Appendix A-Initial Exercise Testing

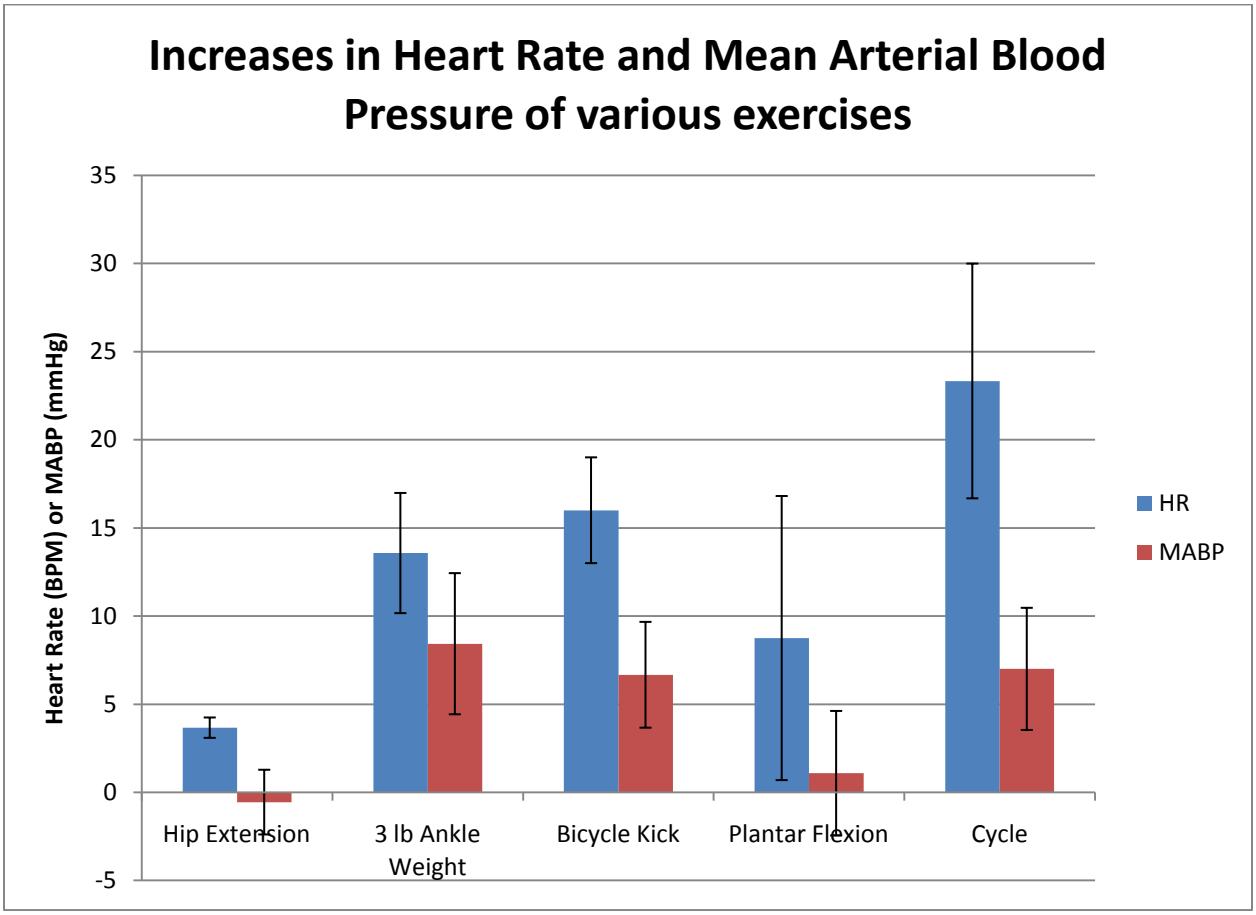

Figure 8: Exercise Comparison to determine optimum method. Initially the cycle motion was considered the best motion to raise subject's heart rate and pulmonary systolic blood pressure but it was later determined that the cycling motion would not be feasible in the GE MRI scanner bore. The next best motion was the bicycle kick, which involves the subject raising their legs a couple inches off the ground and performing a push pull motion (much like how our device facilitates the motion of the subjects legs.

