

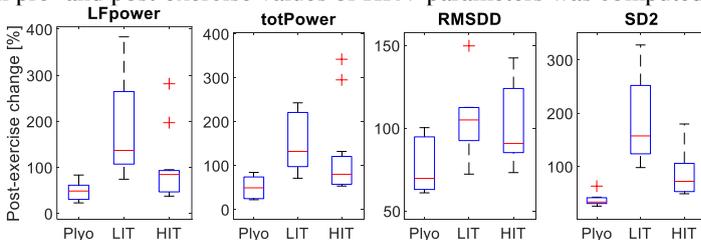
# Autonomic nervous system recovery after various exercises in highly trained athletes

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**Introduction:** Heart rate variability (HRV), expressed by the beat-to-beat variation in heart rate, offers a noninvasive indicator of autonomic nervous system (ANS) activity. Measurement of the ANS response is increasingly used to evaluate the effect of training load on the organism. Most authors compared only the impact of different types of running training session (TS) (e.g. low (LIT), high (HIT) intensity running TS), or separately plyometric TS on HRV. In this study, HRV was used to clarify how different types of running TS and plyometric TS influence post-exercise ANS response.

**Methods:** Fifteen highly trained athletes participated in this study. Each subject completed three types of TS - LIT running, HIT running and plyometric. Pre-exercise HRV measurements were taken for 5 minutes just before TS and post-exercise 5-10 minutes after TS. The pre-exercise and post-exercise HRV parameters: standard derivation of NN intervals, root mean square of successive RR interval differences (RMSSD), percentage of successive RR intervals differ by more than 50 ms and their number, low frequency power (LFpower), high frequency power, relative LFpower and HFpower, LF to HF ratio, total frequency power (totPower), Poincare plot standard deviations (SD1 and SD2) were calculated. Finally, the difference between pre- and post-exercise values of HRV parameters was computed.



**Results:** Statistically significant ( $p$ -value $<0.05$ ) parameters for distinguishing between TS were: totPower, LFpower, RMSSD and SD2. The box-plots are shown in Figure 1. All of these parameters showed the highest drop in values for plyometric training session. Plyometric TS had the most significant effect on the ANS, especially parasympathetic –significant parameters reflect mostly parasympathetic activity. It was proven that plyometric TS caused the highest load for organism. This should be considered when preparing a training plan.