

Optimal Rest Interval between Sets in Robot-Based Upper-Arm Rehabilitation

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Abstract : Muscular fatigue affects the muscle activation that is needed for producing the desired clinical outcome. Integrating optimal muscle relaxation periods into a variety of health care rehabilitation protocols is important to maximize the efficiency of the therapy. In this study, four muscle relaxation periods (30, 60, 90, and 120 seconds) and their effectiveness in producing consistent muscle activation of the muscle biceps brachii between sets of elbow flexion and extension task was investigated among a sample of 10 subjects with no disabilities. The same resting periods were then utilized in a controlled exoskeleton-based exercise for a sample size of 5 subjects and have shown similar results. On average, the muscle activity of the biceps brachii decreased by 0.3% when rested for 30 seconds, and it increased by 1.25%, 0.76%, and 0.82% when using muscle relaxation periods of 60, 90, and 120 seconds, respectively. The preliminary results suggest that a muscle relaxation period of about 60 seconds is needed for optimal continuous muscle activation within rehabilitation regimens. Robot-based rehabilitation is good to produce repetitive tasks with the right intensity, and knowing the optimal resting period will make the automation more effective.

Keywords : rest intervals, muscle biceps brachii, robot rehabilitation, muscle fatigue

Conference Title : ICBBE 2022 : International Conference on Bioinformatics and Biomedical Engineering

Conference Location : New York, United States

Conference Dates : April 25-26, 2022