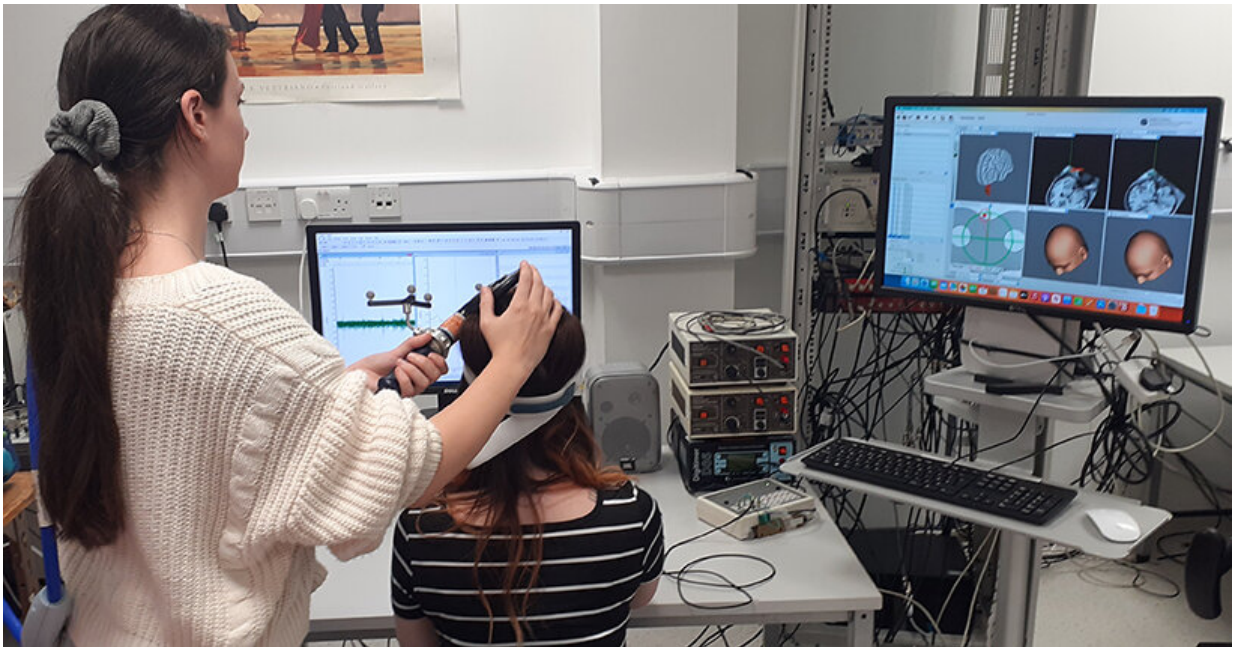# New research sheds light on the causes of fatigue after COVID-19

May 11 2023

TMS testing for long COVID patient. Credit: Newcastle University

Experts from Newcastle University found the nervous system of people with post-COVID fatigue was underactive in three key areas. Fatigue is one of the most common symptoms of long COVID.

The breakthrough could lead to better treatment and tests to identify the condition and the team are already progressing the work having just started a trial. They have begun recruiting patients to test the

effectiveness of a TENS machine—commonly used for pain relief in childbirth—to alleviate the [fatigue](#) in patients with long COVID.

Newcastle University scientists carried out a battery of behavioral and neurophysiological tests on people suffering from post-COVID fatigue and compared them to people without fatigue. They discovered people with post-COVID fatigue showed underactivity in three specific areas of the nervous system. The [research](#) has been published in *Brain Communications*.

They found:

- a slower reaction in specific areas of the brain because of underactivity in specific cortical circuits
- an imbalance in the autonomic nervous system—the network of nerves that regulates unconscious body processes such as [blood pressure](#) and the rate of breathing was found to be impaired. This can have wide-ranging effects on several different body processes.
- muscle abnormalities—muscle fibers became more easily fatigued after exercise than in people without post-COVID fatigue.

Dr. Demetris Soteropoulos, Senior Lecturer in Motor Systems Neuroscience at Newcastle University who led the research said, "These abnormalities in the results on objective tests show that fatigue in long COVID is a measurable disease and these tests may, in time, help us understand how changes in the nervous system contribute to fatigue."

Long COVID and fatigue

An estimated 1.9 million people, around 2.9% of the UK population, have long COVID with around half of those reporting fatigue as their

primary symptom. While most people who catch COVID don't become severely ill and get better relatively quickly, some have long-term problems after recovering from the infection—even if they weren't very ill in the first place.

A group of 37 volunteers with post-COVID fatigue underwent a range of well-established non-invasive behavioral and neurophysiological tests. Their results were compared to those of 52 control subjects, matched for age and sex, who underwent the same tests. The tests which provided 33 sets of data included a startle reaction time test, electrocardiogram and transcranial magnetic stimulation.

Research Associate, Dr. Anne Baker who is a co-author of the paper added, "We know that many people have faced criticism or even disbelief when they report long COVID, so by being able to provide an independent measure, we can help medical teams provide continued support."

Research Assistant Natalie Maffitt, co-author on the paper, said, "Following on from these findings, we are beginning testing at Newcastle University on whether the autonomic nervous system can be modulated to improve symptoms in post-COVID fatigue."

"We're examining a [non-invasive method](#) which involves clipping an earpiece to the tragus on the ear and delivering small electrical currents to the vagus nerve using a TENS machine—familiar to many through its use for [pain relief](#) during childbirth."

More information: Anne M E Baker et al, Neural dysregulation in post-COVID fatigue, *Brain Communications* (2023). [DOI: 10.1093/braincomms/fcad122](#)