

GIMPY

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A QUARTERLY PUBLICATION OF STUMPS "R" US
A WHIMSICAL SUPPORT GROUP OF CHEERFUL CRIPPLES
WHO CAN ANSWER ALMOST ANY QUESTION YOU MAY HAVE
ABOUT LIFE WITHOUT ONE, TWO, THREE OR FOUR LIMBS.

ONCE MORE, WITH FEELING

Prosthetic body parts are nothing new. In 2000, researchers published an account of a 3,000 year old Egyptian mummy with a wooden big toe grafted to her right foot. It had been expertly carved and painted to match her skin tone.

Making limbs that look natural, though, is one thing.

Making them feel real is much harder.

A real limb is constantly talking to the brain that controls it.

That lack of feedback, and the discomfort it causes, is one reason why

between a quarter and a half of people with an artificial limb end up abandoning it.

The Louis Stokes Veteran's Affairs Medical Center in Cleveland, Ohio, created signals that appeared to come from the prosthetic arms of two volunteers by implanting electrodes around nerves in the amputees stumps. When they connected these electrodes to a machine that generated electrical signals, both volunteers reported sensations which seemed, to them, to be coming from their hands.

Restoring sensation has practical uses. Delicate tasks, however, can be tricky, since the user must rely on a combination of sight and experience to work out how much pressure to apply.

For example, when blindfolded volunteers were asked to pluck the stalks from cherries without crushing the fruit, they succeeded only 43% of the time.

But when he connected pressure sensors attached to the prostheses fingers to the signal-generating machine and gave them appropriate feedback, the success rate jumped to 92%.

A procedure called osseointegration, in which an implant is fixed directly into the patient's bones, leaving a small, protruding metal "abutment" onto which the limb can be attached. One advantage of such a socket is that it allows implanted electrodes to control the prosthesis, instead of relying on second-hand signals detected through the skin. That improves performance.

Combining these two approaches, then, should produce a big advance in the efficacy of artificial limbs. Asked about the comparison between a limb with feedback and one without, the participants were unequivocal.

As one put it, "I'd rather have it in a heartbeat."

