

Cardiac Output Dependency on Exercising Muscle Mass during Ergometer Exercise in Healthy Women.

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Women may have different muscle perfusion capabilities when compared to men due to differences in hemodynamics and quantity of muscle mass. **Purpose:** To assess the effects of exercising muscle mass on cardiac output (CO) during small and large muscle exercise in healthy, college-aged women and compare those responses to men. It was hypothesized that: 1) Cardiac output (L/min) and stroke volume (SV (ml/beat) would be greater during leg exercise when compared to arm exercise, 2) CO and SV relative to exercising muscle mass would be greater during arm exercise when compared to leg exercise, 3) CO and SV would be greater in those with greater musculature of the arms and legs, and 4) Similar responses exhibited by men would be found for women.

Methods: Eleven apparently healthy women volunteers, between the ages of 18 and 26, participated. Arm and leg ergometer testing was performed in one session with the order randomly assigned for each participant. Cardiac output and SV were measured at each incremental workload. **Results:** Absolute and relative CO and SV were both significantly greater during arm exercise when compared to leg exercise ($p < 0.001$). Stroke volume did not increase after an initial increase to 25 Watts, while CO continued to increase in a linear fashion. When expressed relative to muscle mass, CO and SV were greater and increased more rapidly with increasing workload during arm exercise ($p < 0.001$ & $p < 0.003$, respectively). When comparing those with High versus Low muscle mass, there were no significant differences between groups for arm or leg exercise and no significant interaction between main effects. **Conclusions:** Women exhibited similar CO values as men, but smaller SV values at each workload. In conclusion, CO and SV were significantly greater during arm exercise, in spite of the lower muscle mass. The reduced SV response in women suggests an impaired ability for skeletal muscle perfusion during arm and leg exercise and a greater HR response to maintain CO. Men had a greater muscle mass when compared to women, which was to be expected. In addition, there was a smaller difference between High and Low muscle mass for women, particularly during leg exercise, which could have made the CO perfusion more difficult for men than women due to the greater amount of muscle mass.