

Carotid Artery Stiffness Decreases with Habitual Physical Activity in a Healthy Adult Population

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Habitual physical activity is believed to retard the atherosclerotic process by reducing established cardiovascular risk factors and by slowing aging of the arterial wall. Aim of the present study was to evaluate the effect of habitual physical activity on carotid artery structure and function in a healthy adult Caucasian population.

Our study cohort (from the RISC [Relationship between Insulin Sensitivity and Cardiovascular disease] Study) included 752 subjects, aged between 30-60 years (mean \pm SD=43 \pm 8), free of cardiovascular disease. All subjects were normotensive, their plasma lipid profile and fasting glucose levels were within normal limits, and their oral glucose tolerance test was normal. An ultrasound examination of the left common carotid artery (CCA) and an ACTIGRAPH recording of physical activity were performed according to standard protocols in 18 European centers. Carotid ultrasound images of left CCA were digitized and intima-media thickness (IMT) was measured by a single operator at the near and far wall, and the mean IMT CCA was calculated. In a subgroup of 531 subjects, systo-diastolic differences in left CCA diameter were measured on B-mode ultrasound images, 2 mm before the carotid bulb, in 5 consecutive cardiac cycles. Pressure-strain elastic modulus (Ep) was calculated as an index of carotid stiffness. ACTIGRAPH was worn for on average 5.5 days .

In univariate analysis, both CCA IMT and Ep were directly related to age, waist circumference, body mass index, systolic blood pressure, and plasma LDL cholesterol, glucose and insulin concentrations (with r 's=+0.16-0.41, p <0.001-0.0001), while they were lower in women and negatively related to ACTIGRAPH parameters (average number of counts per day worn or per minute worn) (with r 's=-0.11-0.25, p <0.01-0.0001). In multivariate analysis, age, waist circumference, LDL cholesterol and systolic blood pressure were independent predictors of CCA IMT, whereas sex, age, waist circumference, and physical activity parameters were independent predictors of Ep.

Conclusion: In an adult, healthy population, levels of habitual physical activity is independently associated with improved CCA compliance rather than CCA wall thickness.

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