METHODS: Ten men and ten women (21.2 ± 2.4 and 21.0 ± 1.5 years) completed a maximal exercise test, strength test and body composition analysis. Subjects then participated in three familiarization sessions, during which they followed a videotaped routine that consisted of a warm-up, functional exercise segment, and a cool down. In the familiarization sessions, proper form and technique were emphasized and written tests were determined for the experimental session. The protocol for the experimental session was the same as for the familiarization sessions, except that physiological and perceptual variables were measured. VO2, VCO2, RER and heart rate were measured via telemetry using a MedGraphics VO2CO2 system and a Polar heart watch. Blood samples were taken pre- and post-training and analyzed for blood lactate and acid concentration. Overall body RPE was assessed at the end of each exercise session using the OMNI-RS. Descriptive statistics were calculated for RPE, RER, blood lactate concentration, and absolute and relative oxygen uptake and heart rate. Caloric expenditure was calculated using VO2 and RER. Only data from the exercise segment was included in the analysis. Independent t-tests were used to examine differences between men and women for oxygen consumption, weight lifted and energy expenditure during the workout.

RESULTS: As a group, men vs. women performed the exercise segment of the study (27.4 ± 21.1 vs. 156.1 ± 21.4, respectively). The mean weight lifted was 5.9 and the mean difference between pre- and post-lactate acid concentration was 0.9 mmol/L. The mean total caloric expenditure was 288 kcal (10 kcal/min). Men lifted significantly more weights and expended more total calories than women. Caloric expenditure (kcal · kg⁻¹ · min⁻¹) and VO2 weight lifted were similar between men and women when expressed relatively.

CONCLUSIONS: Performing dynamic functional exercises in a continuous manner resulted in values that meet the American College of Sports Medicine recommendations for oxygen uptake and caloric expenditure.

1815 Board #103 May 31 9:00 AM - 10:30 AM Effects of Different Types of Stretching on Strength and Agility
A. Lynn Millar, FACSM, Rodrigo Correa, Nolan McIntosh, Andrews University, Berrien Springs, MI. Email: mllar@andrews.edu

There is controversy regarding the immediate effects of stretching on performance. While some studies have found significant losses of strength or jump ability, others have failed to show any effect on performance.

PURPOSE: To further examine the immediate effects of two types of stretching on strength and agility.

METHODS: 24 healthy college students gave informed, voluntary consent. Each subject acted as their own control, and was tested in 3 separate sessions (48 hour apart). During each session the subject was tested for hamstring flexibility, strength and performance of a timed agility test prior to and following 1 of 3 interventions. The interventions included a control (CON), static stretch (SS), or proprioceptive neuromuscular facilitation (PNF) stretch session, with each lasting 5 minutes. Both of the stretch interventions followed standardized protocols, with alternating exercise-rest components.

RESULTS: Hamstring flexibility improved significantly following both the stretch interventions (p < .05), with mean differences ranging between 4.3 and 4.5 degrees. Expected average improvements for SS and PNF on the control were identified as 4 and 2 degrees, respectively. No significant changes were found for either strength or agility as comparable to the control, with average differences being less than 2/10ths of a second for any of the agility tests and ranging from an average loss of 2.2Nm for the control and 2.6N for the PNF session to an average gain of 0.6N for the SS. As with previous studies, the individual strength results showed a large degree of variability, even for the control situation. While the average change for strength was fairly small, the minimum change ranged from a gain of 23.6 Nm to a loss of 49.9Nm for the control, 2 individuals being identified as outliers for both the SS and PNF. The results are consistent with previous findings, with the outcome being dependent on the individual. The individual variability was less obvious during the agility test with the range between minimum and maximum change being under.

CONCLUSIONS: Stretching did not appear to be detrimental to strength or agility for the majority of the sample, however, the response to stretching appears to be related to the individual and is not consistent.

