

Does exercise really help your brain? Jury still out

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It's long been thought that working out helps a person stay sharp, but a

new review argues there's little solid scientific evidence for the mental benefits of physical exercise.

Individual clinical trial results have tended to support the idea that regular [exercise](#) helps maintain [brain](#) health.

But a combined review of 109 trials involving more than 11,000 healthy folks found evidence for that notion is weak overall, according to findings published March 27 in *Nature Human Behavior*.

"There is little evidence for a positive relationship between regular physical exercise and improved cognition in healthy people," said lead researcher [Luis Ciria](#), a postdoctoral researcher with the Mind, Brain and Behavior Research Center at the University of Granada in Spain.

"Our findings suggest caution in claims and recommendations linking regular physical exercise to [cognitive benefits](#) in the healthy human population until more reliable causal evidence accumulates," he added.

The new evidence review focused on [clinical trials](#), which are considered the gold standard for assessing the effectiveness of drugs or therapies.

Evidence for the physical benefits of exercise has steadily accumulated over the last century, Ciria said, which suggests working out might benefit the brain as well.

"If physical exercise positively affects so many physiological systems, why wouldn't it have a beneficial effect on the brain?" he said.

During the last 50 years, there has been a steady flow of clinical trials reporting brain benefits of regular physical exercise in healthy individuals across the human life span, Ciria said.

However, these trials are often beset by low-quality design, too few participants and potential bias, and frequently overlook mixed or contradictory findings, he said.

"We believe this exponential accumulation of low-quality evidence has led to stagnation rather than advance in the field hindering the discernment of the real existing effect," Ciria said.

Ciria and his colleagues decided to take a step back and reassess the state of the evidence, by performing an umbrella analysis of data from 24 prior evidence reviews.

The researchers found that small but statistically significant positive effects of exercise on brain function disappeared after accounting for factors related to how the studies were conducted.

For example, some studies compared their exercise group to a completely passive control group, while others compared to a less-active control group. Not surprisingly, a larger benefit tended to be observed when active folks were compared to sedentary controls.

Other studies found greater benefits from physical exercise when the mental performance of the experimental group was lower than the control group at the beginning.

When the data were reanalyzed with these potential biases in mind, there was little to no evidence that a healthy person's brain benefits from exercise.

Ciria said researchers hope that their findings will serve as a call for rethinking public health policies that encourage exercise adherence based on its reputed cognitive benefits.

"Organizations committed to public health such as the World Health Organization or the National Institutes of Health currently recommend [regular exercise](#) as a means to maintain a healthy cognitive state, which based on our findings cannot be affirmed," Ciria said.

Ohio brain researcher [Stephen Rao](#) agreed that there are significant problems with many clinical trials aimed at testing the benefits of exercise on brain health.

"The interventions vary considerably, but they're usually brief," said Rao, chair and director of the Schey Center for Cognitive Neuroimaging at the Cleveland Clinic. "Most of them are three to six months. It's rare to find one that's a year. And then, of course, there's also the measurement of cognition, and that's a problem because that's going to vary from study to study."

But by focusing solely on clinical trials, this new review overlooks important scientific evidence gathered from other types of studies, Rao said.

For example, observational studies can track people for years rather than months, and therefore, have a better opportunity to detect long-term brain improvement or decline.

"You don't really get a chance to know whether the exercise is working, because it's such a short duration," Rao said of clinical trials. "And if your sample sizes are too small, there's no way you have enough power to even detect if there's a positive effect."

Rao recalled a 2014 study of his own that tracked a group of seniors, including some with a genetic risk for Alzheimer's disease. They were followed for a year and a half, and researchers asked them about their levels of physical activity but didn't assign any to a specific workout

program.

"What you find is that the people who are genetically at risk for Alzheimer's, those people who didn't exercise showed a deterioration in cognition and increased atrophy of their brain," Rao said of his study, published in [*Frontiers in Aging Neuroscience*](#). "So it may be that exercise may not make you smarter, but it can hold off disease in people who are vulnerable."

Additionally, Rao added, studies of animals like mice with short life spans have shown that exercise eventually contributes to improved blood flow and increased neural connections in the brain, indicating longer-term potential benefits for humans.

[Heather Snyder](#), vice president of medical and scientific relations for the Alzheimer's Association, agreed that "this study points out a number of still unanswered questions around the relationship between exercise and brain health, and indicates that more research is required before definitive conclusions can be drawn."

The upshot is that better clinical trials are needed, and until then, it's hard to discount the potential direct benefit of exercise on brain health, Rao said.

"Yes, we have an absence of evidence. We don't have good evidence from these randomized controlled trials that exercise can improve cognition, but that doesn't mean it couldn't have that effect under the right circumstances," he said.

"The ideal clinical trial would be to randomize 500 people into an aerobic exercise and follow them for four years. Now, if that study was conducted and didn't find an effect, I would say conclusively that exercise doesn't improve cognition," Rao concluded.

The Alzheimer's Association is pursuing such a clinical trial right now, Snyder said.

The [U.S. POINTER study](#) is a two-year trial to evaluate whether lifestyle interventions, including exercise, can protect the brains of seniors at risk for cognitive decline.

"The National Institute on Aging is similarly funding ongoing work investigating physical activity's impact on our brains and bodies as we age," Snyder said.

In the meantime, there are steps people can take to enhance their [brain health](#), Ciria said. A healthy diet, good sleep and socializing with others have been shown to benefit the brain.

"All these ordinary activities, including physical activity, are known to correlate positively with better cognitive health," Ciria said, adding that what mechanisms cause this remain unknown.

"It may be that if you exercise regularly throughout your life you have better cognitive health, but is it the physical exercise itself that causes these improvements or is it everything that is around doing physical exercise—sleeping well, relieving stress, breathing clean air, better physical health, eating well, etc.?" he noted.

Ciria added that there are tons of other [health](#) benefits that come with exercise.

"There is no need to appeal to the as-yet-unproven cognitive benefits of physical exercise, especially when the current evidence suggests that, if the effect exists, it is notably small to rethink its practical relevance," he said.

"Engaging in [physical exercise](#) brings not only physical but also [social benefits](#), as we connect with others by forging social bonds, participating in collective activities that give us a sense of belonging, and building new sources of social support," Ciria concluded. "Above all, we strongly believe in the pleasure of doing something for its own sake. The value of exercising may lie simply in its enjoyable nature."

More information: Luis F. Ciria et al, An umbrella review of randomized control trials on the effects of physical exercise on cognition, *Nature Human Behaviour* (2023). [DOI: 10.1038/s41562-023-01554-4](#)

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