## Body Mass Index as an Independent Predictor of Change in Arterial Stiffness Parameters with Change in Body Position

*Elizabeth C. Schroeder, Thessa I.M. Hilgenkamp, Alexander J. Rosenberg, Daniel W. White, Tracy Baynard, & Bo Fernhall*

*University of Illinois at Chicago, Chicago, IL, United States of America*

Changing from supine to a seated position creates an orthostatic challenge due to the effects of gravity on the distribution of blood. This redistribution of volume unloads baroreceptors and may evoke sympathetic activation. The sympathetic activation may lead to increases in arterial stiffness, but it is unknown as to how different demographic variables may impact these changes.

**Objective**: To investigate whether the change in arterial stiffness parameters between two positions is influenced by factors such as age, sex, or body mass index (BMI).

**Methods**: Thirty healthy, young adults (24±4 years) were randomly positioned supine or semi-supine, at two different angles (0°,72°) on an adjustable table. After 5 minutes rest, arterial stiffness parameters of the common carotid artery were obtained via ultrasound: beta stiffness index, elastic modulus (Ep), arterial compliance (AC), and distensibility, as well as cardio-ankle vascular index (CAVI) from the VaSera (Fukuda Denshi, Tokyo, Japan). Linear regression was used on the change value for each arterial stiffness parameter adjusting for age, sex, BMI, and baseline values of each outcome measure.

**Results**: BMI was a significant independent predictor of changes in each measured arterial stiffness parameter after controlling for age and sex. Increasing BMI is related to greater changes in beta stiffness (β=0.55,p=0.001) and Ep (β=0.58,p=0.001) with change in position. Concomitantly, increasing BMI is associated with smaller changes in AC (β=-0.31,p=0.03), distensibility (β=-0.54,p=0.001), and CAVI (β=-0.48,p=0.001). Sex was only a significant independent predictor when assessing change in CAVI (β**=**-0.44,p=0.001).

**Conclusion**: When measuring arterial stiffness parameters in different positions, it is important to account for the effect of BMI in the analyses. Although obesity is associated with increased baseline sympathetic activity and reduced baroreceptor sensitivity, the change in position creates a larger change in arterial stiffness which may relate to the greater displacement of blood volume with a larger body size.