

Peeling Away the Hype in Brain-Spine Research Study

Media overkill: Brain-Spine connection restores paralyzed man's volitional control of stepping. Is it 'natural?' And wasn't he walking already?

MINNEAPOLIS, MN, UNITED STATES, June 5, 2023 /EINPresswire.com/ -- At least once a year



We in the SCI advocacy community must hold the media to a higher standard of reporting on paralysis research.”

Matthew Rodreick

Gregoire Courtine’s spinal cord stimulation lab in Switzerland publishes a research study; these well-written, solidly scientific, beautiful multimedia presentations always seem to wind up in the top journal Nature. They’re always news desk catnip and the headlines are always the same: “paralyzed man walks.”

This past week Courtine’s group published another paper in Nature, “Walking naturally after [spinal cord injury](#) using

a brain–spine interface.”

Here we go again. The press went full feeding frenzy. If you live with a spinal cord injury, you couldn’t have missed this brain-spine hope-fest. Good Morning America’s coverage was 100 percent gee whiz, led by Christopher Reeve’s son Will, saying his dad would’ve been first in line to get something like this. NBC, Washington Post, NYT, BBC, Al Jazeera, they all ran with the story.

A Digital Bridge

Bio-tech wise, it’s brilliant work. Here’s the gist of it: Gert-Jan Oskam, a 40-year-old spinal cord injured Dutchman activates wireless brain sensors to transmit his thoughts to a computer. These “motor intentions” are decoded and transferred to a software algorithm, which times and sequences electrical currents to targeted spinal cord dorsal roots via a 16-electrode paddle array on the lumbar cord. This stimulation activates muscle groups to initiate stepping.

In the scientists’ words, “preprogrammed spatiotemporal sequences replicate the physiological activation of leg motor pools underlying standing and walking.”

Said Courtine, in a press release: “We have created a wireless interface between the brain and the spinal cord using brain-computer interface technology that transforms thought into action. Our idea was to re-establish this communication with a digital bridge, an electronic communication between the brain and the region of the spinal cord that is still intact and can

control the leg movement.”

Here’s the part about the digital bridge you may not get from the headlines: Oskam has an incomplete spinal cord injury (C5/6) and could already walk. He had the spinal stim device implanted five years ago; when it is switched on, he can step with a walker. He also recovered partial mobility without stimulation. The new study shows him walking with a walker, not very fast, but more smoothly. But he’s moving with volitional motor intention. He can pause, change his stride length, walk up inclines or stairs.

Oskam got a lot of physical therapy as part of the study, which is credited with helping him control hip flexion without stimulation. Per the paper: “... the participant exhibited improvements in all the conventional clinical assessments ... These improvements without stimulation translated into a meaningful increase in quality of life, such as walking independently around the house, transiting in and out of a car or drinking a beverage with friends standing at a bar.”

You Can’t Have One

This is wonderful bioengineering, really pushing the brain-machine interface frontier. Meanwhile, none of this is available, it’s not going to be available in the foreseeable future. The brain-spine story remains a research project.

Some considerations to keep expectations real:

Is this walking “natural,” as the study title has it? You tell me: Here is a guy who still uses a wheelchair for primary mobility. He has a pair of 2-inch square sensors in his scalp (one became infected and was removed), an implanted e-stim paddle on his cord and a pulse generator in his abdomen. He wears a cartoony headset antenna, has a computer in his backpack, and uses a wheeled walker with handbrakes. Natural with an asterisk.

SCI doctor Keith Tansey, a physician/scientist at the Jackson VA Medical Center, is very impressed with the biomedical engineering from Courtine’s group. His greatest frustration is media interpretation. “This may not be as profound as it’s being presented to us in terms of clinical impact, never mind translatability to others, or relative to the cost and complex nature of the intervention. The study participant is an incompletely paralyzed guy who has had locomotor training and then an implanted spinal cord stimulator for several years and has a capability of walking. Here we have a study that shows improved walking in a guy already walking.

“What I don’t want is overinterpretation,” said Tansey. “I don’t want spinal cord stimulation to become stem cells all over again – too much promise, too much expectation and pretty soon people become disenchanted and move on to the next thing being hyped.”

And what about all the PT? Tansey pointed out that Oskam’s motor scores were high enough ahead of the brain-spine study that intensive training alone might have encouraged his improvement, or could in others with similar motor capacity.

Megan Gill, an assistant professor of physical therapy at the Mayo Clinic, told an NBC News reporter it's hard to tell how much the technology affected Oskam's recovery, given that his injury was moderate and he underwent extensive rehabilitation prior to the study. The new system "isn't taking someone completely paralyzed from lying in bed and not moving to up and walking," Gill said. "This person had some ability to stand. They had some ability to walk even before this technology was implanted."

Here's the U2FP take on media responsibility, from Executive Director Matthew Rodreick: "We in the SCI advocacy community must hold the media to a higher standard of reporting on paralysis research. Very few stories about this brain-spine advance revealed a very simple but critical piece of information: what could Oskam do before the stim and what changed as a result. Without this, our community, many of whom are desperate for any semblance of hope, are misled, which likely leads to disillusionment. This is not something we can afford as we try to mobilize the SCI community to advocate for cures."

In the coming year the [neuromodulation](#) company Onward (Courtine is chief science officer) plans to enroll four more participants to test the brain-spinal cord system. Two subjects will be tested for upper extremity volitional movement. We'll be there to decode the media coverage.

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