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FORCE DEFICITS OF RAT PLANTAR FLEXOR MUSCLES AFTER ANKLE ROTATIONS WITH CONSTANT VELOCITY OR ACCELERATION

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Twenty stretches of plantar flexor muscles, imposed on isometric contractions (80 Hz, stimulation time 1.1s, rest periods 3 min), were produced by ankle rotation (ankle position 90° to 40° with a constant velocity ($V = 300 \text{ }^\circ\text{ } \dot{u}^{-1}$, $n = 6$) or constant acceleration ($A = 3000 \text{ }^\circ\text{ } \dot{u}^{-2}$, $n = 6$) movement in anaesthetized female Sprague Dawley rats (bw 278 ± 19 g, age 144 ± 19 days, mean \pm SD). Forces were measured at the plantar surface of the foot. Relative declines in isometric force at 90° and peak stretch force at 40° during the stretch protocol were measured. Before and 1 hr after the stretch protocol (i.e. rest), isometric forces were determined at 90° using 5, 10, 20, 40, 60, and 80 Hz. Groups had similar force-frequency relationships before the stretches and similar peak stretch forces for the first stretch (V: 34.9 ± 6.9 N, A: 30.4 ± 5.2 N). During the stretch protocol, the relative declines in isometric force and peak stretch force were similar for V and A rats. At the end of the stretch protocol, deficits in isometric force were $54.5 \pm 6.2\%$ (V) and $49.9 \pm 5.1\%$ (A) ($P = 0.2$) and deficits in peak stretch force were $32.3 \pm 5.5\%$ (V) and $35.0 \pm 4.4\%$ (A) ($P = 0.4$). After 1 hr of rest following the stretches, isometric force deficits were present at all stimulation frequencies resulting in similar force-frequency relationships for both groups. Variation in ankle movement with similar peak stretch forces did not influence the amount of force lost by repeated stretches of activated plantar flexor muscles in rats. Supported by NIOSH R01-OH-02918.

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