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decomposed into individual MU discharges that were then smoothed using support vector regression. Onset-offset hysteresis of pairs of MUs (ΔF) was calculated to estimate PIC magnitude. A quasi-geometric approach was used to garner insights into the neuromodulatory inputs (brace height) and the inhibition pattern (MU discharge acceleration, and post-acceleration [attenuation] slopes).RESULTS: Experiment 1. MU discharge patterns in all muscles were affected by contraction intensity, becoming more linear with lower slopes, but exhibiting greater discharge rate hysteresis. This suggests a reduced relative contribution of PICs to the increase in MU discharge and more reciprocal inhibitory patterns as a function of increased excitatory input. Experiment 2. RT exhibited greater discharge rates compared to ET and UT at 70% MVF. Both RT and ET exhibited more linear discharge patterns at 50 and 70% MVF compared to UT, though this appeared to be due to lower acceleration slopes in ET and lower attenuation slopes in RT. These results suggest modality-specific chronic training adaptations in the pattern of inhibition, with more reciprocal patterns associated with greater discharge rates and superior muscle force production in RT.Experiment 3. Older individuals exhibited reduced estimates of PICs at higher contraction intensities compared to sex-matched younger adults, suggesting modifications in the gain control of aged MUs.CONCLUSIONS: These experiments reveal that motor commands are uniquely shaped across contraction intensities, and that motor commands are modified with chronic training and ageing. The results also underscore the importance of contraction intensity when assessing the contribution of different components of motor commands to MU discharge.

Symposium 9: From lab to living room - opportunities, challenges and potential using smart textiles and wearable solutions to facilitate self-administered home-based rehabilitation

S9.1- Co-creation of smart textile interventions for home-based rehabilitation after stroke – a case study

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Background and Aim:About 80% of stroke survivors suffer from upper limb disorders. Shorter in-patient stays and limited access to rehabilitation programs puts a larger responsibility for functional recovery to the individual. In this context, technology-enabled, self-administered rehabilitation is presented as a way forward and biofeedback-based interventions using surface electromyography (sEMG) is a well-known candidate. However, current sEMG biofeedback methods are confined to the clinic, creating logistical hurdles which limit the training opportunities. This initiative aims to investigate the practicality, safety, and potential benefits of integrating smart textiles into post-stroke bio-feedback-based rehabilitation and explore if and how smart textiles solution(s) can improve the rehabilitation outcomes when performed by the patients themselves in their home environment. By introducing co-design of interventions, the study aims to harness insights from patients, healthcare professionals, and developers, ensuring user-centered and clinically relevant

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solution(s).Methods:The smart textile -based intervention(s) are formulated from a set of system components consisting of a) textile electrodes; b) sEMG acquisition system; c) biofeedback software app; d) data management and analysis platform. The co-design process focuses on optimizing these components for home-based self-administered interventions considering six distinct development aspects, i.e., i) targeted muscle(s); ii) textile electrode solution; iii) relevant training activities; iv) biofeedback measure(s); v) home-based training protocol; vi) user interface(s). The first stage of co-design involved technology developers working closely with healthcare professionals to understand the clinical and technical requirements and constraints related to home rehabilitation post-stroke to formulate a clinically viable prototype. At a second stage, the intervention will be further developed based on stroke survivors' input from testing the intervention at the clinic to co-design a training protocol for home use. Results:Up to now (first stage) we have co-designed a system addressing (i) wrist flexors/extensors by means of (ii) a textile "sleeve" for the forearm comprising electrodes for wrist flexors and extensors to (iii) train wrist flexion/extension by (iv) providing feedback (bar graphs) when successfully activating or relaxing the targeted muscles. At the second stage it will be possible to test and provide users with individualized training protocols (v) based on their preferences, encompassing various types of exercises designed for use with the textile electrode system in the home environment. The resulting intervention(s) will then be investigated focusing on feasibility, safety, functional recovery, usability (vi), user compliance, and overall benefits. Conclusion:By actively involving stroke survivors, healthcare professionals, and system developers in the co-design process, we feel confident that the resulting solution(s) will be user-centered and clinically relevant. It is essential to emphasize that this is an evolving study, and further testing and development are underway to refine and enhance the capabilities and usefulness of the system. Our overarching objective is to provide stroke survivors with a convenient and efficient home-based rehabilitation tool that has the potential to contribute significantly to recovery and overall quality of life.

S9.2 - Phantom limb pain treatment at home facilitated by a textile electrode system – a case study

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BACKGROUND AND AIM: Phantom limb pain (PLP) is a common and frequently distressing condition affecting amputees, posing significant challenges in pain management and quality of life. Traditional approaches to managing PLP, such as mirror therapy, are not always effective, arguably because they can become tedious, leading to reduced patient engagement. Advanced treatments like biofeedback and VR/AR based interventions typically require continuous assistance from healthcare professionals, making independent, at-home management challenging due to the complex setup involved. This study aims to investigate the efficacy and user satisfaction of a novel textile-based solution, designed for PLP management, tested in home environments. The research focuses on evaluating the personalized textile electrode systems for rehabilitation techniques and deepening insights into the nuances of at-home PLP management.METHODS: A qualitative study involving six participants with PLP was conducted. Each participant used a textile-based electrode system to perform phantom motor execution treatment over 3 to 6 months in their home

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