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Effect of Caffeine Supplementation on Acute Rope Exercise Performance and Metabolism

Hannah E. Mercado, Jill A. Bush, FACSM, Julianne Collins, Morgan Choma, Nicholas A. Ratamess, Jie Kang, FACSM, Avery D. Faigenbaum, FACSM. The College of New Jersey, Ewing, NJ

Use of caffeine as well as utilizing battling rope exercises have increased in popularity as increases in lactate during exercise, muscle power, muscle strength, and delayed fatigue, thus improving overall anaerobic exercise performance and enhancing energy use during recovery were observed. **PURPOSE:** To determine caffeine-induced effect on cardiometabolic and performance during acute maximal rope exercises. **METHODS:** In a double-blind design study, 3 male and 10 female, physically active healthy ($23 \pm 3 \text{ kg/m}^2$) adults (20 ± 1 yrs) consumed 5 mg/kg caffeine or placebo (PL) 15-min prior to rope exercise in a randomized order. The 8-min rope exercise protocol consisted of 6 sets of 30-sec timed maximal rope exercises of vigorous intensity with 1-min rest between sets in which rep number was determined. From a HR monitor and RPE scale, exercise intensity was obtained at rest, after each set, and post-exercise. A finger stick sample determined blood lactate (LA) and glucose (GL) in duplicate at rest (fasted), mid-exercise (set 3), and immediate post-exercise. Repeated measures ANOVA with post-hoc analysis examined the caffeine effect at $p \leq 0.05$ level. **RESULTS:** Although an exercise-induced increase in LA and GL at mid- (vs rest) (LA: 8 ± 2 vs 1 ± 0.3 mg/dL; GL: 95 ± 9 vs 89 ± 8 mg/dL) and post-exercise (LA: 13 ± 2 mg/dL; GL: 117 ± 9 mg/dL) after caffeine intake, there was no caffeine-placebo effect. A trend ($p = 0.07$) for a higher caffeine-induced LA (8 ± 4 vs PL 6 ± 2 mg/dL) at mid- but not post-exercise (13 ± 1 vs PL 11 ± 2 mg/dL) existed. Although no caffeine effect existed, compared to set 1, RPE (28%) and HR (44%) increased by set 6. LA at mid- (18%, $p = 0.02$) and post-exercise (9%, $p = 0.06$) was higher (vs PL) when ingesting caffeine in those whose habitual caffeine intake (0.5 ± 0.4 cups/d) was low. **CONCLUSIONS:** Although, when taken 15 min prior to exercise, the caffeine-induced effects during this acute bout of maximal rope exercises had minimal effects on LA during exercise except for a trend during mid-exercise. The protocol did elicit 75-90% of age-predicted HRmax demonstrating the vigorous nature of the exercise. However, an examination of longer protocol durations and varying movements of a multi-set anaerobic rope exercise are necessary as they may provide a better indicator of a potential caffeine response. Supported by TCNJ MUSE Grant (JB)