

Aquatic Treadmill Training Reduces Blood Pressure Reactivity to Physical Stress

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Turns out aquatic treadmill training really works. It lowers blood pressure better than land treadmills and increases an enzyme (endothelial nitric oxide synthase) that protects against vascular disease. When research compared water-based exercise with land based, these improvements only occurred in the aquatic test, not in the land test.

Researchers proposed that endurance exercise might reduce blood pressure and improve vasodilatory capacity, thereby blunting the hypertensive response (high blood pressure response) to physical stress. The researchers sought to test the efficacy of a novel model of low-impact endurance training - the aquatic treadmill (ATM), to test for improvements in blood pressure parameters.

The study included sixty sedentary adults that were randomized to 12 weeks for either aquatic treadmill, (36 subjects averaging 41 years), or land-based treadmill, (24 subjects averaging 42 years). The adults trained three sessions per week, progressing to 500 kcal per session at 85% $\dot{V}O_2\text{max}$.

The Maximal Bruce Treadmill Test protocol was performed before and after training with blood pressure measured before, at the end of each stage, and for 5 minutes after exercise testing. Twelve subjects volunteered for biopsies of the vastus lateralis before and after training. These muscle samples were assessed for presence of the endothelial nitric oxide synthase enzyme.

The results showed that aquatic treadmill exercise significantly reduced resting diastolic blood pressure (BP) by 3.2 mm of Hg (mercury). For exercise, systolic BP ranged 9–18.2 mm of Hg lower for each exercise stage and the diastolic BP ranged 3.2–8.1 mm of Hg lower. Mean arterial pressure was lower in aquatic treadmill exercise than for land-based treadmill exercise. Also, pulse pressure was lower in the aquatic group. In addition, a 31% increase in skeletal muscle endothelial nitric oxide synthase content after training ($P < 0.05$) occurred in only the aquatic group.

Of note, is the fact that a major weapon of endothelial cells to fight vascular disease is endothelial nitric oxide synthase (eNOS), an enzyme that generates the vasoprotective molecule nitric oxide (NO).

Conclusion: Aquatic treadmill training can reduce blood pressure reactivity to physical stress.

Water Works!

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