

Scientific Reports press release

[Neuroscience: Training triggers neurological recovery in paraplegics](#)

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A study involving eight paraplegics with chronic spinal cord injuries (SCIs), found that after 12 months training with a non-invasive brain-machine interface (BMI) protocol, all participants experienced improvements in sensations (including pain localization and fine/crude touch) and voluntary muscle control below the level of the spinal cord lesion. The research published in *Scientific Reports*, suggests that long-term training can induce partial neurological recovery below the level of a spinal cord injury in paraplegics.

BMIs have emerged as potential options to restore mobility in patients who are severely paralyzed as a result of SCIs or neurodegenerative disorders. However, to date no study has suggested that long-term training associating BMI-based paradigms and physical training could trigger neurological recovery.

Using a multi-stage neuro-rehabilitation protocol, Miguel Nicolelis and colleagues investigated the impact training could have on the ability to walk autonomously using a brain-controlled exoskeleton in eight participants with SCIs (seven of which were diagnosed with total paralysis below the level of the SCI). The protocol included using a brain-controlled robotic exoskeleton, virtual-reality environments and training on non-invasive brain controlled virtual avatar bodies with visual and tactile feedback.

Neurological examinations, carried out after 12 months training using the protocol, revealed that all of the participants had experienced a significant clinical improvement in their ability to perceive sensations and exert voluntary motor control in muscles located below the original SCI. The findings suggest that long-term exposure to BMI-based protocols may be capable of inducing partial recovery of some neurological functions.

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