

A Systematic Review on the Effect of Acute Aerobic Exercise on Arterial Stiffness Reveals A Differential Response in the Upper and Lower Arterial Segments

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Objectives: The overall impact of resistance-type exercises and chronic physical activity on the modulation of arterial stiffness has been well characterized; however, the impact of acute aerobic exercise remains unclear. Therefore, we aimed to synthesize evidence pertaining to acute changes in arterial stiffness shortly following aerobic exercise in healthy individuals.

Methods: Electronic databases (MEDLine, EMBASE, Cochrane Library, Sport Discus, and Web of Science) were searched to identify articles assessing the effects of acute aerobic exercise on parameters of arterial stiffness. Eligible studies included arterial stiffness measurements before and after acute exercise in healthy adults, who were free of any cardiovascular risk factors, and were not taking cardioprotective medications.

Results: A total of 43 studies were included. The effect of acute aerobic exercise on arterial stiffness was found to be dependent on the anatomical segment assessed, and on the time at which the measurement was performed post-exercise. Arterial stiffness of the *central* and *upper body peripheral arterial segments* was found to be increased relative to resting values immediately post-exercise (0-5 minutes), while thereafter (>5 minutes) was decreased to a level at, or below resting values. In the *lower limbs*, proximal to the primary working muscles, arterial stiffness decreased immediately post-exercise (0-5 minutes), which persisted into the recovery period post-exercise (>5 minutes).

Conclusions: This systematic review reveals a differential response to acute exercise in the lower and upper/central arterial segments in healthy adult subjects. We further showed that the effect of acute exercise on arterial stiffness is dependent on the time at which the measurement is performed following acute aerobic exercise. Therefore, when assessing the overall impact of exercise on arterial stiffness it is important to consider the arterial segment being analysed and the measurement time point, as failure to contextualize the measurement can lead to conflicting results and misleading clinical inferences.