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COVID-19 can disrupt electrical activity in frontal lobes of brain



By [James Kingsland](#) on November 3, 2020 — [Fact checked by Alexandra Sanfins, Ph.D.](#)

A review of research suggests that abnormalities in the front of the brain identified by electroencephalography (EEG) tests are common among patients who have neurological symptoms with COVID-19.



Image credit: Nicola Tree/Getty Images

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Estimates vary, but approximately [15–25%](#) of patients with severe COVID-19 may experience [neurological symptoms](#), such as headaches, confusion, delirium, impaired consciousness, seizures, and strokes.

Doctors may refer patients who are experiencing neurological symptoms for an [EEG test](#). The test involves placing electrodes on the scalp to monitor the electrical activity of the brain.

To investigate how COVID-19 affects the brain, researchers from Baylor College of Medicine in Houston, TX, and the University of Pittsburgh, PA, analyzed EEG results from 617 patients, reported in 84 different studies.

The median age of patients who underwent an EEG was 61.3 years, and two-thirds were males.

The most common findings that the researchers identified were the slowing of brain waves and abnormal electrical discharges.

The extent of the EEG abnormalities positively correlated with the severity of the disease and whether the patients had preexisting neurological conditions, such as epilepsy.

The journal [Seizure: European Journal of Epilepsy](#) published the review.

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Likely entry point

Around a third of the abnormal findings were in the frontal lobes of the brain.

“We know that the most likely entry point for the virus is the nose, so there seems to be a connection between the part of the brain that is located directly next to that entry point,” says Dr. Zulfi Haneef, assistant professor of neurology/neurophysiology at Baylor and one of two co-authors of the study.

“These findings tell us that we need to try EEG on a wider range of patients, as well as other types of brain imaging, such as MRI or CT scans, that will give us a closer look at the frontal lobe,” he adds.

The researchers note that the virus may not be directly responsible for all the damage. Systemic effects of the infection, such as inflammation, low oxygen levels, unusually “sticky” blood, and cardiac arrest, may play a role in EEG abnormalities that extend beyond the frontal lobes.

The study identified “diffuse slowing” in the background electrical activity of the whole brain in almost 70% of patients.

Brain fog

Some people who have recovered from COVID-19 report ongoing health problems, now labeled [long COVID](#). Among these is “brain fog.”

A recent study, which has not been peer-reviewed or published but was uploaded to the preprint server [MedRxiv](#), found that individuals who claim to have had COVID performed less well on an online cognitive test than those who did not believe they had contracted the virus.

The authors suggest that the infection may have aged people cognitively by around a decade.

According to experts contacted by the [Science Media Centre](#) in London, United Kingdom, this cross-sectional study does not prove that the infection caused long-term cognitive decline. However, it does highlight concerns about lasting effects on the brain.

That there are EEG abnormalities associated with the neurological symptoms of COVID-19 infection adds to these concerns, says Dr. Haneef.

“A lot of people think they will get the illness, get well, and everything will go back to normal, but these findings tell us that there might be long-term issues, which is something we have suspected, and now we are finding more evidence to back that up.”

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On the positive side, the authors report that 56.8% of those who had follow-up EEG tests showed improvements.

The authors note that their analysis had several limitations, including lack of access to raw data from individual studies, such as EEG traces. Doctors may also have omitted to report many normal EEGs, besides performing disproportionately more EEGs on patients with neurological symptoms, potentially skewing the research results.

In addition, doctors gave anti-seizure medications to many patients who they suspected were having seizures. This may have obscured signs of seizures in their EEG traces.

For live updates on the latest developments regarding the novel coronavirus and COVID-19, click [here](#).

Neurology / Neuroscience COVID-19

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COVID-19: How do we explain 'happy' hypoxia?



By [Timothy Huzar](#) on July 8, 2020 — Fact checked by [Alexandra Sanfins, Ph.D.](#)

New research suggests that the seemingly unusual phenomenon of “happy” hypoxia, or silent hypoxemia, in people with COVID-19 can be explained by long-established principles of respiratory science.





A new study attempts to explain happy hypoxia in COVID-19 patients.

Coronavirus data

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A new study has suggested that “long-established principles of respiratory physiology” can explain the otherwise confusing presence of silent hypoxemia patients with COVID-19.

The research, published in the [American Journal of Respiratory and Critical Care Medicine](#), may help clinicians better support patients with severe cases of COVID-19.

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Silent hypoxemia

The ongoing COVID-19 pandemic holds many mysteries. Among the more baffling has been the frequency of silent hypoxemia, or happy hypoxia, as it has been dubbed in the media.

Hypoxemia is [defined](#) as “a decrease in the partial pressure of oxygen in the blood.” As blood oxygen levels begin to reduce, a person may experience shortness of breath, also called dyspnea. If blood oxygen levels continue to fall, the organs may shut down, and the issue becomes life threatening.

COVID-19 is primarily a respiratory illness, and a severe case can reduce the amount of oxygen that the lungs can absorb. Blood oxygen levels have been found to be very low in some COVID-19 patients.

As reported in various media sources, including [Science](#)[®], despite low blood oxygen levels, some patients appear to be functioning without serious issues or even shortness of breath.

According to the authors of the present research, the condition “is especially bewildering to physicians and is considered as defying basic biology.”

The lead author of the study, Dr. Martin J. Tobin — a professor of pulmonary and critical care medicine at the Loyola University Medical Center, in Maywood, IL — noted that “In some instances, the patient is comfortable and using a phone at a point when the physician is about to insert a breathing [endotracheal] tube and connect the patient to a mechanical ventilator, which, while potentially lifesaving, carries its own set of risks.”

