

New hand transplant method tested in Louisville

Laura Ungar, lugar@courier-journal.com 12:07 p.m. EST November 27, 2014



(Photo: Provided)

The Louisville medical team that performed the nation's first hand transplant 15 years ago is now pioneering an experimental therapy that uses a patient's own fat to stave off rejection.

Scientists say Jim Ray, a 67-year-old retired human resources executive from Bowling Green, Ky., became the first hand transplant recipient in the world to receive fat-derived cells on Tuesday. The cells were injected into his new right hand before and after it was attached during a 16-hour transplant procedure.

"These cells from fat have a pretty dramatic effect on wound healing," said Stuart K. Williams, director of the Bioficial Organs Program at the Cardiovascular Innovation Institute, a partnership of Jewish Hospital and the University of Louisville. "We want to see if we can reduce the immunosuppression needed."

Ray received the experimental anti-rejection therapy as the first patient in a clinical trial led by Louisville's Dr. Joseph Kutz, who's working with researchers at the [Christine M. Kleinert Institute for Hand and Microsurgery](http://www.cmki.org/) (<http://www.cmki.org/>) and the Cardiovascular Innovation Institute. Ray is the ninth person to receive a hand transplant from the Louisville surgical team, which is comprised of physicians, researchers and healthcare providers from KentuckyOne Health's [Jewish Hospital](http://www.kentuckyonehealth.org/) (<http://www.kentuckyonehealth.org/>), the Kleinert institute, the [Kleinert Kutz Hand Care Center](http://www.kleinertkutz.com/) (<http://www.kleinertkutz.com/>), and UofL.

The group was awarded \$850,000 for the trial as part of the Armed Forces Institute of Regenerative Medicine research program, which hopes to apply regenerative medicine to battlefield injuries. That money comes as part of a five-year, \$75 million Department of Defense-funded project.

Two main dangers have long loomed over hand transplant recipients: the possibility of rejection and concerns about potentially-serious side effects from immunosuppressive drugs. The clinical trial aims to find out if cells from fat therapy improve the immune system's response to a hand transplant, and ultimately lessen or eliminate the need for anti-rejection drugs — offering hope not just to soldiers but to any hand transplant recipients.

The power of fat

Ray, who is married with three adult sons and two grandchildren, injured both hands in July 2012, when he lost control of a dragster car during a test drive at a race track, flipping the vehicle and striking a pole. Doctors at Kleinert Kutz saved his left hand but were unable to save the right one, so he used a hook prosthesis for his dominant right hand before the surgery.



Jim Ray, hand transplant recipient. (Photo: Photo Courtesy of KentuckyOne Health)

The fat cells were collected just before the transplant, while Ray was under anesthesia. Using liposuction, doctors extract three golf-ball-sized pieces of fat from his belly, which were processed in a machine in the operating room. Williams said the stromal vascular fraction cells isolated from the fat were put into syringes, then injected into the donor hand in several spots before it was attached. More cells were injected into the forearm after the hand was attached.

Williams has been researching stem cells from fat for decades for various medical applications, such as healing damaged hearts. He was among the first in a growing medical field exploring the healing power of these cells.

