*SWACSM Abstract*

# The Effectiveness of Running Power as a Metric of Exercise Intensity During Running Interval Training

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ABSTRACT

Wearable power meters are increasingly popular among runners with Coros and Stryd offering running power as a real-time, trackable of a metric. **PURPOSE**: This study compared running power (RP) to physiological measures, heart rate (HR) and oxygen consumption ($VO_2$), across high and low intensity running intervals. **METHODS**: Thirteen adult participants (n = 6 male; height = 174.9 ± 6.9 cm; mass = 72.5 ± 12.0 kg) were equipped with a Stryd 27 RP meter, a Polar H10 HR monitor, and a Cosmed K5 portable metabolic unit. Participants' self-selected RP was obtained during a 10-min run on an indoor track (10 laps/mile). After resting for five minutes, participants ran another 10 min, alternating between equal intervals of RP 20% higher and 20% lower than self-selected RP: 120 s × 2, 60 s × 2, 30 s × 4, and 15 s × 8. All devices were started simultaneously before each run. RP (W/kg) was sampled at 1 Hz. HR (bpm) and $VO_2$ (mL/kg/min) were sampled at 0.1 Hz throughout the interval run. Data were analyzed from the 60 s mark through the end of the run. HR and $VO_2$ data were interpolated to 1 Hz, and cross correlations (max lag = 60 s) were used to compare RP, HR, and $VO_2$ (mean values in Table 1). **RESULTS**: There were weak to moderate correlations between RP and $VO_2$ (r = 0.351; lag = -29.1 s), RP and HR (r = 0.475; lag = 9.38 s), and HR and $VO_2$ (r = 0.572; lag = -29.1 s; Table 2). **CONCLUSION**: HR showed the strongest correlation and smallest time delay with RP. This may be practically useful because HR data is more readily available to runners than $VO_2$. However, the correlation is only moderate. While related, the three metrics of running intensity are fundamentally different. When exercising at a moderate intensity, changes in HR or $VO_2$, which take seconds to minutes to stabilize, may be less evident than changes in mechanical power, which are immediate. Thus, it is possible that HR and $VO_2$ would show a stronger relationship with RP across intervals longer than the 120 s maximum observed here. While RP can be a useful metric, it may not be informative about physiological responses to running especially over short intervals or when running at high intensity.

**Table 1**. Averages during the interval run.

| | HR (BPM) | $VO_2$ (ML/KG/MIN) | RP (W/KG) |
|---|---|---|---|
| **MEAN** | 169.1 | 36.6 | 3.0 |
| **SD** | 16.2 | 7.0 | 0.6 |

**Table 2**. Average Cross Correlations

| | r | Lag (s) | r (lag = 0) |
|---|---|---|---|
| **RP & HR** | 0.475 | 9.4 | 0.424 |
| **RP & $VO_2$** | 0.351 | -29.1 | -0.0306 |
| **HR & $VO_2$** | 0.572 | -29.1 | 0.331 |