

## Improvement in Physical Function and Quality of Life in Older Adults Following 4 Weeks of Neuromuscular Electrical Stimulation

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### ABSTRACT

Older adults often suffer from sarcopenia, the age-related loss of muscle mass and strength, which negatively impacts physical function and quality of life (QoL). Neuromuscular electrical stimulation (NMES) is frequently used in physical rehabilitation as a muscle strengthening modality; however, little research exists on QoL outcomes in response to NMES. **PURPOSE:** The aim of this study was to determine changes in QoL and physical function in older adults after 4 weeks of NMES. **METHODS:** Ten healthy, older adults participated in the study ( $67.8 \pm 2.1$  years-old). Each participant was seated on an isokinetic dynamometer with the knee positioned at  $60^\circ$ , and a 40-min NMES treatment was applied to the quadriceps muscles of each leg 3 times per week for 4 weeks. Stimulation frequency was set at 60 Hz with repeated cycles of 10s on and 15s off. Stimulation intensity was set to achieve 15% of each participant's maximal voluntary contraction (MVC) and was increased every 5 minutes if the torque was below 15% MVC. Each subject was given a pre and post intervention survey assessing indicators of QoL: self-efficacy for physical function (0-100 scale), perceived competence in physical domains (e.g., strength, endurance, coordination, 1-6 scale), physical self-concept (1-6 scale), and intention to be physically active (1-7 scale). Physical function of the lower body was assessed pre and post intervention with a timed up and go test (TUG). Paired sample *t*-tests were used to test for differences over time (pre, post) for TUG and QoL dimensions (significance set at  $p < 0.05$ ). Cohen's *d* was calculated for effect size. **RESULTS:** Perceived coordination significantly increased with a medium effect size ( $5.10 \pm 0.16$  vs  $5.38 \pm 0.17$ ,  $p = 0.03$ ,  $d = 0.55$ ), pre vs post, respectively. The following QoL dimensions showed a statistically non-significant increase with a small effect size: intention to be physically active ( $6.08 \pm 0.58$  vs  $6.68 \pm 0.22$ ,  $p = 0.33$ ,  $d = 0.48$ ), self-efficacy ( $95.61 \pm 2.19$  vs  $97.37 \pm 1.40$ ,  $p = 0.10$ ,  $d = 0.31$ ), and endurance ( $3.57 \pm 0.33$  vs  $3.77 \pm 0.19$ ,  $p = 0.43$ ,  $d = 0.24$ ). Two dimensions trended toward improvement: physical self-concept ( $4.57 \pm 0.35$  vs  $4.77 \pm 0.30$ ,  $p = 0.37$ ,  $d = 0.19$ ) and physical activity ( $4.08 \pm 0.45$  vs  $4.30 \pm 0.31$ ,  $p = 0.36$ ,  $d = 0.19$ ). There was a significant decrease in time to complete the TUG ( $8.77 \pm 0.59$ s vs  $7.71 \pm 0.43$ s,  $p = 0.004$ ,  $d = 0.63$ ). **CONCLUSION:** TUG times and coordination showed significant improvement while other QoL dimensions trended toward improvement after 4 weeks of NMES. Enhanced physical function subsequent to NMES treatment may contribute to improved overall QoL by increasing confidence to perform physical activities, and may thereby counter the risk of sarcopenia.