

Innovative surgery restores movement in patients with Parsonage-Turner syndrome

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Orthopedic surgeons at Hospital for Special Surgery (HSS) performed successful microsurgery to repair damaged nerves and restore muscle strength and movement to patients experiencing paralysis from Parsonage-Turner Syndrome (PTS), according to a study published online ahead of print in *The Journal of Hand Surgery*.

Parsonage-Turner Syndrome affects the nerves controlling the shoulder, arm and hand. "We published data on the first successful surgical treatment in [patients](#) who experienced some degree of paralysis due to this mysterious disorder," said Scott Wolfe, MD, director of the Center for Brachial Plexus and Traumatic Nerve Injury at HSS and lead investigator.

Also known as neuralgic amyotrophy, Parsonage-Turner Syndrome most frequently manifests as sudden, severe pain in the shoulder and upper arm, often with no known cause. The intense pain, which usually subsides within a couple of weeks, is followed by progressive weakness. Many patients find they are unable to move their affected shoulder, elbow or hand. The area and degree of paralysis depend on the nerves affected and the muscles they control.

There is no known cure, but doctors generally prescribe pain medication, steroids and physical therapy to help relieve symptoms. Although many patients eventually recover and regain function of their arm, it sometimes takes several years.

For those who do not get better, limited use of their arm or even complete paralysis can be devastating. "Imagine going for months with this condition and not knowing if or when you're going to get better. Because recovery can take a year or longer, patients have been told to wait, and there's this feeling of uncertainty," says O. Kenechi Nwawka, MD, director of the Division of Ultrasound Research at HSS, who performs ultrasound in PTS patients to locate the damaged nerves. "Many patients who come to HSS feel relieved because they have found a group of specialists that really understands their condition."

Dr. Wolfe and colleagues set out to determine if patients who weren't improving could be helped by neurolysis, a microsurgical procedure to repair the injured nerve. The doctors hypothesized that successful surgery would allow patients with PTS to regain strength and movement.

To help patients with Parsonage-Turner Syndrome, a multidisciplinary team of specialists is essential. The first step is for a physiatrist to identify which muscles are involved and assess the nerve injury and loss of function. This is achieved through electrodiagnostic testing, which is used again at a later date to look for signs that the nerve is recovering.

It is also critical to pinpoint the exact location of the damaged nerve or nerves with MRI and ultrasound. Hospital for Special Surgery is one of few centers nationwide with the highly specialized team of hand surgeons, physiatrists and radiologists who could pursue such an undertaking.

"Without this team of experts in these varied, but related fields, we could not have made as much progress in a relatively short period of time," said Dr. Wolfe. "It is not only the members of the team, but the spirit of collaboration among my medical and surgical colleagues at HSS that sets us apart from other institutions."

The HSS study enrolled 24 patients with PTS, all of whom had suffered paralysis of their arm or hand. A physiatrist performed electromyography (EMG) to measure muscle and nerve function in all the patients.

"EMG testing is first used to confirm and make the definitive diagnosis of PTS," explained physiatrist Joseph Feinberg, MD, medical director of the Center for Brachial Plexus and Traumatic Nerve Injury at HSS. "A damaged nerve will generally start to recover in six to nine months, and additional EMG testing can indicate if there are early signs of nerve regeneration. If the nerve is starting to regenerate, the patient will likely regain [muscle strength](#), so surgery is generally not needed. However, if there is no sign of regeneration within six to nine months of PTS onset, then recovery is less likely, and surgery may be considered."

Patients in the study met the following criteria: 12 months had passed without improvement since the onset of Parsonage-Turner Syndrome, or there was no evidence of clinical or electrodiagnostic improvement after six months as documented by three successive EMG and clinical exams.

A high-resolution MRI technique known as magnetic resonance neurography (MRN) was performed to zero in on the location of the nerve damage. Previously, radiologists at HSS had documented "hourglass-like" constrictions of the nerve, an anomaly that is unique to patients with PTS. Essentially, a band squeezing the nerve makes it look like an hourglass on the [digital image](#). The MRI, along with high-resolution ultrasound images, is essential in surgical planning.

"Magnetic resonance neurography and ultrasound images give the surgeons a roadmap, a target to treat," explained Darryl Sneag, MD, director, Peripheral Nerve, MRI at HSS. "Instead of having to explore the entire nerve in an arm, the images pinpoint the exact location of the constriction, so the surgeon doesn't have to spend hours searching for it."

Hourglass-like constrictions of affected nerves were identified in each study patient, and the images were correlated with EMG findings. Eleven out of the 24 patients opted for neurolysis surgery by Dr. Wolfe and his colleague, Steve Lee, MD.

"Once we localized the tiny constrictions in the nerve with imaging, we could confine our surgery to that site, and we could locate the lesion with millimeter precision," said Dr. Wolfe. "Looking through a microscope with 25X magnification, we then repaired the constricted nerve by releasing the compressive bands around it."

The mean time from PTS onset to surgery was 12.5 months. At patient follow-up of almost 15 months after the procedure, nine of the 11 patients who had surgery showed clinical improvement, having regained muscle strength and movement. EMG testing revealed significant motor unit recovery from nerve regeneration.

Out of the 13 patients who did not have [surgery](#), only three had recovered strength during follow-up, which took place almost three years after PTS onset.

"Microsurgical neurolysis to repair the hourglass constrictions was associated with dramatic and significantly improved clinical outcomes and [nerve](#) regeneration compared to nonsurgical management," Dr. Wolfe noted. "Therefore, we recommend considering it as a treatment option for patients with chronic Parsonage-Turner Syndrome who have failed to improve with nonoperative treatment."

More information: Karthik R. Krishnan et al, Outcomes of Microneurolysis of Hourglass Constrictions in Chronic Neuralgic Amyotrophy, *The Journal of Hand Surgery* (2020). [DOI: 10.1016/j.jhsa.2020.07.015](https://doi.org/10.1016/j.jhsa.2020.07.015)

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