

Brain implants could restore paralyzed patients' arm movements

September 27 2023, by Lucie AUBOURG



The Dutch company Onward developed a device that takes signals from a brain implant and uses them to stimulate a paralyzed patient's spinal cord, thus restoring lost movement.

A paralyzed Swiss man has become the first person to test a new

technology that reads his thoughts using AI and then transmits signals through his own nervous system to his arms, hands and fingers in order to restore movement.

The treatment, a combination of a [brain-computer interface](#) and a spinal [implant](#), had previously allow a paraplegic patient to walk again, a breakthrough that was published in the scientific journal *Nature* in May.

But this is the first time it's being used for "upper extremity function," Onward, the Dutch company behind it, said Wednesday.

"The mobility of the arm is more complex," surgeon Jocelyne Bloch, who carried out the implantation procedures, told AFP.

Though walking comes with its own challenges—notably balance— "the musculature of the hand is quite fine, with many different small muscles activated at the same time for certain movements," she said.

The patient, who wishes to remain anonymous, is a 46-year-old who lost the use of his [arms](#) after a fall. Two operations were carried out last month at the Lausanne University Hospital in Switzerland.

The first involved removing a small piece of cranial bone and inserting in its place the [brain](#) implant, which was developed by the French group CEA-Clinatec and measures a few centimeters in diameter.

In the second, surgeons placed a stimulator roughly the size of a credit card developed by Onward inside the patient's abdomen, and connected it through electrodes to the top of his spinal column.

The brain-computer interface (BCI) records brain signals and decodes them using [artificial intelligence](#) to make sense of the patient's intentions, acting as a "digital bridge" to send these instructions on to the

[spinal cord stimulator](#).

"It's going well so far," said Bloch, who co-founded Onward and is a consultant for the company. "We are able to record [brain activity](#), and we know that the stimulation works," she said.

"But it is too early to talk about what progress he has made. "

Still in training

The patient is still in the training phase, teaching his brain implant to recognize the different desired movements.

The movements will then have to be practiced many times before they can become natural. The process will take a few months, according to Dr. Bloch.

Two more patients are scheduled to participate in this clinical trial, and the full results will be published later.

Spinal cord stimulation has already been used in the past to successfully move paralyzed patients' arms, but without reading their thoughts by pairing it with a brain implant.

And brain implants have already been used so that a patient can control an exoskeleton. The Battelle research organization used a [brain implant](#) to restore movement in a patient's arm—through a sleeve of electrodes placed on the forearm, stimulating the muscles required from above.

"Onward is unique in our focus on restoring [movement](#) in people who have paralysis by stimulating the [spinal cord](#)," the company's CEO Dave Marver told AFP, adding the technology could be commercialized by the end of the decade.

Brain implants were long trapped in the realm of science fiction, but the field is now rapidly growing thanks to firms like Synchron and Elon Musk's Neuralink.

They are working on having paralyzed patients to control computers through thought, restoring for example the ability to write.

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