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# Relationship of breathing pattern with vascular tone and arterial stiffness in young healthy individuals

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## ABSTRACT

**Objectives:** A dynamic interaction exists between respiration, cardiovascular system, and autonomic nervous regulatory mechanisms as demonstrated by respiratory sinus arrhythmia. The vascular tone might also demonstrate a similar variability during inspiration and expiration. The breathing patterns by influencing the sympathetic outflow may have an impact on the vascular tone and hence cardiovascular system at large. The present study was undertaken to assess the quiet breathing pattern and its relation with vascular tone, hemodynamics, and arterial stiffness in normal young healthy individuals.

**Materials and Methods:** The study involved 46 young healthy adults (both males and females) aged 19–25 years. Breathing parameters included were respiratory rate (RR), inspiration time (IT), expiration time (ET), and inspiration-expiration ratio (I/E ratio). Vascular parameters included were reflection index (reflects vascular tone) and stiffness index (reflects arterial stiffness). Blood pressure (BP in mmHg) and heart rate (bpm) were measured.

**Results:** IT and ET were almost equal with no significant difference. ET was weekly correlated with diastolic BP ($r = -0.410$; $P = 0.058$) in females but not in males. Breathing pattern was not significantly associated with vascular tone and arterial stiffness.

**Conclusion:** IT, ET, I/E ratio, and RR were not significantly correlated with vascular tone and arterial stiffness suggesting that breathing does not influence the arterial health and function in young healthy individuals. There was a weak negative correlation between ET and diastolic BP in females but not in males, implicating the existence of fundamental differences in basic BP regulation between the sexes.

**Keywords:** Breathing pattern, Inspiration time, Expiration time, Respiratory rate, Vascular tone, Arterial stiffness