Appendix B- Tensile Testing Results

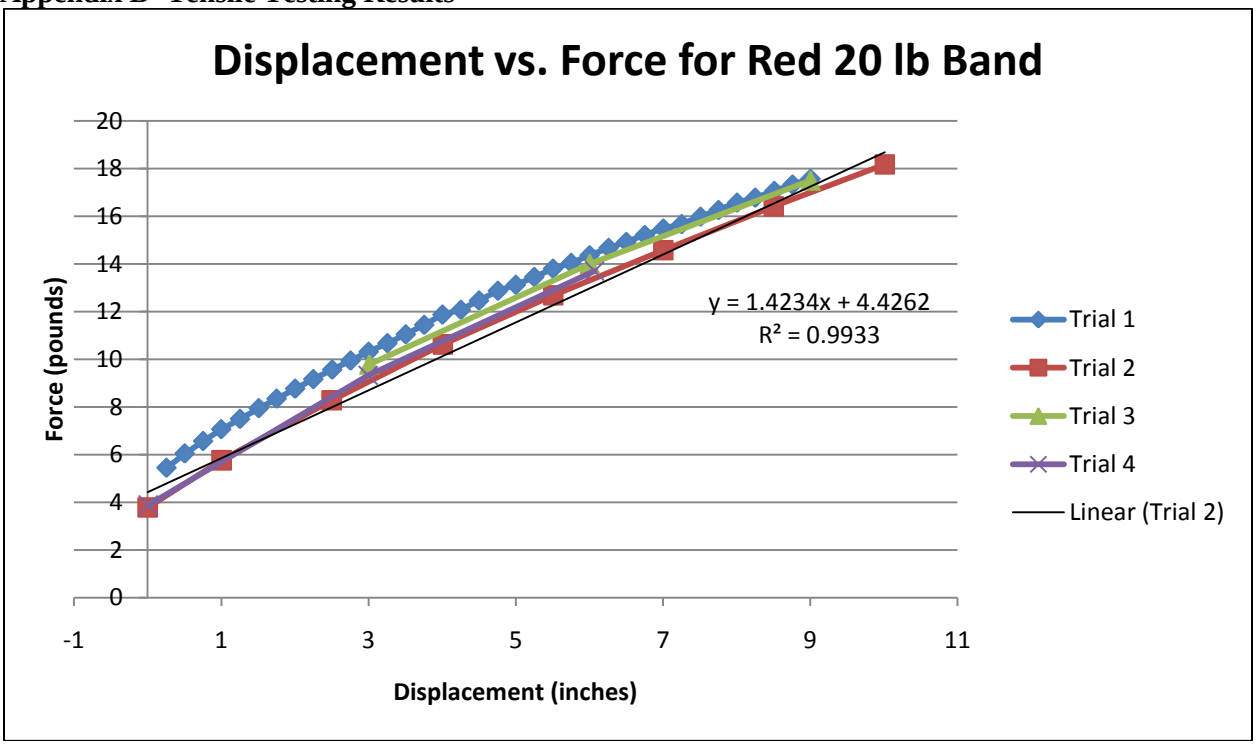

Figure 9: Displacement vs. Force for Red 20 lb. band. Several trials were done to observe possible hysteresis. This included stretching the band at different increments, and stepping it back down (loosening) at different increments. The second trial was used to obtain a spring constant k for the band by obtaining the approximate slope of the data points. The approximate spring constant is 1.42 lbf/in.

Appendix D-Research Study Information

A screening process for eligibility included a questionnaire regarding any previous history of hypertension or other cardio/pulmonary diseases. Other exclusion criteria included women who are pregnant and the presence of any metal in the body. If the subjects passed the preliminary screening they were enrolled in the study and underwent the primary scanning. The primary scanning included using ultrasound to identify if they had a tricuspid regurgitant (TR) jet. The presence of the TR jet is crucial for estimating pulmonary artery pressure, which we expected to increase with exercise. The velocity of blood flow through this heart valve was used to estimate systolic pulmonary blood pressure noninvasively. Pulmonary Artery diameter was also measured to estimate arterial cross-sectional area. Systemic heart rate and blood pressure will also be measured using an external arm cuff. Ultrasound imaging was chosen to screen patients for the existence of a jet because it is noninvasive, inexpensive and relatively simple to perform. Subjects having an identifiable regurgitant jet proceeded to the MR scan. All members of the research team that worked with patient data possessed Health Insurance Portability and Accountability Act (HIPAA) training in order to ensure proper confidentiality protections were enforced. All study protocol and materials were submitted to the University of Wisconsin Institutional Review Board (IRB) for approval. The subjects determined to have the jet underwent an MR scan performed by a qualified radiologist or medical physicist.

