Respiratory muscle training improves endothelial function in healthy humans

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Aim: The study was aimed at evaluating the effects of respiratory muscle training (RMT) on endothelial function, assessed by flow mediated dilation (FMD), in young healthy individuals. The hypothesis was that RMT could enhance FMD by: i) reducing vessels shear stress; and ii) modifying the balance between sympathetic and parasympathetic neural drive.

Methods: Twenty-three physically active participants were randomly assigned to RMT (age 27±8 yrs, BMI 24±4 $kg \cdot m^{-2}$; RMT 3 times a week for 2 months, 15-30 minutes of progressive RMT assessed weekly) or sham group (age 33±11 yrs, BMI 24±4 $kg \cdot m^{-2}$; 3 times a week for 2 months of RMT-placebo). Maximum inspiratory pressure (MIP) and maximum voluntary ventilation (MVV) were utilized to assess the effectiveness of RMT. Endothelial function was determined by measuring vessel vasodilation (%FMD) normalized by the shear rate (%FMD/SR). Heart rate variability (HRV, the ratio between low and high frequencies) was utilized to assess the autonomic balance.

Results: After RMT, MIP and MVV increased significantly (+26% and +17%, respectively). Contrary to SHAM, RMT exhibited also a significant improvement in %FMD/SR from 0.044±0.023 to 0.058±0.026 (+30%). No changes in HRV were observed either in RMT or in SHAM.

Conclusions: According to our hypothesis, the present findings indicate a positive effect of RMT on endothelial function possibly trigged by a reduction in shear stress in the vessels but not by changes in autonomic balance.

References:

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