



Refining Tendon Transfer Surgery for People with Quadriplegia

Procedure gives some patients what once seemed out of their reach – restoration of some arm and hand function.

BY AMANDA CROWE, MA, MPH

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Crystal Black of Lexington, S.C., was only 26 years old and a young mother when she dove into a friend's pool at a July 4 celebration and felt her neck crack. The resulting spinal cord injury (SCI) left her unable to fully use her hands or do simple activities, such as eat, hold her then-5-year-old's hand, wash her hair or even pick out a birthday card – things that able-bodied people often take for granted.

But reconstructive surgery performed frequently by Shepherd Center consulting orthopedic surgeon Allan Peljovich, M.D., MPH, has reliably and successfully helped to restore some arm and hand function for Crystal and many other patients.

In Crystal's surgery, which was based around tendon transfers, Dr. Peljovich carefully detaches a functioning muscle in the arm and reroutes it to a new location to perform a new function. For example, using one of the elbow flexor muscles called the brachioradialis and reattaching it to the thumb flexor muscle can restore a person's thumb pinch.

"We basically steal a muscle or two from the arm without losing function and yet recreate the ability to grasp objects," says Dr. Peljovich, who sees patients in Shepherd Center's

Upper Extremity Rehabilitation Clinic. "The results are fairly immediate and life-changing."

It's meant the world to Crystal who, after undergoing the procedure in 2012, is now able to play board games and draw pictures with her 11-year old son.

"It's changed my life," she says. "I'd struggle for 20 minutes to get food out of the pantry, and by the time I got it, I'd drop it. Now I can cook, hold onto a plate and grasp utensils, write better and lift my hands up over my head to wash my hair without my hand just falling and hitting me in the head."

Tendon transfers are among the most common procedures to re-animate a muscle and restore function in the arm, wrist and/or hand for people with tetraplegia (also referred to as quadriplegia). In fact, it's been the standard reconstructive method, and Dr. Peljovich and his team have streamlined the procedure over the years to maximize outcomes in patients with SCI.

But what sets Shepherd Center apart – beyond the expertise amassed over decades of performing these procedures – is that the operation and subsequent rehabilitation takes place within the context of a

multidisciplinary setting. Shepherd helps people with SCI to return to living life as independently as possible in their homes, communities and workplaces. The treatment team understands SCI and the special arrangements someone may need post-surgery.

"I've worked in many hospital settings, and I don't know of a place that does a better job of reminding people that they have value in their lives and pushes them to achieve this potential," Dr. Peljovich says.

While tendon transfer surgery is not for everyone, the operation is designed to make people more functional to help with activities of daily living and get them closer to the independence they want, he explained.

"People don't have to automatically accept what they have; there are ways to be able to get more function," Dr. Peljovich says, adding that patients often exceed their expectations. "We tell people it will help them be able to reach up, pinch and grasp things, but next thing we know, they are driving [adapted vehicles], transferring themselves to and from their wheelchairs and being much more independent – things that would not have been possible prior to this type of reconstruction."

These outcomes give people living with these injuries a psychological boost, and patients gain more confidence in their ability to do things that once seemed beyond their reach.

Victor Harris, 34 of Decatur, Ga., was injured in a car accident in 2001. Before undergoing surgery in 2012, he improvised a lot.

"Even though I was trying to slide over [to my shower chair] the best I could, the nurse was doing most of the work," he says. "Now, I can do it almost all on my own. She just helps move my legs over. I can wash my van, grab and reach for things on the floor. It's made a big difference."

Dr. Peljovich likes to show a video of Victor lifting his hand and arm above his head, using his elbow extension with a dumbbell in his hand. "He gained more strength than I thought he would," the doctor says. "He no longer needs any braces and more importantly, he's more independent."

Patients are usually in a cast for several weeks after the procedure and participate in physical therapy for two to three months.

Victor says his "new" arm felt a little awkward in the beginning, before his brain caught up with the results of the surgery.

"What seems like a clunky process suddenly becomes second nature because the brain remodels itself, but it takes time to get used to, even though patients have use of their hand the whole time," Dr. Peljovich says.

Although tendon transfers and similar restorative procedures have been performed for decades and applied to SCI since the 1950s, Shepherd Center remains one of only a handful of facilities that offers the procedure for people with SCI. Dr. Peljovich is seeing more and more patients from outside Georgia who want more function, but don't have access to the kind of specialized care Shepherd Center offers.

"Our clinic has become a national leader in tetraplegia reconstruction," Dr. Peljovich says.

And this isn't just in terms of the number of procedures performed. He and his team have been asked to present best practices at several national meetings, author textbook chapters on the subject and will be part of a symposium at the next American Spinal Injury Association/International Spinal Cord Society meeting. They are also among the first centers exploring techniques to augment tendon transfer surgeries, including transferring nerves.

Candidates for reconstructive surgery need to be healthy and have enough strength and function in their arm for surgeons to build on. "If someone can bend their elbow slightly, they will usually meet the criteria," Dr. Peljovich says.

The Upper Extremity Rehabilitation Clinic at Shepherd Center, which officially opened its doors nearly 15 years ago, offers comprehensive treatment programs. For more information on the reconstructive procedures and other services offered at the clinic, visit <http://bit.ly/1P4Xhxt>. *

 More online at news.shepherd.org

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– ALLAN PELJOVICH, M.D., MPH, CONSULTING ORTHOPEDIC SURGEON FOR SHEPHERD CENTER

1. OT Sherry Turner removes a cast from George Welsh, who underwent tendon transfer surgery. 2. Allan Peljovich, M.D., MPH, is a consulting orthopedic surgeon at Shepherd Center.