

Effects of Acupuncture, Electroacupuncture, and Electrostimulation Treatments on Plantaris by Casting Model

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ABSTRACT

It is essential to seek the therapeutic strategy for attenuating muscle atrophy because muscle atrophy diminishes the quality of life. Acupuncture and electrostimulation have been used as a therapeutic intervention to control pain under pathological conditions. However, little is known about the effects of acupuncture and electrostimulation on skeletal muscle mass and function. **PURPOSE:** To test whether acupuncture, electroacupuncture, and electrostimulation affect muscle mass and contractile properties **METHODS:** Forty female Sprague Dawley rats were randomly divided into 5 groups: 1) Control (CON), 2) Cast (CT), 3) CT+ Acupuncture (AC), 4) CT+ Electroacupuncture (EA), and 5) CT+ Electrostimulation (ES) (n=8 each). The plaster casting material was wrapped from the trunk to the middle of one hind paw. Acupuncture and Electro-Acupuncture treatment (2-15 Hz, 2-4 Voltage) was applied by needling ST36 and GB34 (acupoints). Electrostimulation (2-15 Hz, 2-4 Voltage) was conducted by needling in the lateral and medial Gastrocnemius. All treatments were conducted 15 minutes with 3 times/wk for 14 days. Two major atrophy markers, muscle-specific E3 ubiquitin ligases, MAFbx/atrogen1 and muscle ring Finger -1 (MuRF1), were measured using the Western blot method. Data were analyzed using one-way ANOVA with the Least Significant Difference *post hoc* test. **RESULTS:** After 2 weeks of casting, plantaris showed significant atrophy in CT compared to the CON group (143.94±13.08 vs. 223.9±20.93 mg; p<0.05). MAFbx/atrogen1 and MuRF1 were significantly increased with CT, while decreased with treatments (AC, EA, and ES). The peak twitch tension was significantly decreased in CT, while increased in AC and ES. However, AC, EA, ES did not alleviate muscle atrophy associated with casting. **CONCLUSION:** Acupuncture and electrostimulation can be used as effective therapeutic interventions for decreased muscle strength that is associated with casting-induced muscle atrophy.