Appendix E- MR Data

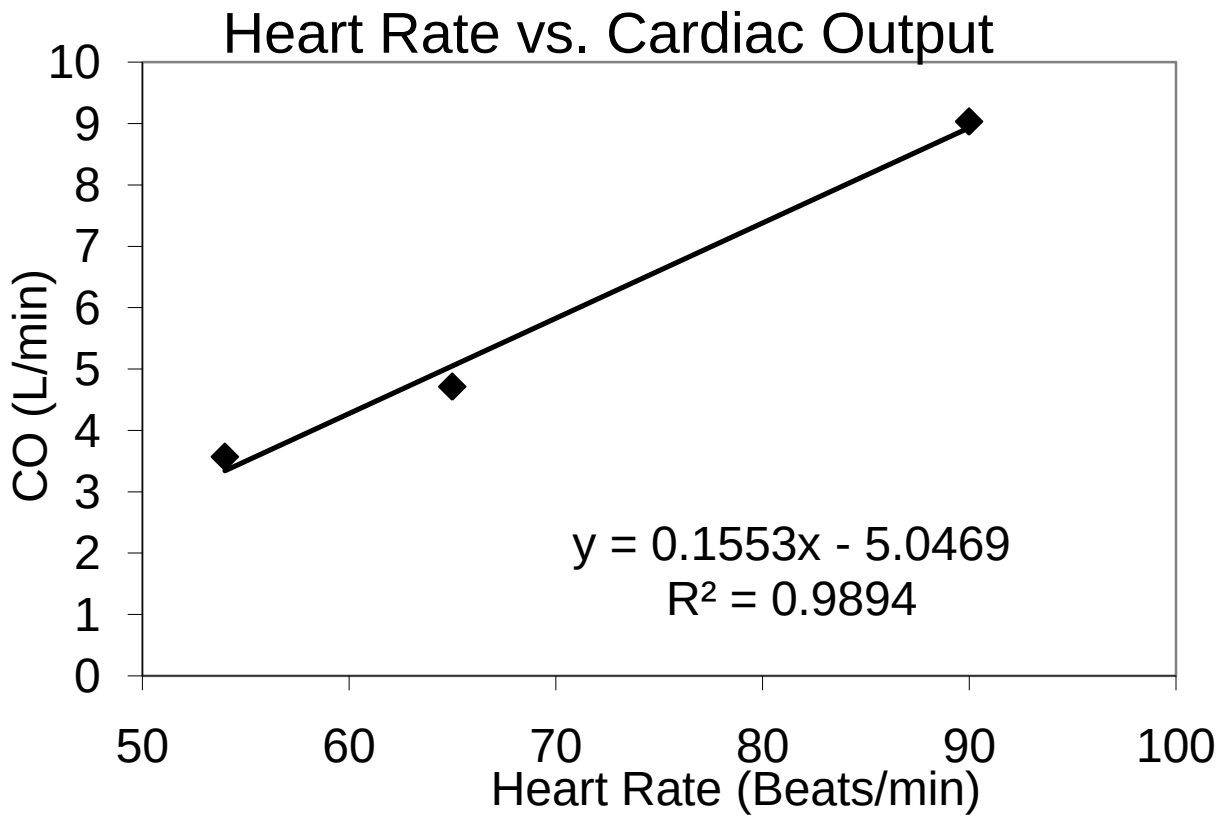

Figure 12: Heart rate vs. Cardiac output. Cardiac output is equal to heart rate by stroke volume, so as heart rate increases, cardiac output increases as well, assuming stroke volume stays constant.