Informal survey

To understand why this is the case, Dr. Tobin and colleagues first conducted an informal survey of 58 healthcare workers asking whether they had encountered cases of silent hypoxemia, or happy hypoxia. The team received 22 responses with useful data.

After analyzing the data, the authors concluded that many of the cases of silent hypoxemia could be explained through conventional respiratory science.

For example, a healthcare provider typically first measures oxygen levels with a pulse oximeter. Dr. Tobin points out that “while a pulse oximeter is remarkably accurate when oxygen readings are high, it markedly exaggerates the severity of low levels of oxygen when readings are low.”

Dr. Tobin also noted that the brain may not immediately recognize that blood oxygen levels have reduced, explaining, “As oxygen levels drop in patients with COVID-19, the brain does not respond until oxygen falls to very low levels — at which point, a patient typically becomes short of breath.”

In addition, more than half of the patients with silent hypoxemia also had low carbon dioxide levels, which Dr. Tobin and his co-authors believe could reduce the effect of low blood oxygen levels.

“It is also possible that the coronavirus is exerting a peculiar action on how the body senses low levels of oxygen,” said Dr. Tobin, speculating that this could be linked to the lack of smell that many COVID-19 patients [experience](#).

As the initial wave of the disease is quelled, [new outbreaks](#) across the world raise the specter of a second wave. COVID-19’s sudden emergence and rapid spread gave scientists and clinicians little information to go on when determining effective treatments.

Now, with real-world data to guide future treatments, learning from this information will be crucial in reducing the number of people who die of

the disease.

While verifying the explanations that the present study proposes will require further research, the study contributes to a growing body of research that will prove invaluable for clinicians working in critical care wards.

For Dr. Tobin, “This new information may help to avoid unnecessary endotracheal intubation and mechanical ventilation, which presents risks, when the ongoing and much anticipated second wave of COVID-19 [fully] emerges.”

For live updates on the latest developments regarding the novel coronavirus and COVID-19, click [here](#).

Pulmonary System Infectious Diseases / Bacteria / Viruses COVID-19

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One-third of patients may experience ‘long COVID’



By [James Kingsland](#) on December 11, 2020 — [Fact checked by Alexandra Sanfins, Ph.D.](#)

A study has found that 32% of people who tested positive for SARS-CoV-2 were still experiencing at least one symptom 6 weeks after their tests. The most common of these symptoms were fatigue, shortness of breath, and a loss of taste or smell.



Katleho Seisa/Getty Images

Coronavirus data

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People with relatively mild COVID-19 usually recover within [2–3 weeks](#) of the symptoms arising.

However, many have reported debilitating symptoms that last for weeks or months, a health issue called [long COVID](#). Common [symptoms](#) include breathlessness, a cough, heart palpitations, exercise intolerance, fatigue, difficulty concentrating, and [brain fog](#).

Those who were never formally diagnosed with COVID-19 can have particular difficulty convincing healthcare professionals that they have long COVID.

The phenomenon appears to be more common among people who experienced more severe infections.

One study of people hospitalized with COVID-19 in Italy found that [87.4%](#)  reported experiencing at least one symptom, often fatigue or shortness of breath, 2 months after discharge.

Among people with milder infections, however, the prevalence of long COVID has been unclear. Data from the COVID Symptom Study app suggest that [1 in 10](#) people with the illness experience symptoms for 3 weeks or more.

Now, researchers in Switzerland have found that as many as 1 in 3 people who had milder COVID-19 were still experiencing symptoms after 6 weeks.

Their findings have been published in [Annals of Internal Medicine](#).

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Telephone interviews

Doctors and epidemiologists led by a team from Geneva University Hospitals followed up with 669 people who had tested positive for SARS-CoV-2. Most, 69%, had no underlying risk factors for the illness.

The participants' average age was 42.8 years, and 60% were female. Over the course of the study, 40 people required hospitalization.

Healthcare professionals interviewed most of the participants by phone every 48 hours for the first 10 days after their diagnoses. They asked a standardized list of questions about symptoms.

If a person reported worsening symptoms, they received these calls every 24 hours. All participants were interviewed again between 30 and 45 days after their diagnosis.

At an average of 43 days, or 6 weeks, after diagnosis, at least 32% of all the participants reported that they were still experiencing at least one symptom of COVID-19.

The most commonly reported were fatigue, experienced by 14% of the participants, shortness of breath (9%), and a loss of taste or smell (12%). A further 6% reported a persistent cough, and 3% reported headaches.

"This has enabled us to better understand the evolution of the disease in people who generally suffer neither from specific risk factors nor from a serious form of the disease," says study co-author Dr. Idris Guessous.

"In addition to the physical distress of their symptoms, many were very worried: How much longer would it last? Were some after-effects irrecoverable?" adds Dr. Mayssam Nehme, the co-lead author of the study.

Call for recognition

The team call on healthcare providers, employers, insurance companies, and wider society to recognize that previously healthy people can experience the after-effects of COVID-19 for weeks or even months after developing the underlying infection.

In their paper, the authors conclude:

"Recognizing the persistence of symptoms could legitimize patients' concerns in an unknown and new disease. Adequate communication can provide reassurance, reduce anxiety, and potentially optimize recovery."

The researchers will continue to follow up with their study population for 3, 7, and 12 months after diagnosis.

They acknowledge some limitations to their published research. In particular, several people stopped participating during the follow-up, which could have led to [ascertainment bias](#) in the final results.

For example, people who experienced lingering symptoms may have been more willing to take part in the later stages of the study than those who had fully recovered.