

# Exercise heart rate recovery in obesity

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**Introduction:** Obesity is an epidemic that carries significant cardiovascular (CV) burden. Autonomic dysfunction, characterized by reduced vagal tone and sympathetic overactivity, has been found in diabetes, hypertension, heart failure, metabolic syndrome, and other conditions. Heart rate decrease after exercise, or heart rate recovery (HRR) reflects cardiac autonomic activity. Decreased HRR is a powerful predictor of CV disease, CV and all-cause mortality.<sup>1-3</sup>

**Patients and Methods:** A total of 54 obese patients (24% male, 76% female), age 22-66 (mean 47 year), BMI 29.4-53.3 (mean 40.3 kg/m<sup>2</sup>), were enrolled in a multidisciplinary weight management program. Treadmill testing was done initially and after 6-month follow-up. Standard Bruce protocol was used to assess exercise capacity and passive HRR (15 sec, 3 and 6 min into the recovery period, as per institutional protocol). Control group was composed of age- and sex-matched non-obese subjects.

**Results:** Obese subjects had significantly slower HRR (HRR0:15 6.1 vs. 9.1 BPM, HRR3:00 57.8 vs. 66.6 BPM, HRR6:00 63.3 vs. 72.7 BPM; p=0.0216, 0.0006, 0.0004, respectively). Exercise capacity was also significantly lower in comparison to control (6.7 vs. 8.6 METs; p=0.000001), with reduced exercise time (6.0 vs. 8.2 min; p=0.000001). Sixteen subjects that reached 6-month follow-up lost 5.4 kg on average. Exercise capacity increased mildly (6.4 to 7.1 METs; NS), as well as total exercise time (5.6 to 6.6 min; NS).

**Discussion and Conclusion:** Physiological HRR kinetics follows exponential decay function. Rapid first phase, mediated by vagal reactivation is followed by a gradual HRR decline, dominated by sympathetic withdrawal. We found significantly slower HRR over different time-points in the obese, which reflects autonomic imbalance. Functional aerobic capacity was also significantly reduced. Somewhat improved functional capacity and dynamics of HRR after weight loss did not reach statistical power. To conclude, we found evidence of significantly impaired cardiac autonomic function in obese subjects, together with reduced functional capacity. As the study is ongoing, we hope to demonstrate sustained effect of exercise and diet on autonomic function. Potential benefit on mortality and CV risk reduction should encourage patients and health care providers to manage obesity more vigorously.

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## LITERATURE

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