The Acute Effects of Self-Myofascial Release on Range of Motion and Fatigue Rate in the Lower Extremities

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ABSTRACT

There has been a growing popularity in a technique similar to a massage that is easily accessible known as self-myofascial release, or more commonly as "foam rolling". While research has been conducted to examine the effects on a smooth foam roller, little research has been conducted regarding a more aggressive form of deep tissue self-myofascial release on muscular strength and fatigability. PURPOSE: To examine the acute effect of deep tissue self-myofascial release on hip range of motion and fatigue rate of the quadriceps in uninjured individuals. METHODS: Nineteen males, ages 20-35, with no prior knee surgery/injury on their preferred leg regardless of current functional status were recruited. Subjects were allowed familiarity trials for goniometry of hip flexion/extension, self-myofascial release, and the isokinetic strength/fatigability test prior to exercise testing. All subjects underwent three experimental trials [self-myofascial release (SMR), static stretching (STS), no additional warm-up control (CON)] in a balanced crossover design. During the treatment trials, subjects were required to perform a 10 minute warm-up on a stationary rate independent cycle ergometer (50 W) followed by one of the treatments applied to the hamstrings and quadriceps of the preferred leg; SMR (1 set; 2 min), STS (4 sets; 30 secs). Subjects were required to perform the Thorstensson test, using a single-chair isokinetic dynamometer, which consisted of 50 voluntary maximal isokinetic leg extensions on their preferred leg where the rate of force production was controlled as $180°\cdot sec^{-1}$. Measurement of hip flexion (HF) and extension (HE), absolute peak quadriceps force production (AF), relative peak quadriceps force production (RF), quadriceps fatigue rate (FR), and perceived local leg fatigue (PF) were recorded. One-way ANOVA with repeated measures was used to analyze for differences between trials (STS, SMR, CON), except for FR where a Friedman ANOVA was used, $\alpha=0.05$. RESULTS: HF did differ significantly between the treatments ($p<0.05$) where SMR (113.7±4.8°) and STS (114.7±4.9°) > CON (106.2±5.0°). The treatments also differed significantly ($p<0.05$) in HE, where SMR (19.7±3.3°) and STS (18.2±4.3°) > CON (13.2±3.6°). AF did not differ significantly ($p>0.05$) between the treatments (SMR=175.2±32.1 Nm, STS=180.9±35.6 Nm, CON=177.2±38.3 Nm), nor did RF (SMR=1.9±0.4 Nm/kg, STS=1.9±0.4 Nm/kg, CON=1.9±0.4). FR also did not differ ($p>0.05$) between treatments (SMR=59.7±9.4%, STS=61.3±11.0%, CON=61.5±8.8%). PF was seen to be more frequently greater with most subjects in CON, but there were no significant difference ($p>0.05$) between trials. CONCLUSION: While SMR had no effect on muscular strength and fatigability, SMR did have similar significant effect as static stretching on hip range of motion.