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Research article

Higher Cardiorespiratory Fitness in Older Trained Women is Due to Preserved Stroke Volume

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ABSTRACT

Previous literature has shown that sedentary older women rely on peripheral adaptations to improve cardiorespiratory fitness with endurance training i.e. they show minimal increases in central parameters (cardiac output, Q) in response to endurance training. The purpose of this study therefore was to determine whether endurance trained older women were able to preserve maximal exercise Q and were characterized by a high stroke volume (SV) when compared to physically inactive older women. Trained (n = 7) and untrained (n = 10) women attended two maximal and one submaximal laboratory session. Breath-by-breath analysis was conducted using mass spectrometry and Q was assessed using acetylene open circuit inert gas wash-in. Multivariate analysis of variance and paired samples t-tests were used to determine between and within group differences. Trained women had a significantly higher VO_{2max} (37.5 vs. 24.1 $ml^{-1} \cdot kg \cdot min^{-1}$) compared to untrained women. There were no differences for peripheral oxygen extraction (VO_2/Q) at either submaximal or maximal work rates; however trained women had a significantly higher SV at maximal (119.3 vs. 94.6 ml) exercise compared to untrained women. In both trained and untrained women, SV did not rise significantly between submaximal and maximal exercise. Conclusion: Highly fit, endurance trained older women are able to preserve central parameters of VO_{2max} . Peripheral oxygen extraction is similar between older trained and untrained women.

Key words: cardiac output, aging, exercise, running, VO

Key Points

- Older women are able to preserve stroke volume with high volumes of endurance training.
- Stroke volume of endurance trained older women does not continue to rise until maximal exercise, as is the case in young endurance trained adults.
- Peripheral oxygen extraction does not differ between endurance trained and physically inactive older women.

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