



ACC.15

TCT@ACC-12 | innovation in intervention

A1199
JACC March 17, 2015
Volume 65, Issue 10S

Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

THE IMPACT OF DIFFERENT TYPES OF AEROBIC EXERCISE ON ENDOTHELIAL FUNCTION AND ARTERIAL STIFFNESS

Poster Contributions

Poster Hall B1

Sunday, March 15, 2015, 9:45 a.m.-10:30 a.m.

Session Title: Exercise and Imaging: Healthy and Unhealthy Adaptations to Exercise

Abstract Category: 20. Non Invasive Imaging: Sports and Exercise

Presentation Number: 1173-012

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Background: Chronic exercise training improves endothelial function in individuals with cardiovascular diseases. Endothelial function and arterial stiffness are key players in the pathophysiology of atherosclerotic disease. We investigated the acute effects of continuous moderate-intensity aerobic exercise (CAE) and high intensity interval aerobic exercise (hIAE) on endothelial function, central and peripheral arterial stiffness in healthy subjects.

Methods: Twenty healthy men (23 ± 3 yr) were recruited in this cross over study. They participated in two exercise sessions: a) CAE: volume at 50% of maximum aerobic work on a cycle ergometer for 30 min and b) hIAE: interval maximum aerobic work on a cycle ergometer for 30 min. Endothelial function was evaluated by flow-mediated dilation (FMD) in the brachial artery. Carotid femoral pulse wave velocity (cfPWV) was measured as an index of the central aortic stiffness, while femoral tibial PWV (ftPWV) was measured as an index of peripheral arterial stiffness. Measurements were carried out before and immediately after each exercise session.

Results: There was no statistically significant difference in baseline measurements of the participants before CAE and hIAE, concerning FMD, cfPWV and ftPWV ($p=NS$ for all). Importantly, both CAE ($8.57\pm 2.53\%$ vs. $6.37\pm 1.48\%$, $p<0.001$) and hIAE ($8.48\pm 2.59\%$ vs. $5.95\pm 1.77\%$, $p<0.001$) caused a significant improvement in FMD compared to baseline measurements. Moreover, CAE and hIAE had no impact in cfPWV, compared to baseline measurements ($p=NS$ for both). Interestingly, compared to baseline measurements, CAE ($8.17\pm 1.48\text{m/sec}$ vs. $9.26\pm 1.11\text{m/sec}$, $p<0.003$) and hIAE ($8.25\pm 0.80\text{m/sec}$ vs. $9.14\pm 1.07\text{m/sec}$ vs., $p<0.002$) significantly improved ftPWV.

Conclusion: Endothelial function is favorably affected by both continuous moderate-intensity aerobic exercise and high intensity interval aerobic exercise which may explain the cardioprotective effects of exercise on atherosclerosis progression. Interestingly, only peripheral arterial stiffness improved by both types of aerobic exercise. Further studies are needed to elucidate how different patterns of aerobic training can affect cardiovascular health.