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**Acute Effects of Maximal Endurance Exercise on Arterial Stiffness in Children, Adolescents and Young Adults**

*Müller J., Oberhoffer R.*

*Institute of Preventive Pediatrics, Technische Universität München, Germany*

**Objective:** Measures of arterial stiffness are surrogates for cardio-vascular health and predict cardiovascular events. Arterial stiffness is responsive to acute physiologic stressors like exercise. However, the acute effects of intensive exercise on post exercise arterial stiffness and associations to the fitness level measured by peak oxygen uptake are commonly unknown especially in the pediatric cohort.

**Patients and methods:** 119 healthy male children, adolescents and young adults (mean age  $16.3 \pm 5.4$  years, BMI  $19.7 \pm 2.6$  m<sup>2</sup>/kg) underwent evaluation of their arterial stiffness, as well as central and peripheral blood pressure after resting 5 minutes in supine position using the oscillometric Mobil-O-Graph. Afterwards they performed a cardiopulmonary exercise test (CPET). Finally, 5 minutes after terminating CPET a second measurement of arterial stiffness parameters was obtained.

**Results:** Measures of arterial Stiffness are increased 5 minutes after acute exercise. Systolic blood pressures was still increased ( $118 \pm 9$  mmHg to  $123 \pm 11$  mmHg;  $p < .001$ ) as well as central blood pressure ( $108 \pm 10$  mmHg to  $114 \pm 12$  mmHg;  $p < .001$ ). The stiffness parameters augmentation index ( $12.9 \pm 15.9\%$  to  $17.1 \pm 10.7\%$ ;  $p = .014$ ) and pulse wave velocity ( $5.0 \pm 0.46$  m/s to  $5.3 \pm 0.54$  m/s;  $p < .001$ ) were also still enhanced.

Unfortunately, no significant association of peak oxygen uptake to arterial stiffness at baseline or the change during exercise could be found after correcting data for age by partial correlation.

**Conclusions:** Arterial stiffness is increased shortly after maximal endurance exercise. However, no association could be found between exercise capacity, measures of arterial stiffness and changes in stiffness parameters after acute exercise. Longer post-exercise observation studies are needed to evaluate the effects of exercise on cardiovascular stiffness parameters that, maybe, are comparable to post-exercise hypotension.