Comparative Analysis of Heart Rate Variability Between Traditional Sets and Rest Redistribution

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ABSTRACT

Resistance exercise methods have different effects on the cardiovascular system. During skeletal muscular contraction, heart rate increases while heart rate variability (HRV) decreases. HRV is thought to represent the complex interaction between the sympathetic and parasympathetic branches of the autonomic nervous system. **PURPOSE:** This study analyzed heart rate variability during two methods of resistance exercise, traditional sets (TS) and rest redistribution sets (RR), both containing the same volume and total rest time. **METHODS:** Twenty-five participants (Mean ± SD: Age= 22.4 ± 3.7 y.; height = 167.5 ± 9.7 cm; body mass = 72.7 ± 14.7 kg) completed 40 repetitions of the barbell squat with 65% 1RM load. Participants completed TS (4 sets of 10 repetitions, 3-minute rest) and RR (10 sets of 4 repetitions, 1-minute rest), in a randomized order on separate days. HRV was collected from each participant using a heart rate monitor. The HRV was analyzed using a specialized software. Average windows were developed to calculate the root mean square of successive differences (RMSSD) between normal heartbeats and stress index (SI) at rest, during the exercise session, and during recovery. Log transformation was performed in the case of a violation of the normality assumption. Paired *t*-tests were used to compare RMSSD and SI responses at initial rest, during exercise and recovery between TS and RR. **RESULTS**: During the initial rest period, there were no statistical differences between RR and TS in RMSSD (p=0.36; 7.85 ± 44.2 vs. 9.14 ± 6.63, respectively or SI (p=0.81; 3.50 ± 0.43 vs. 3.41 ±0.60, respectively). However, there were statistical significance for both RMSSD (p<0.001) and SI (p<0.01) during the exercise (RMSSD for RR = 1.67 ± 0.54 and TS = 2.11 ± 0.87; SI for RR = 3.42 ± 0.45 and TS = 3.25 ± 0.5).There were no significant differences in RMSSD (p=0.44) and SI (p=0.52) between RMSSD for RR (2.06 ± 0.80) and TS (2.08 ± 0.90) as well as between SI for RR (3.27 ± 0.54) and TS (3.25 ± 0.56) during recovery. **CONCLUSION**: While the vagal response does not seem to be affected by training method during recovery, stress responses were higher during RR than TS exercise, as measured by HRV. Future studies can examine HRV behavior during exercise and establish its relationship to other physiological and perceptual markers.