

## **Psychological and Physical Response to Neuromuscular Electrical Stimulation**

JENNIFER A. JASSO, JONI A. METTLER, and LINDSAY E. KIPP

Neuromuscular Physiology Lab; Department of Health and Human Performance; Texas State University; San Marcos, TX

---

*Category: Masters*

*Advisor / Mentor: Mettler, Joni (jam388@txstate.edu)*

### **ABSTRACT**

Neuromuscular electrical stimulation (NMES) is commonly used to improve muscle function in physical rehabilitation settings. However, reasons for limited use as an alternative to voluntary exercise may be due to lack of familiarity and perceived discomfort during treatment. **PURPOSE:** The purpose of this study was to determine attitude toward NMES exercise and perceived pain and muscle soreness experienced from NMES exercise with increasing stimulation intensity. **METHODS:** Thirty healthy adults (age:  $23.6 \pm 0.5$  years) who had not experienced electrical stimulation within the last year completed the study. Repetitive, intermittent stimulation of 10 seconds on and 15 seconds off was applied to the quadriceps muscles for 60 minutes with the stimulation frequency set at 60 Hz. Stimulation intensity was increased every 5 min throughout the course of the intervention to achieve a target torque of 15% maximal voluntary contraction as measured by an isokinetic dynamometer. During the NMES application, participants rated the pain they experienced using a standard pain scale (0-10 scale: 0 = no pain; 10 = most pain possible) at minute 0, 15, 30, 45, and 55 of the treatment. Participants were also asked to rate muscle soreness felt 48 hours after exercise (0-10 scale: 0 = no soreness; 10 = greatest soreness possible). A survey on attitude toward NMES exercise (e.g., useful, pleasant, beneficial) was administered pre and post NMES on a 1-7 scale (e.g., 1 = useless; 7 = useful). Repeated measures analysis of variance (ANOVA) was used to test statistical differences between scores over time. Data are reported as mean  $\pm$  SE. **RESULTS:** Attitude toward NMES exercise was high and did not change pre-post exercise (pre:  $6.2 \pm 0.1$ , post:  $6.1 \pm 0.2$ ,  $p = 0.21$ ). Reported pain during NMES was low and was not different across time points (0 min:  $2.1 \pm 0.4$ , 15 min:  $2.7 \pm 0.4$ , 30 min:  $2.6 \pm 0.4$ , 45 min:  $2.9 \pm 0.4$ , 55 min:  $2.5 \pm 0.4$ ,  $p = 0.126$ ). Muscle soreness remained elevated 48-hours post-NMES ( $3.5 \pm 0.593$ ,  $p < 0.001$ ). **CONCLUSION:** Pain reported during NMES was low and did not increase as stimulation intensity increased. Attitudes toward NMES sessions were relatively high and were unchanged after exercise, indicating that any pain and soreness experienced did not change participants' attitude regarding the benefits of NMES exercise.