

**Title** – Low dose caffeine consumption improves power output, reduces fatigability and cardiovascular strain during anaerobic exercise

**Program of Study** – M.S. Biomedical Science.

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## **ABSTRACT**

About 85% of the US population consumes an average of 130mg of caffeine daily. Caffeine consumption from coffee and energy drinks is increasing among young adults, especially athletes, aged 18-34. This rise is probably due to the ergogenic effects of low dose caffeine which are increased endurance (330mg) and performance (250mg) in aerobic exercise due to increased blood flow to the muscles and metabolism of fatty acids, thereby sparing muscle glycogen stores. Due to the few conflicting studies the ergogenic effects of caffeine on anaerobic exercise, we hypothesized that low dose caffeine will improve power output and reduce fatigability during anaerobic exercise.

A crossover trial of 47 healthy (30 females and 17 males) vicenarians performed the 30s Wattbike test. Then EMG amplitudes of 64 healthy (38 females and 26 males) vicenarians were measured using AD instruments software and equipment. Each trial was 1min long and utilized each individual's dominant and non-dominant arm. The experimental trial was performed 30min after 200mg of caffeine was administered. The results were analyzed using a paired samples z-test.

During the 21s-25s period of the 30s wattbike test, there was a 5.8% statistically significant increase in power output with caffeine ( $z(46)=2.811, p=0.007$ ). Also there was a 10.6% statistically significant increase in power output with caffeine during the last 5s ( $z(46)= 4.457, p<0.0005$ ). There was a 15.8% statistically significant decrease in EMG amplitude from the biceps brachii of the dominant arm with caffeine ( $z(63)=2.565, p=0.013$ ). However, the decrease observed from the non-dominant hand with caffeine was not statistically significant ( $z(63)=0.795, p=0.43$ ).

In conclusion, caffeine decreases motor unit recruitment, EMG amplitude and fatigability in a forearm non-ischemic (anaerobic) test. Caffeine also improves power output in the last 10secs of an anaerobic 30sec-wattbike test. These observed ergogenic effects reduce cardiovascular strain, are independent of blood glucose levels and are dose-dependent.