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A NEURO-ELECTRONIC SYSTEM TO RESTORE MOVEMENT AFTER PARALYSIS

By BrainGate

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The problem

When US Navy veteran Bill Kochevar became quadriplegic after a charity bike ride accident eight years ago, he had little hope of moving his limbs again. Unable to feed himself, he became one of 5.6 million paralysed people in the US who require constant care.

The response

Kochevar started taking part in research for BrainGate2, a neuro-electronic system designed to help restore movement after paralysis, currently being trialled by US company BrainGate at Case Western Reserve University and the Cleveland Functional Electrical Stimulation Center. After 45 weeks of rehabilitation to restore muscle tone, he learned how to use his brain signals to move a virtual reality arm on a computer screen. A special MRI machine tracked the parts of his brain used to make these movements relaying the data to a computer.

Researchers then implanted two pill-sized electrodes in Kochevar's brain and more than 30 wires in his arm muscles. When he 'willed' certain movements, the electrodes captured the brain activity, relayed it to a computer which stimulated muscles in his arm, generating physical movement - all in a split second.

This meant Kochevar could control his own movement to feed himself with a fork and lift a cup to drink through a straw, a huge milestone for someone who had no control over their arms for eight years. And while the system does have its limitations - it currently relies on wires, externally fitted electrodes and a

gravity support for his arm – it demonstrates what's possible.

The potential

The aim is to take BrainGate from a laboratory setting into patients' homes. Researchers hope to develop a wireless system, improving the accuracy and the flow of movement. The tech promises to restore a level of independence to millions of people affected by paralysis.

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