

Hyperbaric hope for fibromyalgia sufferers

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Two 20-seat hyperbaric chambers at the Sagol Center for Hyperbaric Medicine and Research in Israel were used in a study to see if hyperbaric oxygen treatment could help patients with fibromyalgia. A new study by researchers at Rice University and institutions in Israel showed patients in a small trial experienced remarkable improvement after two months of treatment. Credit: Sagol Center for Hyperbaric Medicine and Research

Women who suffer from fibromyalgia benefit from a treatment regimen in a hyperbaric oxygen chamber, according to researchers at Rice University and institutes in Israel.

A clinical trial involving women diagnosed with [fibromyalgia](#) showed the painful condition improved in every one of the 48 who completed two months of [hyperbaric oxygen therapy](#). Brain scans of the women before and after treatment gave credence to the theory that abnormal conditions in pain-related areas of the [brain](#) may be responsible for the syndrome.

Results of the study appear in the open-access journal *PLOS ONE*.

Fibromyalgia is a chronic pain syndrome that can be accompanied by - and perhaps related to - other physical and mental conditions that include

fatigue, cognitive impairment, irritable bowel syndrome and sleep disturbance.

More than 90 percent of those diagnosed with the syndrome are women, said Eshel Ben-Jacob, a lead author of the proof-of-concept study who developed the analytical method used to show the association between [patients'](#) improvement and changes in their brains. He is an adjunct professor of biosciences at Rice University, a senior investigator at Rice's Center for Theoretical Biological Physics and a professor of physics and member of the Sagol School of Neuroscience at Tel Aviv University.

"Symptoms in about 70 percent of the women who took part have to do with the interpretation of pain in their brains," Ben-Jacob said. "They're the ones who showed the most improvement with hyperbaric oxygen treatment. We found significant changes in their brain activity."

Scientists have not pinned down the syndrome's cause, although another recent PLOS One study identified a possible RNA-based biomarker for its diagnosis. A variety of treatments from drugs to lifestyle changes have been tried to relieve patients' suffering, with limited success, Ben-Jacob said.

"Most people have never heard of fibromyalgia," he said. "And many who have, including some medical doctors, don't admit that this is a real disorder. I learned from my M.D. friends that this is not the only case in which disorders that target mainly women raise skepticism in the medical community as to whether they're real or not. However, these days there are increasing efforts to understand the effect of gender on body disorders."



The interior of a hyperbaric chamber at the Sagol Center for Hyperbaric Medicine and Research in Israel, used to treat patients with fibromyalgia in a recent trial. A new study showed patients who completed a two-month regimen of treatment experienced significant improvements in their health. Credit: Sagol Center for Hyperbaric Medicine and Research

Researchers at the Sagol Center for Hyperbaric Medicine and Research at the Assaf Harofeh Medical Center and Tel Aviv University were studying post-traumatic [brain injury](#) patients when they realized hyperbaric oxygen treatment (HBOT) could help patients with fibromyalgia.

"Patients who had fibromyalgia in addition to their post-concussion symptoms had complete resolution of the symptoms," said Dr. Shai Efrati, who noted his own mother suffers from the syndrome. Efrati is lead author of the study, head of the research and development unit at the Assaf Harofeh Medical Center and a member of the Sagol School of Neuroscience at Tel Aviv University.

Hyperbaric oxygen chambers that expose patients to pure oxygen at higher-than-atmospheric pressures are commonly used to treat patients with embolisms, burns, carbon monoxide poisoning and decompression sickness (known to divers as "the bends"), among many other conditions.

One effect of exposure is to push more oxygen into a patient's bloodstream, which delivers it to the brain. Efrati's earlier trials found HBOT induces

neuroplasticity that leads to repair of chronically impaired brain functions and improved quality of life for post-stroke and mild traumatic [brain injury patients](#), even years after the initial injury.

Ben-Jacob said two patients spearheaded the push for the study. One was an Oxford graduate student who developed fibromyalgia after suffering a traumatic brain injury in a train crash. "By chance, the secretary of the department where she worked is the mother of the nurse in charge of the HBOT. She said you have to go and try to do it," he recalled.

The other, he said, is a professor of sociology who specializes in post-traumatic stress disorders due to child abuse. The professor had suffered from fibromyalgia for many years. Her symptoms got worse through the initial treatments - a common experience for other patients in the study who she said had suppressed memories due to child abuse - before they got better. But by the end of treatment both women showed remarkable improvement, Ben-Jacob said.

Efrati said some patients will likely require follow-up sessions. "The abnormalities in brain regions responsible for the chronic pain sensation in fibromyalgia patients can be triggered by different events," he said. "Accordingly, the long-term response may be different.

"We have learned, for example, that when fibromyalgia is triggered by [traumatic brain injury](#), we can expect complete resolution without any need for further treatment. However, when the trigger is attributed to other causes, such as fever-related diseases, patients will probably need periodic maintenance therapy."

The clinical trial involved 60 women who had been diagnosed with fibromyalgia at least two years earlier. A dozen left the trial for various reasons, but half of the 48 patients who completed it received 40 HBOT treatments five days a week over two months. Half of the 48 patients who completed the trial received 40 HBOT treatments five days a week over two months. The 90-minute treatments exposed patients to pure oxygen at two times the atmospheric pressure.

The other half were part of what Ben-Jacob called a crossover-control group. They were evaluated before the trial and after a control period that saw no improvement in their conditions. After the two-month control, they were given the same HBOT treatment as the first group and experienced the same relief, according to the researchers.

The researchers noted the successful treatment enabled patients to drastically reduce or even eliminate their use of pain medications. "The intake of the drugs eased the pain but did not reverse the condition, while HBOT did reverse the condition," the researchers wrote.

Efrati said the findings warrant further study. "The results are of significant importance since, unlike the current treatments offered for fibromyalgia patients, HBOT is not aiming for just symptomatic improvement," he said. "HBOT is aiming for the actual cause—the brain pathology responsible for the syndrome. It means that brain repair, including even neuronal regeneration, is possible even for chronic, long-lasting pain syndromes, and we can and should aim for that in any future treatment development."

More information: *PLOS ONE*,
[journals.plos.org/plosone/arti ...](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0127012)
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Provided by Rice University

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