CONTINUOUS BLOOD PRESSURE MONITORING DURING HIGH-INTENSITY RESISTANCE TRAINING IN A CARDIAC REHABILITATION SETTING

Katelyn Brown, BS; Jenny Adams, PhD; Tim Bilbrey, MBA

Baylor Heart and Vascular Hospital

Dallas, Texas
INTRODUCTION

- After a heart event, patients often worry about resuming physical activity and may limit or postpone their return to work or exercise until long after it is medically safe to do so. Some patients give up their vocation all together and opt for early retirement or seek to obtain disability benefits.

- Many cardiac rehabilitation patients have occupations or athletic pursuits that require them to perform high intensity activities, yet it has been difficult to accurately measure their maximal blood pressure with a manual blood pressure cuff and auscultation. It is beneficial to the patient that they perform not only cardiovascular endurance exercise but also resistance training in order to improve skeletal muscle strength and endurance, essential to the patient’s safe return to activities of daily living, occupations and recreational activities.
The ADInstruments Finometer blood pressure monitor records continuous heart rate and blood pressure readings and may allow CR patients to perform high intensity exercise (85% of 1RM) while maintaining a rate-pressure product (RPP, defined as peak heart rate x peak systolic blood pressure) under the safety threshold of 36,000.

The purpose of this study is to use the Finometer blood pressure monitor during high intensity resistance training to obtain a more accurate representation of peak myocardial work in the form of RPP. With this information, healthcare professionals in CR settings will be able to better evaluate the feasibility of high intensity resistance training by keeping the RPP under 36,000.
This study included 5 male CR patients, 18 to 80 years of age, who had a current diagnosis of stable angina, MI, or PTCA with or without stent and who performed high-intensity leg press resistance training while undergoing continuous blood pressure and heart rate monitoring.
METHODS

- Each of the 5 subjects performed a 1-RM test on the leg press resistance training equipment while the Finometer finger cuff recorded continuous finger arterial pressure.
- During the next 5 sessions, they performed 4 sets of 6 reps at 85% of their 1-RM with 1 minute of rest between. This process was repeated for a total of 10 sessions.
- A one-sample t-test was used to compare the average RPP for each leg press movement with the safety threshold suggested by current guidelines.
SUBJECTS PERFORMING HIGH INTENSITY RESISTANCE TRAINING USING THE FINOMETER CONTINUOUS BLOOD PRESSURE MONITOR
RESULTS

- The study subjects reached an RPP (mean ± SD) of 15,379.4 ± 2,626.7 while performing the leg press resistance training exercise, an average that differed significantly from the recommended 36,000 safety threshold (p-value: <0.0001). No adverse events were observed.
RESULTS

Figure 1: Average RPP of CR Patients with Current Diagnosis of MI, PTCA or Stable Angina During High Intensity Resistance Training

Figure 2: Average RPP of CR Patients with Current Diagnosis of MI, PTCA or Stable Angina During High Intensity Resistance Training

Figure 3: Average Systolic Blood Pressure of CR Patients with Current Diagnosis of MI, PTCA or Stable Angina During High Intensity Resistance Training
CONCLUSIONS

- The results of using the Finometer to measure continuous blood pressure during high-intensity leg press resistance training indicate that the patients reached an RPP that was substantially less than the currently recommended safety threshold.

- With these results, medical professionals could more accurately prescribe high intensity resistance training in order to help patients reach desirable strength and endurance increases more closely related to the activities they will be required to perform through their athletic pursuits as well as their occupations.