Bionic reconstruction: after amputation of a hand, muscles can be repurposed using nerve transfers
7 January 2019

Modern prostheses offer hand amputation patients much greater capability in everyday life than was possible with previous prosthetic reconstructive techniques. Redundant nerves from the amputated extremity can be surgically transferred to provide a much better connection between the patient's body and the prosthesis. This technique has proven to be successful, although the specific reasons were not fully understood. A team of researchers led by Konstantin Bergmeister and Oskar Aszmann from MedUni Vienna's Division of Plastic and Reconstructive Surgery and the Christian Doppler Laboratory for Recovery of Limb Function have now shown that this nerve transfer technique has previously unidentified neurophysiological effects. These result in more accurate muscle contractility and much more finely controlled muscle signals than previously thought.

The researchers also found that muscles take on the identity of the donor nerves, that is to say, the function of the muscle from which the nerve was originally harvested. This means that muscles can be modified very specifically to achieve the desired
control of the lost extremity. This information will
now be used in follow-up studies to refine the
surgical technique of nerve transfer and adapt it
more accurately to fine control systems. The vision
of an intuitively controlled prosthesis that can
perform all the natural manual functions could
become a reality within the next few years.

More information: Konstantin D. Bergmeister et
al. Peripheral nerve transfers change target muscle
DOI: 10.1126/sciadv.aau2956

Provided by Medical University of Vienna
APA citation: Bionic reconstruction: after amputation of a hand, muscles can be repurposed using nerve transfers (2019, January 7) retrieved 18 November 2022 from

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