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Title: Reliability of a Running Power Meter between subsequent trials of submaximal running on three different surfaces

Authors: Mason J. Coppi, Randolph E. Hutchison, Lee F. Shearer, Nicholas R. Hayden, Frank Lara, Jake T. Ogden, Scott Murr, Eric Sobolewski (Sponsor: Anthony Caterisano, FACSM)

Running pace is one of the primary measures of running intensity, however, variations in grade and surface limit quantifying intensity solely based on pace. With the advent of wearable running power meters, runners can address the external work stimulus inclusive of pace, grade, and surface. **Purpose:** To address reliability, a running power meter was evaluated based on two trials of submaximal running on three different surfaces.

**Methods:** Eight collegiate cross country runners (male  $n=4$ , age= $21.25\pm 0.5$  yrs, weight= $63.45\pm 9.73$  kg, height= $178.5\pm 10.82$  cm; female  $n=4$ , age= $20\pm 1.41$  yrs, weight= $56.45\pm 4.95$  kg, height= $169.5\pm 7.969$  cm) participated in two trials of submaximal running at 85% of lactate threshold (LT) on each of three different surfaces: treadmill, grass, and track. Subjects first completed an LT test to determine submaximal running speed with lactate collected and analyzed (Lactate Pro) via blood samples taken by finger prick. During subsequent submaximal running trials, ventilatory measures and heart rate (HR) were collected with a portable breath by breath analyzer (COSMED K4B2) and HR monitor (Polar). Speed was controlled by a rider on a bicycle that was equipped with a speedometer and cadence meter. Intraclass correlations were run between trials 1 and 2 on all surfaces including treadmill, track and grass. **Results:**  $VO_2$ , HR, and running power were all reliable between trials 1 and 2 on the 3 different surfaces ( $VO_2$ :  $r_{\text{treadmill}}=0.980$ ,  $r_{\text{grass}}=0.876$ ,  $r_{\text{track}}=0.977$ ; HR:  $r_{\text{treadmill}}=0.938$ ,  $r_{\text{grass}}=0.978$ ,  $r_{\text{track}}=0.981$ ; Power<sub>1</sub>:  $r_{\text{treadmill}}=0.995$ ,  $r_{\text{grass}}=0.999$ ,  $r_{\text{track}}=1.00$ ; Power<sub>2</sub>:  $r_{\text{treadmill}}=1.00$ ,  $r_{\text{grass}}=1.00$ ,  $r_{\text{track}}=1.00$ )

**Conclusions:** The results support that the Stryd running power meter can reliably measure power for multiple trials of submaximal running on three different surfaces including treadmill, grass, and track.