ABSTRACT

TITLE:	Investigation of Stroke Volume Response to Incremental Exercise in Cyclists of Varying Fitness Levels
AUTHOR(S):	Knight-Maloney, Melissa; Savage, Kevin; McWhorter, Alex; Dillon, Noah; Schulke, Forest
PRESENTED AT:	2015 Undergraduate Research and Creative Activities Symposium, Fort Lewis College

ABSTRACT: Stroke Volume (SV) is the amount of blood pumped out the left ventricle of the heart after each contraction and is a measure of the efficiency of the heart. Knowing SV is important for both non-athletes and athletes, because as SV increases an individual's capacity for work increases as well. Several studies have shown little change in SV with incremental exercise. However, other research has shown that SV can change with increasing levels of exercise and produce five types of response: plateau, plateau with a drop, plateau with a large drop (>20%), plateau with a secondary increase, and progressive increase. It is possible that the difference in SV response observed in previous studies was due to participant fitness level, however it is still unclear what specifically accounts for changes in SV response amongst individuals.72 cyclists completed a graded VO2 max test (GXT) on a cycle ergometer. Subjects completed a 5-minute warm up at 100 watts for men and 80 watts for women. Following the warm-up, resistance was increased in 3-minute intervals by 25 watts for men and 20 watts for women, until subjects reached volitional exhaustion. Expired gas samples were collected in 10 second averages using a metabolic cart, and were used to determine relative VO2 peak. SV was measured using bioimpedance and was analyzed in between the warmup and cool down periods of the test. Relative VO2 Peak was used to categorize fitness levels. Using relative VO2 peak subjects were grouped into three levels of fitness: untrained (n=12), moderately trained (n=25), and highly trained (n=24). Results showed significant difference between the peak HR of untrained and highly trained groups. Significant differences were also found between the moderately trained and highly trained groups. There was no significant difference between untrained and moderately trained groups for peak HR. SV response showed no single dominant reoccurring patterns throughout fitness groups. Plateau with a drop occurred in the greatest frequency, occurring in nine subjects in both the moderately and highly trained group.