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Associations Of Fitness, Physical Activity, And Fatness With A New Index Of Endothelial Function

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Abstract:

Current methods for assessing endothelial function, an early marker of cardiovascular disease (CVD), are either invasive or use noninvasive methods that are highly operator dependent or require nonreusable expensive probes, thereby limiting their use for CVD risk prediction. **Purpose:** To assess the relationship of fitness, physical activity (PA), and fatness, each a CVD risk factor, with a novel measure of endothelial function. **Methods:** This was a cross-sectional data analysis in adults recruited for a study examining the clinical utility of a new device that measures endothelial vasodilator function using a standard BP cuff. The resulting EnDys score is derived from direct calibrated measurements of brachial arterial compliance throughout the entire transmural pressure curve during a staged cuff release after 5 minutes of upper arm occlusion. A higher score means better endothelial function. Fitness was assessed by a 6-minute walk test (6MWT). Self-report of PA was assessed by the Rapid Assessment of Physical Activity tool. Body mass index (BMI) was used as a marker of general fatness and waist circumference (WC) as a marker of abdominal fatness. **Results:** In all 153 subjects, 51% were

female, 7% were smokers, 7% had CVD, and 10% had type 2 diabetes. The mean \pm SD for age was 49.3 ± 17.2 , EnDys was 80.8 ± 30.4 , BMI was 29.3 ± 6.9 kg/m², WC was 37.5 ± 6.7 inches, and 6MWT was 495.4 ± 113.5 meters. EnDys was higher in females, 87.6 ± 30.5 , vs males, 73.8 ± 28.9 , $p < 0.01$. EnDys did not differ by being sedentary, 80.8 ± 27.6 , or active, 81.0 ± 33.0 , $p = 0.97$. Using bivariate analysis, a lower EnDys was associated with higher BMI, $r = -0.23$, higher WC, $r = -0.33$, lower 6MWT, $r = 0.32$, and older age, $r = -0.20$, all $p < 0.02$ or less. In a multivariate model, 6MWT ($\beta = -0.06$, $p < 0.01$), WC ($\beta = -1.02$, $p < 0.02$), and sex (female, $\beta = 6.9$, $p < 0.01$) were each independently associated with EnDys. There were no interactions for sex with 6MWT and WC. **Conclusion:** Among measures of fitness, PA, and fatness, and in both sexes, a lower walking distance and a higher waist circumference were each independently associated with a lower EnDys, indicating worse endothelial function. A next logical step is to assess if EnDys improves with interventions like exercise and weight loss, thereby providing a novel and relatively simple way to track progress towards CVD risk reduction.

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Author Disclosure Information:

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