1816 Board #104 May 31 9:00 AM - 10:30 AM Effects of High-Intensity Exercise On The ROM Training Device On Muscular Strength and Body Composition
Hanno van der Loo, Eline M. van Es. TNO Defence, Security and Safety, Soesterberg, The Netherlands. Email: Hanno.vanderlo@tno.nl

The importance of exercise and physical activity for the maintenance and improvement of health and physical fitness is beyond discussion. However, people who do not allow themselves the time to engage in conventional, time consuming exercise programs. Time efficient training schedules could offer them a solution. High intensity - low volume exercise on the so called ROM training device has shown to increase VO2max and endurance capacity in healthy, untrained subjects.

PURPOSE: To investigate whether high intensity training on the ROM training device also has a positive effect on whole body strength, body weight and fat percentage.

METHODS: 16 healthy, untrained subjects (12 men, 4 women, mean age 36 ± 10 years) exercised on the ROM device for 8 weeks, 3 times a week. In every session, firstly the upper body was exercised for 4 minutes and then, after a short break, the lower body was exercised for the same length of time. The upper body exercise was more or less similar to rowing, with resistance in both movements of the upper body. The lower body exercise can be described as deep stepping. Subjects were encouraged to train at their maximal intensity. External resistance progressively increased over the weeks. Total net exercise time over 8 weeks was 3 hours and 12 minutes.

RESULTS: After the training period maximal isometric strength of 6 muscle groups (left and right arm flexors, arm extensors, trunk flexors, trunk extensors, leg extenders), body weight and fat percentage (Durin & Worpley displacerank) method were measured.

RESULTS: The average increase of isometric strength for the 6 muscle groups was 5.2% (p < .01). Fat percentage decreased significantly from 25.5 ± 5.5 to 24.6 ± 5.2% (p = .001). Body weight (kg) did not change (pre = 81.1 ± 13.0, post = 82.2 ± 13.0, p = .01).

CONCLUSION: High intensity exercise on the ROM training device has a small, but significant positive effect on whole body strength and body composition in healthy, untrained adults.

1817 Board #105 May 31 9:00 AM - 10:30 AM The Effect of Two Modes of Resistance Training on Cardiovascular Disease Risk Factors
Daniel J. Leib, Indiana University of Pennsylvania, Indiana, PA. (Sponsor: Dr. Michelle Pavone, Youngko, FACSM) Email: daniel leib@indiana.edu

PURPOSE: To determine the effects of two modes of circuit training on blood lipids in college-aged men and women.

METHODS: 14 college aged (18-24) subjects were recruited and randomly assigned into either the free-weight training protocol (6 FR) or machine training device (8 MA). Subjects were asked not to change their diet/ exercise. Subjects’ blood lipid profiles were ascertained using the Cholesterol LCD system before and after an 8-week circuit training protocol. Values measured were total cholesterol (TC), HDL, LDL, triglycerides (TG), and fasting blood glucose (GLU). Both FR and MA completed 1 circuit of 6 exercises the first week, 2 the second, and 3 for the remaining weeks. Pre and post - test comparisons were performed using independent t-tests in SPSS.

RESULTS: Both MA and FR combined showed a statistically significant decrease of 0.63 ± 0.15 mmol/L (p = .014) in TC and no change in other factors. LDL showed a near significant decrease (p = .060) of 0.9 ± 0.7 mmol/L. HDL, GLU, and TRG showed no change. For MA, only TC demonstrated a significant change (p = .035) of -1.15 ± -0.15 mmol/L. For FR, significance was not reached for any measure. Males (combined groups) showed near significance in TRG (p = .056) decreasing by 17.6 ± 27.38 mmol/L. Women (combined groups) showed significance in TC (p = .014) decreasing 18.17 ± 14.5 mg/dl and near significance in LDL (p = .176) at 8.5 ± 12.14 mg/dl and TRG (p = .088) at 59.17 ± 53.81 mg/dl. Body weight/ BMI did not change significantly over the course of the study.

CONCLUSIONS: Resistance training with either machines or free-weights appears to be a reasonable method of controlling blood lipids for apparently healthy college-aged women.

Further studies should focus on obtaining a larger sample size to determine if the nonsignificant found in this study were due to a non-significant effect or a small sample size.

