USA TODAY

HEALTH

After researchers implanted microchips into his brain, a paralyzed man was able to write with his mind

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Published 12:13 p.m. ET May 13, 2021 | **Updated 3:30 p.m. ET May 13, 2021**

A man who lost all movement below the neck after a spinal cord injury in 2007 was finally able to write again – with his mind.

Stanford University researchers used artificial intelligence software and a brain-computer interface to help the man with immobilized limbs to communicate by text, according to a study published Wednesday in the peer-reviewed journal Nature.

Dr. Jaimie Henderson, professor of neurosurgery at Stanford, implanted two microchips the size of baby aspirin about 1 millimeter into the man's brain in 2017. The chips have electrodes that record neurons in the motor cortex, the part of the brain that controls hand movement.

When the man imagined he was using his hand to write on a notepad, the computer converted his thoughts into text on a computer screen.

"This approach allowed a person with paralysis to compose sentences at speeds nearly comparable to those of able-bodied adults of the same age typing on a smartphone," Henderson said. "The goal is to restore the ability to communicate by text."

The man – referred to in the study only as T5 – texted at a rate of about 18 words per minute.
A person of the same agewith full use of their hands can text an average of 23 words per minute on a smartphone.

His error rate was about one mistake every 18 or 19 attempted characters. When researchers used an autocorrect function, similar to most smartphones, error rates plummeted below 1% when he was asked to copy text and slightly more than 2% when he was asked to write something original.

"It's exciting to improve the speed of these kinds of devices to approach a level where I think it could be very useful for someone who's severely paralyzed," said Dr. Frank Willett, study author and neuroscientist at Stanford. "It's comparable to writing on a notepad or typing on a smartphone."

Study authors are excited not only about the breakthrough technology but about what their discovery means for future research.

Until now, scientists weren't sure how long a person could retain motor skills without putting them into practice.

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"We had no idea someone who had never moved his hands for 10 years, if you asked him to write, what his brain would do," Willett said. "It shows these fine dexterous (movements) still evoke rich patterns of brain activity that we can use."

Researchers hope the technology could be adapted to allow people who can't talk to simulate conversation through writing.

"While handwriting can approach 20 words per minute, we tend to speak around 125 words per minute, and this is another exciting direction that complements handwriting," said Krishna Shenoy, professor of electrical engineering at Stanford University.

More work needs to be done before the study's results can be successfully transferred into real-world applications such as a tablet, smartphone or computer.

"The immediate next step would be refining and streamlining the algorithm, so it's easier to get up and running quickly," Willett said. "Every brain is unique, and you get different neurons that do different things, so there's always a calibration."

Follow Adrianna Rodriguez on Twitter: @AdriannaUSAT.

Health and patient safety coverage at USA TODAY is made possible in part by a grant from the Masimo Foundation for Ethics, Innovation and Competition in Healthcare. The Masimo Foundation does not provide editorial input.