


Training for a First-Time Marathon Reverses Age-Related Aortic Stiffening

Anish N. Bhuva MBBS ^{a, b}, Andrew D'Silva MBBS ^{c, d}, Camilla Torlasco MD ^{b, d}, Siana Jones PhD ^a, Niromila Nadarajan MBBS ^a, Jet Van Zalen MSc ^b, Nish Chaturvedi PhD ^a, Guy Lloyd MD ^b, Sanjay Sharma MD ^c, James C. Moon MD ^{a, b}, Alun D. Hughes PhD ^a, Charlotte H. Manisty MD ^{a, b} 

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The Run Against Arterial Aging*

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Abstract

Background

Aging increases aortic stiffness, contributing to cardiovascular risk even in healthy individuals. Aortic stiffness is reduced through supervised training programs, but these are not easily generalizable.

Objectives

The purpose of this study was to determine whether real-world exercise training for a first-time marathon can reverse age-related aortic stiffening.

Methods

Untrained healthy individuals underwent 6 months of training for the London Marathon. Assessment pre-training and 2 weeks post-marathon included central (aortic) blood pressure and aortic stiffness using cardiovascular magnetic resonance distensibility. Biological “aortic age” was calculated from the baseline chronological age-stiffness relationship. Change in stiffness was assessed at the ascending (Ao-A) and descending aorta at the pulmonary artery bifurcation (Ao-P) and diaphragm (Ao-D). Data are mean changes (95% confidence intervals [CIs]).

Results

A total of 138 first-time marathon completers (age 21 to 69 years, 49% male) were assessed, with an estimated training schedule of 6 to 15 miles/week. At baseline, a decade of chronological aging correlated with a decrease in Ao-A, Ao-P, and Ao-D distensibility by 2.3, 1.9, and 3.1×10^{-3} mm Hg⁻¹, respectively ($p < 0.05$ for all). Training decreased systolic and diastolic central (aortic) blood pressure by 4 mm Hg (95% CI: 2.8 to 5.5 mm Hg) and 3 mm Hg (95% CI: 1.6 to 3.5 mm Hg). Descending aortic distensibility increased (Ao-P: 9%; $p = 0.009$; Ao-D: 16%; $p = 0.002$), while remaining unchanged in the Ao-A. These translated to a reduction in “aortic age” by 3.9 years (95% CI: 1.1 to 7.6 years) and 4.0 years (95% CI: 1.7 to 8.0 years) (Ao-P and Ao-D, respectively). Benefit was greater in older, male participants with slower running times ($p < 0.05$ for all).

Conclusions

Training for and completing a marathon even at relatively low exercise intensity reduces central blood pressure and aortic stiffness—equivalent to a ~4-year reduction in vascular age. Greater rejuvenation was observed in older, slower individuals.

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6 ~ 13 m c k / w

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23

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+

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