Recovery of motor function after stroke: a polymyography-based analysis

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References:

Abstract:
We present a method for assessing muscle activation patterns during goal-directed movement. We present a cohort study from a randomized clinical trial that followed the recovery of motor function during and after intensive gait training, assisted by sensor-driven, four-channel electrical stimulation. The instrument that we developed allows for the simultaneous recordings of up to 16 channels that are wirelessly sent to a host computer, which then provides feedback to the subject. The inputs to the portable instrument support electromyography (EMG) amplifiers, inertial sensors and goniometers. We show that this method is sensitive enough to show changes in muscle activation patterns in stroke patients before and after gait training (four weeks, five days a week, 30 min daily). We also show that the recovery decreases the differences between patterns of muscle activities (e.g., levels of muscle activations and median frequencies) assessed in hemiplegic and healthy subjects. This method allows for the analysis of muscle contributions and activation patterns; therefore, it might be possible to better understand the physiology behind the recovery of function. This EMG analysis provides a quantification of recovery that is a valuable addition to other measures, such as the Fugl-Meyer score, the Berg-Balance score, gait speed, and the symmetry index.

Keywords: