Conclusions on brain-machine interfaces for communication and rehabilitation

October 5 2016

In the journal *Nature Reviews Neurology*, the researcher Ander Ramos of Tecnalia, with Niel Birbaumer, lecturer at the University of Tübingen, have expounded how brain-machine interfaces (BMI) use brain activity to control external devices, thus enabling seriously disabled patients to interact with the environment.

The paper "Brain-computer interfaces for communication and rehabilitation" explores invasive and non-invasive techniques for brain-machine control, including EEGs, and, more recently, those involving near-infrared spectroscopy. Brain-machine assistive interfaces are designed to enable paralysed patients to communicate with or control external robotic devices such as prostheses; brain-machine interfaces for rehabilitation are designed to facilitate neuronal function recovery.

This review provides a summary of the development of brain-machine interfaces and of the technology that is currently awaiting clinical studies. It deals firstly with the use of brain-machine interfaces for communication in paralysed patients, in particular in those with locked-in syndrome resulting from amyotrophic lateral sclerosis.

The use of brain-machine interfaces for motor rehabilitation following a serious cerebrovascular accident or stroke and damage to the spinal cord are discussed. The possible neurophysiological and learning mechanisms underpinning the clinical effectiveness of brain-machine interfaces are also described.

More information: Ujwal Chaudhary et al, Brain–computer interfaces for communication and rehabilitation, *Nature Reviews Neurology* (2016). DOI: 10.1038/nrneurol.2016.113