

## **Relationships between peak oxygen uptake and arterial function: a preliminary study.**

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**INTRODUCTION:** Aerobic fitness, as measured by  $VO_{2peak}$ , is a well-validated predictor of morbidity and mortality in healthy individuals and those with cardiovascular disease. Resting arterial function, as indicated by carotid to femoral pulse wave velocity (cfPWV: arterial stiffness), and arterial structure as indicated by intima-media thickness (IMT), and carotid diameter (Dc), are correlated to cardiovascular risk. As alterations in arterial health likely impact aerobic capacity, identifying arterial parameters that predict cardiovascular fitness are necessary; however, this relationship has not been fully investigated.

**PURPOSE:** This preliminarily cross-sectional study examined the relationship between relative peak  $VO_2$  and resting arterial function of 51 subjects without overt cardiovascular disease (CVD) (mean age  $44.9 \pm 11.6$ ). **METHODS:**  $VO_{2peak}$  was assessed using a staged graded exercise test on a semi-recumbent bicycle until volitional fatigue. cfPWV was measured with Applanation tonometry; IMT and Dc were measured with B mode ultrasound. To account for individual differences in CVD risk each individual was assigned a metabolic risk score based on their age, sex, blood pressure, BMI, triglycerides, HDL, and glucose. **RESULTS:** Univariate regression models indicated that  $VO_{2peak}$  is significantly related to cfPWV [ $r = -0.43$ ,  $p = 0.002$ ], IMT [ $r = -0.46$ ,  $p = 0.001$ ], and Dc [ $r = -0.30$ ,  $p = 0.035$ ]. For multivariate analysis adjusted for age, sex, and metabolic risk scores,  $VO_{2peak}$  remained significantly related to cfPWV [ $r = -0.29$ ,  $p = 0.036$ ], IMT [ $r = -0.32$ ,  $p = 0.012$ ], and Dc [ $r = -0.25$ ,  $p = 0.037$ ]. **CONCLUSION:** Preliminary data suggest that peak oxygen uptake is independently correlated with arterial health in populations free of overt CVD. These results suggest that improving peak oxygen uptake may have a favorable effect on arterial function and vice versa.

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