Electrical stimulation improves paralyzed patients' function

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Nearly 282,000 people in the U.S. live with paralysis following a spinal cord injury (SCI). A review of more than 90 studies found that electrical stimulation may help restore function in those paralyzed after SCI. The article is published in *Physiology*.

SCI can cause paralysis in the arms, legs or both, limiting physiological functions such as movement, bladder and bowel control, and temperature regulation. Electrical stimulation, a treatment first developed in the 1960s to treat pain, has been studied as a means to restore movement in paralyzed limbs. Three types of stimulation therapies discussed in the review and found to be effective include:

- Epidural spinal stimulation—electrodes placed outside the covering of the spinal cord with a device implanted under the skin to generate electrical pulses—relieved muscle tightness and improved leg extension, sensation, hand function and bladder control even after therapy ended;
- Transcutaneous stimulation—electrodes applied to the skin's surface and using an external pulse generator—improved muscle tightness and stepping ability; and
- Intraspinal stimulation—electrodes implanted directly in the spinal cord; studied mostly in animals—enhanced reaching, grasping and stepping movements by directly activating nerve cells responsible for movement (motoneurons).

Electrical stimulation may be most effective for SCI-related paralysis

when combined with physical therapy and medications that encourage the spinal cord to form new neural pathways. "Going forward, careful and systematic evaluation of therapeutic stimulation approaches and their combinations with molecular and cellular interventions may be necessary to deliver effective new treatments to benefit people with spinal cord injuries," the authors wrote.

More information: Aiva Ievins et al. Therapeutic Stimulation for Restoration of Function After Spinal Cord Injury, *Physiology* (2017). DOI: 10.1152/physiol.00010.2017

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