1818 Board #106 May 31 9:00 AM - 10:30 AM Post-Activation Potentiation: Neurophysiology and Strength Performance
Jonathan P. Folland, Tomoyoshi Wakkara, Marius S. Finland. Loughborough University, Loughborough, United Kingdom. Email: j.folland@lboro.ac.uk

The contractile response of skeletal muscle is affected by its contractile history, including fatigue and post-activation potentiation (PAP). PAP is attributed to both muscle twitch potentiation (TP) and reflex potentiation (RP), and following high level muscle activity has been postulated to improve strength and power performance.

PURPOSE: To describe the temporal profile of TP and RP following maximum voluntary activation of the quadriceps femoris and assess if these changes influence strength performance.

METHODS: TP and RP were evaluated by changes in isometric muscle twitch force and the Hmax/Mmax ratio, respectively, for 18 min after: a period of rest (GND condition); a 10 s isometric maximal voluntary contraction (MVC, PAP condition) in eight recreationally active males.

RESULTS: In comparison to CON, the Hmax/Mmax ratio was potentiated for 5-11 min (p < .05) PAP, with the highest values recorded 3 min post (+42.4 ± 27% compared to mean of CON). TP was greatest 16 min after PAP (+57 ± 20% compared to CON), but remained elevated for 18 min (p < .05). Optimal PAP was arbitrarily decided to occur 5 min after PAP (+16%; RP: +30 ± 10%), and strength performance (isometric rate of force development and isometric torque at 4.19 rad/s–1) was measured at this time in

Abstracts were prepared by the authors and printed as submitted.
exercise training may decrease the risk of cardiovascular disease by reducing oxidative stress and improving endothelial function, and these mechanisms may be interrelated.

**PURPOSE:** The purpose of this study was to examine the effect of 12-weeks walking/running training in elderly women with angiotensin-converting enzyme (ACE) II+ID and ACE DD genotypes.

**METHODS:** The study was a randomized controlled trial. Elderly women (age 65-75 years) were randomly assigned to a placebo group or an exercise group. The exercise group performed 12 weeks of walking/running training three times a week. The placebo group did not participate in any physical activity. Oxidative stress and endothelial function were measured at baseline and after 12 weeks of training.

**RESULTS:** The exercise group showed a significant increase in endothelial function and a decrease in oxidative stress compared to the placebo group. The changes in endothelial function and oxidative stress were positively correlated with the duration of exercise training.

**CONCLUSION:** Exercise training is an effective way to improve endothelial function and reduce oxidative stress in elderly women.
short break, the lower body was exercised for the same length of time. The upper body exercise was done in a less rigorous manner, with only a limited number of movements used. The lower body exercise can be described as deep stepping. Subjects were encouraged to train at their maximal intensity. Total net exercise time over eight weeks was 12 hours and 12 minutes.

RESULTS: Changes in VO2max (36.6 ± 4.7 vs. 41.0 ± 4.8 mL·kg⁻¹·min⁻¹, p < 0.01) and Wmax (243 ± 64 vs. 272 ± 66 W, p < 0.01) increased significantly over the training period, while heart rate max (182 ± 8 vs. 181 ± 8 bpm) did not change. There was a significant increase of 72% in endurance time at 80% VO2max (14:53 ± 6:31 vs. 25:31 ± 11:57 min, p < 0.01).

CONCLUSION: Whole body, high-intensity training on the ROM training device is a time efficient way to improve VO2max and especially endurance capacity in healthy, untrained adults.

2008 Board #78 May 31 2:00 PM - 3:30 PM
Effect of Endurance Training on Cardiovascular Fitness, Body Composition, and Lipoprotein Profile in Postmenopausal Women
Zaizta A. Zaring, Jill A. Fattor, George A. Brooks, FACSM. UC Berkeley, Berkeley, CA.
Email: zaringb@crckley.edu

PURPOSE: We examined the effects of endurance training [12 wk, 5 days/wk, 1 h, 65% peak oxygen consumption (VO2peak) on changes in maximum oxygen consumption (VO2max), resting blood pressure (BP), resting heart rate, body composition, waist circumference, triacylglycerides (TG), total cholesterol (TC), high-density lipoprotein (HDL), and low-density lipoprotein (LDL)] in postmenopausal women (n=10, 55±0.61 yr).

