

## The Effects of Hydration Status on Heart Rate Variability Following Supramaximal Intensity Exercise

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Category: Doctoral

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### ABSTRACT

Heart rate variability (HRV) is a non-invasive method used to monitor physiological stress via assessment of sympathetic and parasympathetic regulations and can indicate an individual's recovery and readiness to exercise. Evidence suggests dehydration negatively impacts HRV; however, the influence of hydration status on HRV following supramaximal resistance exercise (RE) is unknown. **PURPOSE:** To investigate the effect of hydration status on HRV indices following supramaximal intensity RE. **METHODS:** 14 recreationally resistance-trained men (age, 21 ± 2 years; height, 176.25 ± 5.84 cm; weight, 81.31 ± 12.77 kg) participated in this study. In a randomized, counterbalanced order, participants performed a supramaximal intensity RE protocol in a euhydrated (EUH; urine specific gravity [USG] < 1.020) and a dehydrated (DEH; USG > 1.020) state, with conditions separated by 2 weeks. HRV indices (standard deviation of normal sinus beats [SDNN], root mean square of successive differences between normal heartbeats [RMSSD], high frequency power [HF], low frequency power [LF], LF:HF ratio, standard deviation of Poincaré plot perpendicular to [SD1] and along the line of identity [SD2]) were measured with participants lying in a supine position for 5 minutes in a dark room at baseline, immediately post-, 1hr-, 2hr-, and 3hr post-RE. Repeated measure analysis of variance was used to determine the effect of hydration status on HRV indices at each timepoint, with Bonferroni corrections for post-hoc analysis. **RESULTS:** RMSSD was significantly higher 1hr post-exercise in EUH (30.69 ± 7.09 ms) compared to DEH (16.31 ± 2.44 ms;  $p = 0.04$ ). Similarly, HF power was significantly higher 1hr post-exercise in EUH (32.49 ± 4.12 %) compared to DEH (16.63 ± 2.71 %;  $p < 0.01$ ). In contrast, LF power was lower 1hr post-exercise in EUH (57.74 ± 3.62 %) compared to DEH (75.95 ± 3.42 %;  $p = 0.02$ ), with LF:HF ratio significantly lower in EUH (2.36 ± 0.62) than DEH (6.21 ± 1.34;  $p = 0.01$ ). SD1 was significantly greater 1hr post-exercise in EUH (21.74 ± 5.03 ms) than DEH (11.54 ± 1.73 ms;  $p = 0.04$ ). No significant condition by time effects were observed for SDNN and SD2, or at remaining timepoints. **CONCLUSION:** These findings indicate that recovery and readiness to exercise are impaired 1hr following supramaximal intensity RE in a dehydrated state. However, impairments were ameliorated 2-3hrs proceeding the RE bout.