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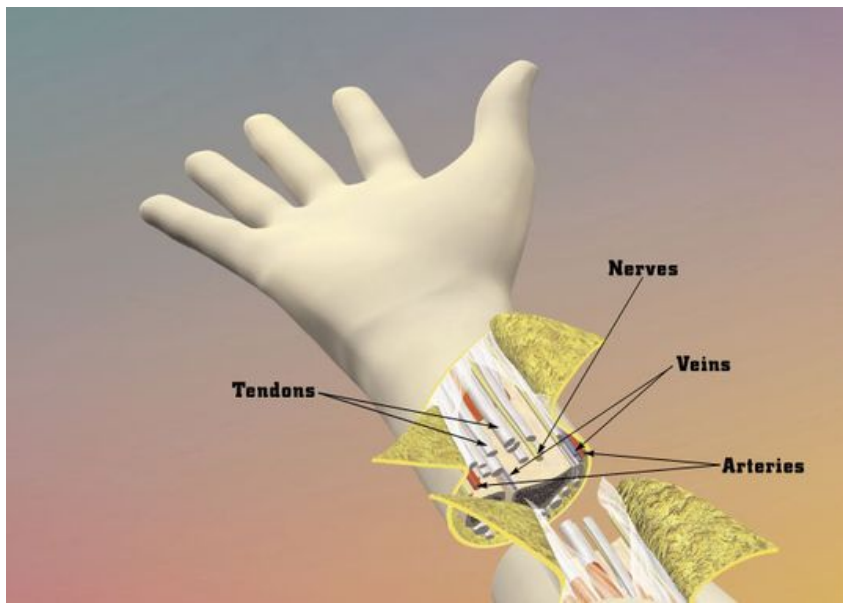
Christina Kaufman, executive director of the Kleinert institute, said using fat-derived cells is very safe for transplant recipients, partly because it's done as part of the same larger procedure.

Doctors said Ray's injury occurred at the forearm level, making it more severe than previous transplant recipients, but they are nonetheless optimistic about his healing and immunosuppression. In addition to the fat-derived cells, Ray's immune system will also be suppressed with a combination of drugs, and doctors will closely monitor him for signs of rejection.

"Mr. Ray is doing well," said Dr. Tuna Ozyurekoglul, a physician with Kleinert Kutz. "His pain is well-controlled... He looks great."

A 15-year journey

The Louisville Vascularized Composite Allograft surgical team performed its first hand transplant in 1999 on Matt Scott, a New Jersey native who lost his dominant left hand in a firecracker accident. The team has so far attached a total of 10 hands, performing a double hand transplant in 2010.



Tendons, Nerves, Veins, and Arteries must be attached.(Photo: *The Louisville Composite Tissue Allograft Transplantation program/KentuckyOne Health/University of Louisville*)

Hand transplants require surgeons to fix bones and repair tendons, arteries, nerves and veins. Patients must be between 18 and 65, have an amputation below the elbow and understand the risks involved in the still-experimental surgery.

Rejection has been an issue since Day 1. Doctors initially were very aggressive about responding to even slight signs of rejection, such as skin rashes, but later learned that these could be treated with topical creams. The first two patients got steroids, which they have since been weaned from, but subsequent patients did not. Also, doses of two other anti-rejection drugs were lessened for three patients.

FROM 2013: (</story/news/local/2013/09/29/world-renowned-hand-surgeon-harold-kleinert-dead-at-91/2892879/>) [World-renowned hand surgeon Harold Kleinert dead at 91 \(/story/news/local/2013/09/29/world-renowned-hand-surgeon-harold-kleinert-dead-at-91/2892879/\)](/story/news/local/2013/09/29/world-renowned-hand-surgeon-harold-kleinert-dead-at-91/2892879/)

As for side effects, doctors said the second patient suffered the worst, and the third needed to be placed on a cholesterol-lowering medication, which doctors thought might be related to his drug regimen.

Dave Robert Armstrong of California, the nation's fourth hand-transplant recipient, had his transplanted hand removed in 2009, but it was unclear what led him to lose it. At the time, Louisville doctors said they saw no signs of rejection, but thought it might nonetheless be related to either rejection or trauma leading to an obstruction in the hand.



Kleinert Kutz surgeon, Michelle D. Palazzo, M.D. injects the donor hand with stromal vascular fraction (SVF) cells isolated from the patient's fat. *(Photo: Provided)*

Doctors and researchers said this week they are hopeful that the fat-derived cells provide another avenue to help future transplant recipients keep their hands. The current clinical trial includes funding for one more patient in Louisville, but researchers said they hope this week's success portends many more across the nation in the future.

"For us," Williams said, "this is one of the most exciting moments."

Reporter Laura Ungar also covers public health for USA Today. Reach her at (502)582-7190 or on Twitter @laura_ungar.

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