Researchers implant sensors for wireless control of muscle signal transmission following nerve transfers

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Prosthetics: for the first time, sensors have been implanted for wireless control of muscle signal transmission following nerve transfers.

Research in the field of wireless biosignal transmission is no longer a fringe phenomenon in the field of modern prosthetics. A large number of international research groups are working on potential solutions to create a more fluent man-machine interface. For the first time, the research group led by Oskar Aszmann from MedUni Vienna's Department of Surgery, working with commercial partner Otto Bock Healthcare Products and a development group in the U.S. (Alfred Mann Foundation), has successfully implanted sensors in three male patients following nerve transfers to transmit biosignals for wireless control of

robotic arms.

"After more than two years of observation, the results demonstrate extremely reliable data transmission and much quicker and safer use in comparison with standard systems," says principal investigator Aszmann, who is very happy with this pilot project. The results have now been published in *Science Robotics*.

The international research group is confident that in the near future, wireless biosignal transmission systems will not only be used in the area of modern prosthetics, but also make important contributions in many other biotechnology sectors.

"These patients had had above-elbow amputations as a result of occupational or road accidents. In such cases, they not only have to have the hand and the wrist replaced by a myoelectric prosthesis, but the elbow as well. The implanted sensors transmit the muscle signal wirelessly from the amputation stump to the prosthesis and are similarly wirelessly charged by a magnetic coil in the shaft of the prosthesis," explains study author Stefan Salminger from MedUni Vienna's Department of Surgery.

In combination with selective extension of the nerves that were responsible for hand and arm function before the amputation, these patients are able to control the prosthesis intuitively. This implantable technology could make a significant improvement in muscle signal quality, in particular, and, above all in the reliability of prosthesis control.

More information: S. Salminger et al. Long-term implant of intramuscular sensors and nerve transfers for wireless control of robotic arms in above-elbow amputees, *Science Robotics* (2019). DOI: 10.1126/scirobotics.aaw6306

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