

Researchers find way to speed up nerve regrowth for trauma patients

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A University of Alberta researcher has found a treatment that increases the speed of nerve regeneration by three to five times, leading to much better outcomes for trauma surgery patients.

"We use the term 'time is muscle,'" said Christine Webber, an associate professor in the U of A's anatomy division and a member of the

Neuroscience and Mental Health Institute. "If that regrowing nerve can't get to the muscle fast enough, you're not going to get a functional repair."

Peripheral nerve injury occurs in about three per cent of trauma victims. The slow nature of nerve regeneration means that often muscles atrophy before the nerve has a chance to grow and reconnect.

That's where conditioning electrical stimulation (CES) comes in.

Webber and her collaborators—plastic [surgery](#) resident and former Ph.D. student Jenna-Lynn Senger, and physical rehabilitation clinician Ming Chan—have examined CES in many previous publications. The process involves electrically stimulating a nerve at the fairly low rate of 20 hertz for one hour. A week after the CES treatment, nerve surgery is done, and the nerves grow back three to five times faster than if the surgery was done without CES.

In their latest work on CES, Webber's group examined animal models with foot drop, a common injury that affects patients' quality of life by impeding their ability to walk normally. Previously, the only treatments for foot drop were orthotics that affect a patient's gait, or surgery.

Webber's lab performed a distal nerve transfer in which a nerve near the damaged one was electrically stimulated, then a week later a branch of the nerve was cut and placed near the target of the non-functioning nerve. The newly transferred nerve would then be primed and ready to regrow, at a much faster rate, into the muscles that lift the foot.

CES can be a tool for faster nerve regrowth in any portion of the peripheral nervous system. Ming Chan, also a Neuroscience and Mental Health Institute member, has started a clinical trial in which CES is used before a nerve repair of the carpal tunnel.

Webber hopes to bring the information gained from examining nerve transfers in the leg—a difficult body part for nerve regrowth due to the vast area the [nerve](#) must cover—to [clinical trials](#) within the next year or two.

More information: Jenna-Lynn B. Senger et al, Conditioning Electrical Stimulation Accelerates Regeneration in Nerve Transfers, *Annals of Neurology* (2020). [DOI: 10.1002/ana.25796](https://doi.org/10.1002/ana.25796)

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