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### Non-pharmacological treatment of chronic pain: A multimodal approach

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Chronic pain, such as low back pain or facial pain, is a highly disabling condition severely degrading people's quality of life. Pharmacological therapies are effective only in a minority of patients and alternative treatments have to be developed to relieve patients' pain. Chronic pain can also cause severe anxiety or depression disorders, as well as complex cognitive impairments. The chronicity of pain can also lead to a dysperception of patient's own body. Since clinical evaluation of pain lies on the subjective reports of patients, a "distortion of self" can lead to incorrect pain rating leading to incorrect treatment. Our project aims at defining a multimodal neurorehabilitative strategy to reduce chronic pain in patients presenting with low back pain and facial pain, using innovative technologies to help patients regain a correct somatotopic sensibility. Our approach combines virtual reality settings with well-validated and multimodal neurorehabilitation techniques in order to produce highly performing and personalized treatments to each patient. We first proceed to detailed physiotherapeutical and neuropsychological evaluations of patients. Then, the multidisciplinary team defines a neurorehabilitative strategy based on virtual reality rehabilitation combined with psychological support. The virtual-reality setting reinforces patients' feedback in a multisensory point of view (visual, auditory and proprioceptive) and has the advantage of increasing patients' compliance and motivation. Our technological setting also permits remote communications with patients from the hospital, allowing close follow-ups directly at patients' homes. This has the great advantage of monitoring and helping maintain the benefits gained during rehabilitation. Our preliminary results demonstrated improvements in both patients' groups, as revealed by a reduction of pain rating scale, analgesic drugs intake and improvement of quality of life. This treatment offers thus each patient a complete neuropsychological evaluation, a psychological support, and an innovative and efficient neurorehabilitative treatment, which is also associated with a better compliance of patients compared to standard rehabilitative care.

#### Biography

Federica Alemanno is a Neuropsychologist working in the Department of Specialistic Rehabilitation of Neurological, Cognitive and Motor Disorders, San Raffaele Hospital, Milan, Italy. She is specialized in the treatment of neurodegenerative diseases and cerebral focal lesions, and is responsible for the intraoperative monitoring of higher cognitive functions during awake neurosurgeries. She holds a PhD in Molecular Medicine and Experimental Neurology and underwent a Research Fellowship at the Department of Bioengineering, University of California San Diego (UCSD) with whom she still has ongoing collaborations. She lectures and mentors students of the Neuro-Psychological Faculty at the San Raffaele University, and is the lead Neuropsychologist in clinical trials on the use of non-invasive brain stimulation in aphasia; the use of virtual reality for neuro-cognitive rehabilitation; and pharmacological clinical trials on Alzheimer's disease (Biogen; Merck Serono). She also coordinates the Well Being Program for international private patients, at the San Raffaele Hospital.

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