The purpose of this study is to determine if tissue oxygenation is compromised at altitude during submaximal and maximal bouts of exercise and whether reducing the active muscle mass exercise can be used to offset any observed decrement due to increases in blood flow. Ten individuals performed submaximal double leg cycling for four minutes at 50%, 60%, 70%, and 80% of their maximal oxygen consumption, rested for 15 minutes and then performed submaximal single leg cycling utilizing the same protocol but at half the double leg work rate in both normoxic and hypoxic conditions (oxygen concentration of 15% which simulated an altitude of 2,740 meters). Ten individuals performed a maximal double leg 30 second anaerobic Wingate test, rested for 15 minutes and then performed a maximal single leg 30 second anaerobic Wingate test in normoxic and hypoxic conditions. In the first study, no difference was found in the amount of oxygenated hemoglobin when comparing the single leg trial in hypoxia to the double leg trials in normoxia ($p = 0.36$) and hypoxia ($p = 0.13$). In the second study, both single leg trials had increased amounts of oxygenated hemoglobin compared the two double leg trials although these amounts are not significant ($p = 0.47$). In general, we found that increased blood flow leads to an increase in tissue perfusion with single leg cycling which could allow for greater muscle specific work rates when compared to double leg cycling and can be accomplished with reduced cardiovascular stress.