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Arterial Stiffness and Wave Reflections Predict Postural Sway in Young Adults

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Vascular function is associated with many indices of physical function, including muscle strength, exercise tolerance and gait speed. Balance, measured as postural sway, is an important component of physical function that may be influenced by vascular function. Arterial stiffening and increases in pulsatile blood pressure may be detrimental to the structural and functional components of the brain that are important for postural control. Whether vascular function predicts postural sway is unclear. **PURPOSE:** To examine whether measures of vascular function predict postural sway in young adults. **METHODS:** 112 young adults (21.3±3.8 years; n = 78 women) participated in this study. Postural sway was measured in triplicate while participants stood on a foam surface with their eyes closed for 30 seconds. The average total center of pressure path length from the three trials was used for this analysis. Measures of vascular function were estimated using an oscillometric blood pressure device while at rest in the supine position. Vascular function measures included pulse wave velocity (PWV), augmentation index (AIx), pulse pressure (PP) amplification, and total vascular resistance (TVR). PWV, AIx, PP amplification and TVR were entered into a backward stepwise regression model to determine significant predictors of postural sway. **RESULTS:** The results from backward stepwise regression indicated that PWV (β = 0.194, p<0.05) and AIx (β = -0.316, p<0.01) significantly predicted postural sway, explaining 13.2% of the variance in postural sway. Variables not included in the model were PP amplification and TVR (p>0.05). **CONCLUSION:** PWV and AIx were found to be significant predictors of postural sway in young adults. These findings suggest that increased arterial stiffness may negatively influence balance, while wave reflections may be protective for balance. Arterial stiffening may lead to increases in pressure and flow pulsatility that could detrimentally affect the components of the brain important for postural control. In contrast, wave reflections may act as a buffer against forward pulsatile energy to help protect those components of the brain.

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