Robotic arm

- Design and Development of a Device (Sifilotto()) for Tumour Tracking in Cervical Cancer Patients Undergoing Robotic Arm LINAC Stereotactic Body Radiation Therapy Boost: Background to the STARBACS Study
- Robot-assisted versus navigated spinal fusion surgery: a comparative multicenter study on transpedicular screw placement accuracy and patient outcomes
- Robot-assisted deep brain stimulation with intraoperative CT imaging and frameless registration module: a new gold-standard?
- A Cost Effectiveness Analysis of Spinal Cord Stimulation versus Conventional Medical Management for the Treatment of Low Back Pain Using Data from DISTINCT RCT and Medical Claims from a U.S. Commercial Payer Database
- Thalamic neural activity and epileptic network analysis using stereoelectroencephalography: a prospective study protocol
- Treatment Plan Comparison Between Self-Shielding Gyroscopic Radiosurgery and Robotic Radiosurgery
- Clinical experiences and accuracy of stereoelectroencephalography using the robotic arm Cirq
- Intraoperative Fast Adaptive Focus Tracking Robotic OCT Enables Real-Time Tumor Grading and Large-Area Microvascular Imaging in Human Spinal Cord Surgery

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Extra robotic arms (XRAs) are gaining interest in neuroscience and robotics, offering potential tools for daily activities. However, this compelling opportunity poses new challenges for sensorimotor control strategies and human-machine interfaces (HMIs). A key unsolved challenge is allowing users to proficiently control XRAs without hindering their existing functions. To address this, we propose a pipeline to identify suitable HMIs given a defined task to accomplish with the XRA. Following such a scheme, we assessed a multimodal motor HMI based on gaze detection and diaphragmatic respiration in a purposely designed modular neurorobotic platform integrating virtual reality and a bilateral upper limb exoskeleton. Our results show that the proposed HMI does not interfere with speaking or visual exploration and that it can be used to control an extra virtual arm independently from the biological ones or in coordination with them. Participants showed significant improvements in performance with daily training and retention of learning, with no further improvements when artificial haptic feedback was provided. As a final proof of concept, naïve and experienced participants used a simplified version of the HMI to control a wearable XRA. Our analysis indicates how the presented HMI can be effectively used to control XRAs. The observation that experienced users achieved a success rate 22.2% higher than that of naïve users, combined with the result that naïve users showed average success rates of 74% when they first engaged with the system, endorses the viability of both the virtual reality-based testing and training and the proposed pipeline [1)]

Hybrid Assistive Limb.

1)

Dominijanni G, Pinheiro DL, Pollina L, Orset B, Gini M, Anselmino E, Pierella C, Olivier J, Shokur S, Micera S. Human motor augmentation with an extra robotic arm without functional interference. Sci Robot. 2023 Dec 13;8(85):eadh1438. doi: 10.1126/scirobotics.adh1438. Epub 2023 Dec 13. PMID: 38091424.