

BIONIC ARM

M.V. Loburenko - Sumy State University, group GM – 91
S.G. Zolotova – EL Adviser

A new prosthetic arm has been developed by a researcher in Switzerland that not only provides the user with a working limb, but also lets them feel rudimentary sensations from the hand and fingers. It's being tested out on an anonymous patient later this year.

The artificial limb was designed by Dr. Silvestro Micera at the Ecole Polytechnique Federale de Lausanne in Switzerland. It works by tapping directly into the median and ulnar nerves in the arm, allowing signals from the brain to reach the limb — and vice versa.

This two-way connection lets the limb be controlled directly by the brain's motor signals instead of indirectly, through muscles in the arm or other means. But perhaps more importantly, it allows the limb to send feedback to the brain, giving crude but functional sensation in the limb.

Micera has been working on tactile prosthetics for years; in 2009, a prototype of the current design was tested on another man, but the feedback was very limited, both in location and type. It could only send a certain single sensation, from one of two locations — a far cry from a real hand's range of tactile experience.

The new limb will have "sensory zones" in the wrist, palm, and every fingertip, and could eventually send more than one type of feeling: For example, the fingertips could register pressure, but the wrist could send a signal indicating its position — a sense known as proprioception.

Being able to actually sense the position and grip pressure, rather than observing it second-hand, could be a huge step in making the limb acceptable to whoever is using it.

It's not without challenges: The neural connection requires a implant that can only be left in for up to a month at a time. There are plans to improve this, among other aspects, but it will likely take at least two years before the limb is ready for thorough testing, Micera told *The Independent*. For now, he and his team are collaborating with the Italian Ministry of Health to do this initial clinical trial.

Micera's work was presented at the 2013 meeting of the American Association for the Advancement of Science in Boston.

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