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Performing Resistance Type Exercise in Various Body Positions Elicits Different Cardiovascular Responses

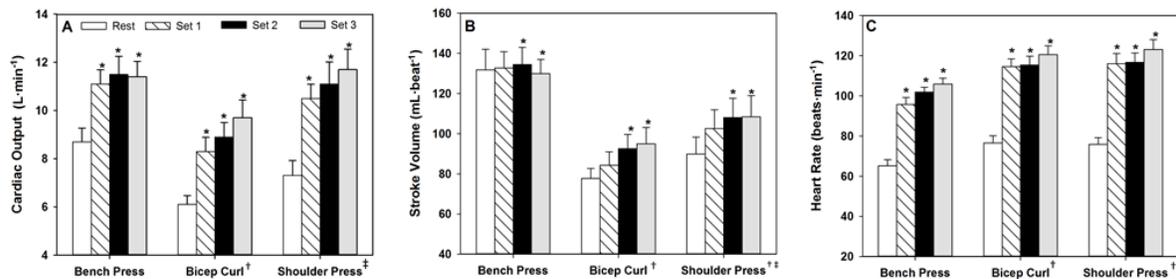
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PURPOSE: There is limited research regarding the different cardiovascular responses to acute resistance training in various body positions. Therefore, the purpose of this investigation was to determine the different responses of cardiac output (CO), stroke volume (SV), heart rate (HR), systolic (SBP) and diastolic blood pressures (DBP) while performing resistance type exercise in three different body positions. **METHODS:** Fourteen apparently healthy individuals (8 female; 6 male) volunteered to participate in this study. The resistance type exercises to be performed included the bench press, seated bicep curl, and shoulder press. A non-invasive cardiac output monitoring (NICOM) system was used to measure cardiac output, stroke volume, and heart rate. A two-way analysis of variance (ANOVA) with repeated measures revealed significant differences ($p < 0.05$) in cardiac output, stroke volume, heart rate and diastolic blood pressure between different body positions. **RESULTS:** Average participant characteristics were as follows: age 20.4 ± 1.5 years, height 169.6 ± 8.4 cm, body mass index (BMI) 26.9 ± 6.1 kg/m², and fat free mass (FFM) 21.8 ± 12.1 kg. The figure below shows cardiovascular responses during various types of resistance exercise.



Panel A: Cardiac Output; **Panel B:** Stroke Volume; and **Panel C:** Heart Rate; values shown are mean \pm SE. Study conditions are as follow: white bars = rest, striped bars = set 1, black bars = set 2, gray bars = set 3. *Significantly different from baseline; $P < 0.001$; †Significantly different from Bench Press; $P < 0.001$; ‡Significantly different from Bicep Curl; $P < 0.05$.

There was no significant interaction between exercises and sets for any of the dependent variables.

CONCLUSION: In conclusion, these differences occurred due to the relationship that exists between cardiac output, stroke volume, and heart rate.