METHODS: Ten postmenopausal women recruited for the study were sedentary (VO2max=1.69±0.08 L/min), normo/low density overweight (BMI=25.8±4.171), healthy, weight stable, did not have the metabolic syndrome, and were not taking estrogen or any other medications that could affect metabolism. The baseline measurements for blood pressure, triacylglycerides and lipoprotein levels were all within optimal range (mean BP=116.7±9.9 mmHg, mean TC=203.3±39.9 mg/dL, mean HDL=48±11 mg/dL, mean LDL=115 mg/dL). The exercise intervention was supervised and consisted of pedaling on a cycle ergometer 4 days/wk and walking on a treadmill 1 day/wk. The duration and intensity of exercise training was gradually increased such that by week 5 the subjects were exercising 5 days/wk at 65% of their VO2peak. Over the last four weeks of training, subjects did interval training on a cycle ergometer 1-2 days/wk.

RESULTS: The VO2max and the maximal workload increased significantly after training (+16%, p<0.05 and +25% respectively). The results of skin caliper measurements indicated a significant decrease in body fat percentage after training (p<0.05). While the results of the DEXA indicated a similar trend, the results did not reach significance (p=0.08). Resting blood pressure, resting heart rate, TG, HDL, and LDL did not significantly change after endurance training (p>0.05 for all variables).

CONCLUSION: These results suggest that in sedentary postmenopausal women with normal levels of TG, TC, HDL, and LDL, endurance training in the absence of weight-loss significantly increases VO2max and maximal workload. 2) A favorable trend in altering body composition and 3) does not have a significant effect on changing TG, TC, or the lipoprotein levels.

2009 Board #79 May 31 2:00 PM - 3:30 PM
The Effects of In-Home versus Facility Personal Training
Dianne Sykes, Lauren Probst, Robert M. Otto, FACSM, John W. Wygand, Adelphi University, Garden City, NY.

In recent years, several venues for personal training are available including small facilities that offer one-on-one training and personal trainers who are trained in HHD training clients in their houses. There is a paucity of data to support the efficacy of different settings relative to magnitude of change.

PURPOSE: To determine the effect of in-home (IH) versus facility (F) supervised exercise training.

METHODS: 14 clients (12 women and 2 men age 49.5±10.5 yrs) participated in the facilities (F) training trial and 10 women (age 46.5±10 yrs) participated in the in-home (IH) training trial. Both groups trained with a single personal trainer twice each week for 10 weeks. The pre- and post training data were collected: body mass (BM), skinfold thickness, percent body fat, body composition and segmental fat mass.

RESULTS: The following data were obtained:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline (mean ± SD)</th>
<th>Post-test (mean ± SD)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM (kg)</td>
<td>86.3 ± 15.2</td>
<td>83.5 ± 15.1</td>
<td>0.05</td>
</tr>
<tr>
<td>BF (%)</td>
<td>25.4 ± 5.0</td>
<td>23.1 ± 4.9</td>
<td>0.01</td>
</tr>
<tr>
<td>LE (kg)</td>
<td>22.0 ± 4.9</td>
<td>21.4 ± 4.8</td>
<td>0.05</td>
</tr>
<tr>
<td>12 cm</td>
<td>80.4 ± 10.3</td>
<td>77.6 ± 9.5</td>
<td>0.001</td>
</tr>
<tr>
<td>18 cm</td>
<td>16.9 ± 2.3</td>
<td>16.1 ± 2.1</td>
<td>0.001</td>
</tr>
<tr>
<td>24 cm</td>
<td>11.9 ± 1.9</td>
<td>11.2 ± 1.7</td>
<td>0.001</td>
</tr>
<tr>
<td>30 cm</td>
<td>7.2 ± 1.1</td>
<td>6.8 ± 1.0</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Statistical analysis by ANOVA (p<0.05) revealed significant changes for participants in body composition and mass, and in participants in a measure of cardiovascular function, which may in part be attributed to increased adherence. Exercise compliance was identical, with each group averaging 2 absences in ten weeks.

CONCLUSION: The ease of access to personal training (IH vs F) does not influence exercise compliance. In addition, changes in physiological measures can be clearly attributed to one specific mode of training.