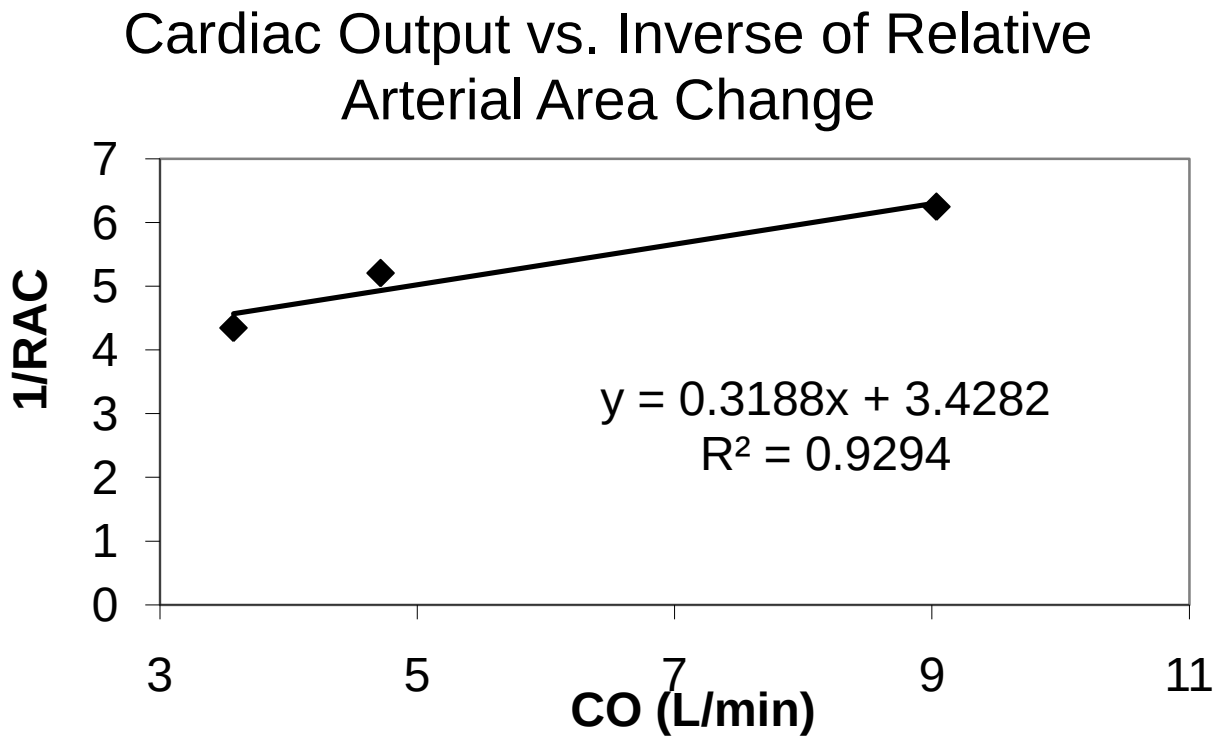

Figure 13: Cardiac Output vs. Inverse of relative arterial area change (RAC). As cardiac output increases, the RAC decreases.

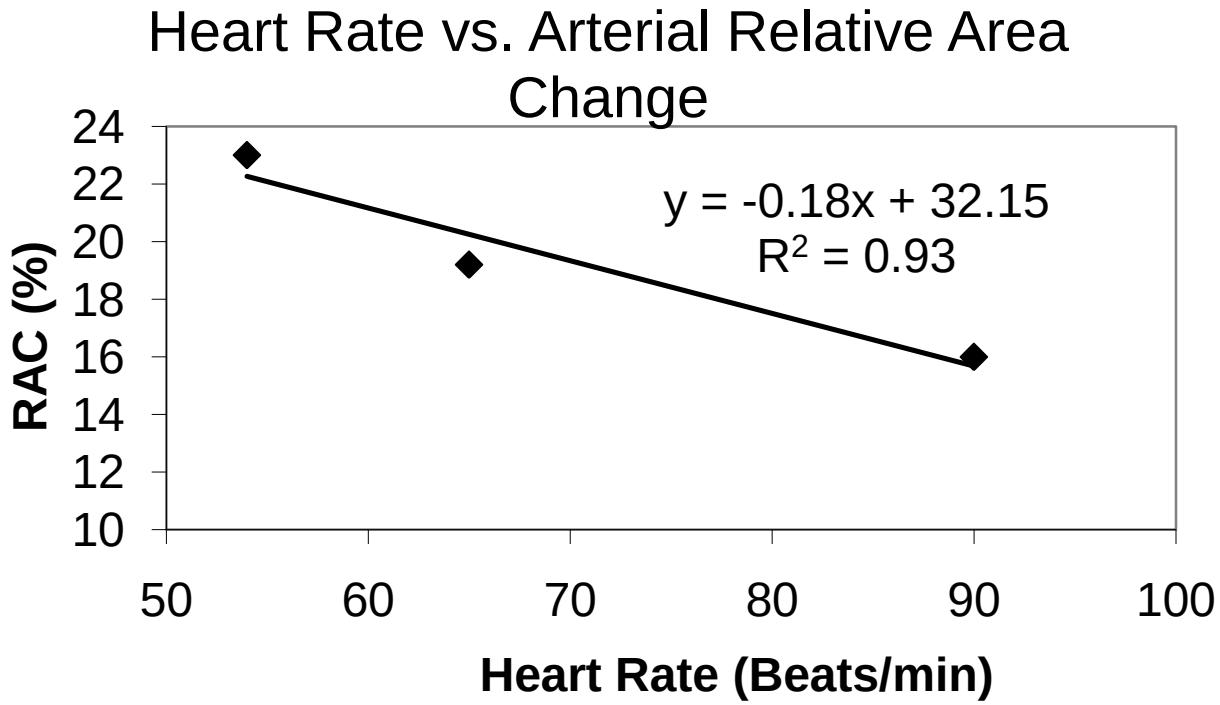

Figure 14: Heart rate vs. arterial RAC. This figure shows that as the heart rate increases, the acceleration rate at which the cross-sectional area of the artery decreases.