

Myoelectric Analysis for the Assessment of Muscle Functions and Fatigue Monitoring of Upper Extremity for Stroke Patients Performing Robot-Assisted Bilateral Training

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Abstract : Robot-assisted bilateral arm training has demonstrated useful to improve motor control in stroke patients and save human resources. In clinics, the efficiency of this treatment is mostly performed by comparing functional scales before and after rehabilitation. However, most of these assessments are based on behavior evaluation. The underlying improvement of muscle activation and coordination is unknown. Moreover, stroke patients are easier to have muscle fatigue under robot-assisted rehabilitation due to the weakness of muscles. This safety issue is still less studied. In this study, EMG analysis was applied during training. Our preliminary results showed the co-contraction index and co-contraction area index can delineate the improved muscle coordination of biceps brachii vs. flexor carpiradialis. Moreover, the smoothed, normalized cycle-by-cycle median frequency of left and right extensor carpiradialis decreased as the training progress, implying the occurrence of muscle fatigue.

Keywords : robot-assisted rehabilitation, strokes, muscle coordination, muscle fatigue

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