



Grant Information Summary:

Aggressive Application of Monophasic High-Voltage Stimulation (MHVS)

Practical Significance:

Aggressive application of monophasic high-voltage stimulation (MHVS) appears to be a viable treatment strategy for improving potential adverse responses following novel occupational, recreational, or sport-related endeavors.

Background

Due to the considerable incidence of musculoskeletal injury in the physically active population, elucidation of effective intervention strategies is warranted to attenuate potential negative side effects associated with physical activity. MHVS is a widely prescribed modality for the treatment of muscle injury and inflammation. However, limited scientific evidence exists to support the purported benefits of MHVS in regulating the inflammatory response and the associated adverse effects in humans. Therefore, the purpose of the current investigation was to examine the efficacy of MHVS treatment following injurious

exercise on markers of muscle injury and inflammation.

Objective

To determine the efficacy of MHVS on markers of muscle injury and inflammation following injurious exercise.

Design & Setting

In a randomized crossover design, subjects participated in both an experimental and control condition. The elbow flexors were injured by repetitive eccentric contractions followed by treatment with MHVS or sham (control) at 5 minutes and 3, 6, 24, 48, 72, 96, and 120 hours post injury.

Subjects

Fourteen apparently healthy, sedentary male subjects (age 23.9 ± 4.6 yrs., height 68.9 ± 3.7 cm., weight 77.2 ± 15.2 kg.) from The University of Toledo and surrounding community completed both conditions.

Measurements

Maximal isometric force, perceived soreness, flexed arm angle (FANG; elbow flexion) and relaxed arm angle (elbow extension) were assessed before (chronic effect) and after treatment (acute effect of MHVS; D post- vs. pre-) at all time periods across both conditions. Arm volume was determined at all periods with the exception of the 5 minutes post-measurement.



Figure 1 Maximum isometric force



Figure 2 Eccentric exercise protocol



Figure 3 Arm volume determination



Figure 4 Electrode Placement

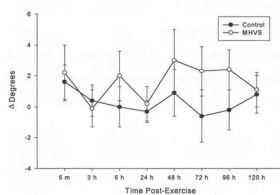


Figure 5 Absolute change in RANG (acute effect). Values represent the difference between post- and pre-measurements for both control and MHVS. All values expressed as mean \pm SE (n=14). MHVS differs significantly from control ($p \leq .05$).

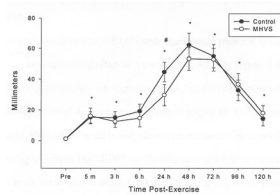


Figure 6 Perceived soreness (chronic effect). Measurements were taken prior to control and MHVS for all time points assessed. All values expressed as mean \pm SE (n=14). *denotes significant difference from the Pre-measurement ($p \leq .05$). # denotes significant difference between MHVS and control ($p \leq .05$).

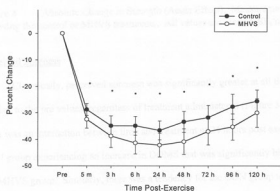


Figure 7 Percent change in strength (chronic effect). Measurements were taken prior to control and MHVS for all time points assessed. All values expressed as mean \pm SE (n=14). *denotes significant difference from the Pre-measurement ($p \leq .05$).

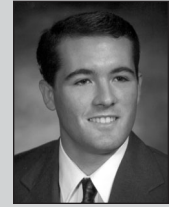
Results

Chronic application of MHVS resulted in a significant ($p \leq .05$) reduction in delayed-onset muscle soreness (DOMS) 24h post exercise. Elbow extension was significantly increased immediately following administration of MHVS (acute effect) across all time periods. No significant effect for maximal isometric force, FANG, or arm volume was observed between MHVS and control conditions.

Conclusions

Aggressive application of MHVS provides transitory relief from DOMS and short-term improvements in range of motion following injurious exercise.

Primary Investigator:



Thomas J. McLoughlin, PhD, ATC

Postdoctoral Research Associate
The University of Illinois at Chicago
School of Kinesiology
901 W. Roosevelt Rd. M/C 194
Chicago, IL 60608
Phone: 312.996.9877 Fax: 312.996.2958

Publication & Presentation List

2001 American College of Sports Medicine Annual Meeting

2001 National Athletic Trainers' Association Annual Meeting

Manuscript in development

Financial Support By:

Dr. Michael T. Lee
Arizona Orthopedic & Sports Medicine Specialists

Ellington Printery, Ellington, CT



2952 Stemmons • Dallas, TX 75247
214-637-6282

Supporting and advancing the Athletic Training profession through research and education.