

# 'Luke Skywalker' robotic arm lets amputee feel again

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In a laboratory in Utah, Keven Walgamott experienced something he assumed was gone for ever: the feel of his wife holding his hand.

He had last felt it almost two decades ago, before his arm was amputated as a result of a severe electric shock.

Mr Walgamott, 57, is one of the first patients to be fitted with a prosthetic arm that gives users a sense of touch. He moves it with his thoughts, much as he would a natural hand.

The arm is fitted with more than 100 sensors transmitting signals back to his brain, recreating tactile sensations and

giving him more dexterity than any conventional prosthetic.

"It almost put me to tears," he said. "I never thought I would be able to feel in that hand again."

The feedback provided by touch is essential for fine motor skills. Mr Walgamott, an estate agent from West Valley City, Utah, was able to pluck grapes without crushing them and pick up an egg without cracking it.

"One of the first things he wanted to do was put on his wedding ring. That's hard to do with one hand," Gregory Clark, of the University of Utah, said. "It was very moving."

The device is called the "Luke Arm"

## How it works

1 Microelectrodes implanted in user's forearm tap into surviving arm nerves

2 A computer translates nerve impulses into digital signals to instruct the arm to move

Sensors in hand send signals to nerves, allowing user to feel a variety of sensations



To nerves



— a nod to the robotic hand that Luke Skywalker receives in *The Empire Strikes Back*. It was described yesterday in the *Science Robotics* journal.

The device taps into the wearer's nervous system via a bundle of 100 microelectrodes and wires implanted into the forearm, including in the median and ulnar nerves. These are then connected to a computer outside the body.

The microelectrodes

interpret signals from the surviving arm nerves and the computer translates them to digital signals that instruct the arm to move.

Crucially, information also flows the other way, allowing the user to feel pressure, movement, vibration and pain. "When you touch objects with a natural hand, there's an extra burst of neural impulses when you first make contact, or when you change your grip force," Dr Clark said.

"That's the type of information that brain normally receives, so that's what it finds easiest to interpret. So that's also the type of information that we tried to send to the brain — and it worked."