did

both the walk and the brain training games. The last group was a control group—meaning they did not do any of the activities and stuck to their normal routine.

The group that walked three times a week increased their walking distance by nearly 10%. In the combined group, who did both the walking intervention and the brain training, they improved their walking distance by 12%. There were no changes in distance walked in either the brain training or control groups for distance walked.

When it came to cognitive function, the brain training group, exercise group and combined group all showed improvements in their performance on the cognitive tests. But we were surprised to find that the exercise group and combined group actually showed greater improvements in their performance on the cognitive tests than the brain training group did—particularly on tests looking at decision-making speed and answer accuracy.

These results suggest that exercise on its own can help improve both physical health and cognitive function in people with Down's syndrome. But combining regular exercise with brain training may provide the greatest boost to physical fitness and brain health.

This was an innovative study in its design, as all the participants and their caregivers became the data collectors. This approach does mean that there's more chance of errors compared to if data was collected in the lab. But looking at a group as large as we did ensured that the results were more reflective of the Down's syndrome population as a whole.

Walking and brain health

Walking is a complex task. It activates numerous areas of the brain in order to drive movement and regulate stability and coordination.

For every step you take, a flow of information is generated by the brain—and this information is continually monitored to ensure your body can readily adapt to the environment (such as if the road becomes uneven).

Walking therefore uses quite a bit of cognitive power. For the participants of our study, walking required them to pay attention to the task at hand—forcing them to develop their attention and concentration skills while exercising. These are transferable skills to everyday life, so when the cognitive tests were given, participants were able to put these skills to use—especially on the tasks requiring sustained focus.

The next step for research in this area will be to focus on what effect more complex exercises (such as dancing) may have on cognitive function.

Our work shows that for people with Down's syndrome, an exercise as simple and accessible as walking can have significant benefits for both physical fitness and cognitive health.

This is important, as people with Down's syndrome are at greater risk of certain health conditions. Many people with Down's syndrome also often fall short of recommended activity minimums, which may further increase their risk of poor health.

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