TACSM Abstract

Cardiovascular Adaptations Induced by Heat Acclimation/Acclimatization in Endurance Trained Athletes

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ABSTRACT

Heat acclimation/acclimatization (HA) is the improvement in heat tolerance that comes from gradually increasing intensity or duration of work in a hot background. HA reduces heat-mediates performance decrements while providing protection against exertional heat illness. **PURPOSE**: To assess and quantify the magnitude of cardiovascular adaptations induced by heat acclimation/acclimatization in endurance trained athletes. **METHODS**: A literature search was conducted using PubMed, SPORTDiscus, Scopus, and Cochrane- Library, with data from 23 studies being chosen for analysis. Subgroup analysis determined the differences in cardiovascular adaptations between short (≤7days; MTHA), medium (8-13 days; MTHA), and long-term HA (≥14 days; LTHA). **RESULTS**: HA (Heat Acclimation/Acclimatization) offered a moderate reduction in mean heart rate (HR) during exercise in the heat when established within short duration timeframes. Collectively, HA produced a non-significant, small reduction in resting HR (Effect size [95% confidence intervals], 0.23 [-0.08–0.55], $p > 0.05$). MTHA displayed a trivial reduction HR (-2 ± 2 bpm). STHA produced a small, but slightly greater effect (-3 ± 1 beats.min-1) Overall, HA generated a significant, moderate increase in resting plasma volume (0.62 [0.38–0.86], $p < 0.05$). MTHA increased resting plasma volume to the greatest extent (5.6 ± 3.8%), demonstrating a large, significant effect ($p < 0.05$). LTHA displayed a greater effect compared to STHA (0.66 and 0.46, respectively), although the percentage increase in the resting plasma volume was similar (3.7 and 3.8 ± 1.6%, respectively). **CONCLUSION:** HA offered a moderate reduction in mean HR during exercise. Increased heat exposure could offer greater cardiovascular adaptation potential. Cardiovascular adaptions are essential to athletic performance and health. Overall, HA produced a significant, moderate increase in resting plasma volume. These findings may explain the more prominent HR adaptations over longer HA observations across multiple studies. The moderate increase in plasma volume could be the cause of effectual regulation of blood pressure which consequently lowered resting heart rate.