SEMINAR SERIES

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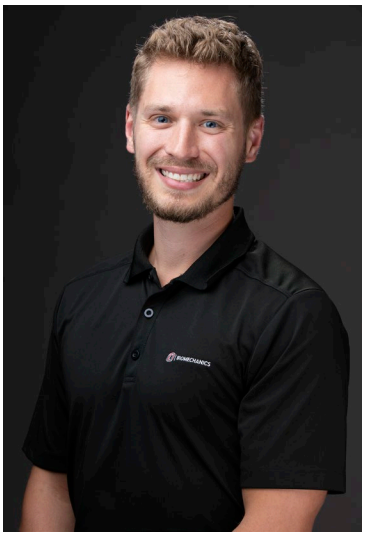

PHANTOM LIMB TRAINING FOR AN AMPUTEE AFTER TARGETED MUSCLE REINNERVATION SURGERY

Featuring Dr. Jordan Borrell

University of Nebraska at Omaha

Friday, Nov 5th, 2021 | 12:00 - 1:15 pm | Via Zoom

https://unomaha.zoom.us/s/92012305734

PRESENTATION ABSTRACT

Targeted muscle reinnervation surgery (TMR) involves the coaptation of amputated nerves to nearby motor nerve branches with the purpose of reclosing the neuromuscular loop in order to reduce phantom limb pain. The purpose of this case study was to create a phantom limb training protocol for an amputee after undergoing TMR surgery, where the four main nerves of his right arm were reinnervated into the chest muscles. The goal of this phantom limb training was to reengage the reinnervated nerves and further strengthen these newly formed neuromuscular closed loops. The phantom limb training focused on intended phantom limb movements specific to each reinnervated nerve. Data collections for the TMR subject occurred every 2 weeks for 3 months. During the data collections, the TMR subject performed various phantom movements specific to each reinnervated nerve and a gross manual dexterity task (Box and Block Test) while measuring brain activity (functional near-infrared spectroscopy; fNIRS) along with surface electromyography (sEMG) activity of the four reinnervated nerves. Future goals are: 1) to design and build a brain-computer-interface connection with the prosthetic arm that that has the capability to differentiate intended phantom movements to control the prosthetic arm and 2) derive real-time biofeedback training systems to aid in the beginning stages of prosthetic use.

ABOUT DR. BORRELL

Dr. Jordan Borrell is a Research Associate in the Department of Biomechanics at the University of Nebraska at Omaha. He directs the functional near-infrared spectroscopy (fNIRS) research in the Additive Manufacturing Laboratory under the guidance of Dr. Jorge Zuniga. Prior to arriving at UNO, he received his M.S. and Ph.D. degrees in Bioengineering from the University of Kansas. His dissertation work incorporated acute and chronic neuromodulatory techniques in a preclinical model of spinal cord injury under the supervision of Dr. Randy Nudo in the Cortical Plasticity Laboratory at the University of Kansas Medical Center. He received his B.A. in Physics from Hastings College.

more info at **cobre.unomaha.edu**

*This seminar was supported by the National Institutes of General Medical Sciences of the National Institutes of Health under Award Number P20GM109090 Center for Research in Human Movement Variability.

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