

Associations Between Leg Lean Mass and Arterial Function in Pre-Menopausal and Post-Menopausal Women.

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ABSTRACT

Vascular dysfunction has been associated to sarcopenia, the age-related impairment in skeletal muscle mass, strength, and performance, in postmenopausal women. Previous research has shown inverse relationships between leg lean mass (LM) and arterial stiffness (measured as carotid to femoral pulse wave velocity, cfPWV) or pressure wave reflection (augmentation index, AIx) in men and women. AIx is an appropriate vascular marker in young but not middle-age/older adults, especially in women.

Purpose: To examine the associations between leg LM and arterial function (cfPWV and aortic AIx adjusted to 75bpm (AIx@75)) in pre-menopausal (PRE-M) and post-menopausal (POST-M) women.

Methods: 47 women (24 PRE-M, age 36 ± 4 years; 23 POST-M, age 69 ± 4 years) participated in this study. Leg LM (expressed as kg/m^2) was measured by DEXA. cfPWV and AIx@75 were measured using applanation tonometry. The relationship between both cfPWV and AIx@75 to leg LM were analyzed using multiple linear regression analysis by each group. Results are reported as mean \pm SD and unstandardized regression coefficient (b). **Results:** cfPWV (9.0 ± 1.3 m/sec vs. 6.9 ± 0.9 m/sec, $p < .001$) and AIx@75 ($29.3 \pm 5.3\%$ vs. $18.1 \pm 8.7\%$, $p < 0.001$) were significantly greater in POST-M compared to PRE-M. Leg LM was significantly lower in POST-M compared to PRE-M (4.30 ± 0.32 kg/m^2 vs. 4.67 ± 0.47 kg/m^2 , $p = 0.003$). Leg LM was inversely associated with cfPWV ($b = -2.07$, $p = 0.02$) when adjusted for body mass index (BMI) in POST-M. This inverse association remained after adjustment for brachial systolic blood pressure (BSP), fasting blood glucose (FBG), and waist circumference (WC) ($b = -1.884$, $p = 0.02$). Leg LM was not associated with cfPWV in PRE-M. Leg LM was inversely associated with AIx@75 ($b = -9.95$, $p = 0.01$) in PRE-M when adjusted for BMI. The inverse association remained after adjusting for BSP, FBG and WC ($b = -10.52$, $p = 0.02$). No association was found between leg LM and AIx@75 in POST-M. **Conclusions:** Our findings suggest that low leg LM may adversely affect pressure wave reflection in PRE-M and aortic stiffness in POST-M. Future studies will be necessary to investigate the potential benefits of strength training on arterial function in non-obese POST-M and PRE-M.