



The Relationship Between Countermovement Jump Force-Time Characteristics and 2,000-meter Rowing Ergometer Performance

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Purpose

- The primary aim of this study was to evaluate the relationship between rowing ergometer performance and countermovement (CMJ) performance and its associated force-time curve characteristics related to force, power, and impulse.

Methods

- n = 30; male and female 18-49 years old participating at the 2023 US Rowing Atlantic City Indoor National Championships
- During the competition weekend athletes completed 3 vertical CMJ’s on VALD ForceDecks (force plates) at a sampling rate of 1,000 Hz.
- 2,000-meter rowing ergometer performance time was converted to watts and compared to CMJ variables of interest: concentric mean force (N), concentric mean power (W), concentric peak force (N), jump height (imp-mom) (cm), peak power (W), countermovement depth (cm), and positive impulse (N • s).
- All variables of interest were tested for normality using the Shapiro-Wilk test. Values were rounded up to the nearest hundredth. Statistical significance was set at $p \leq 0.05$.

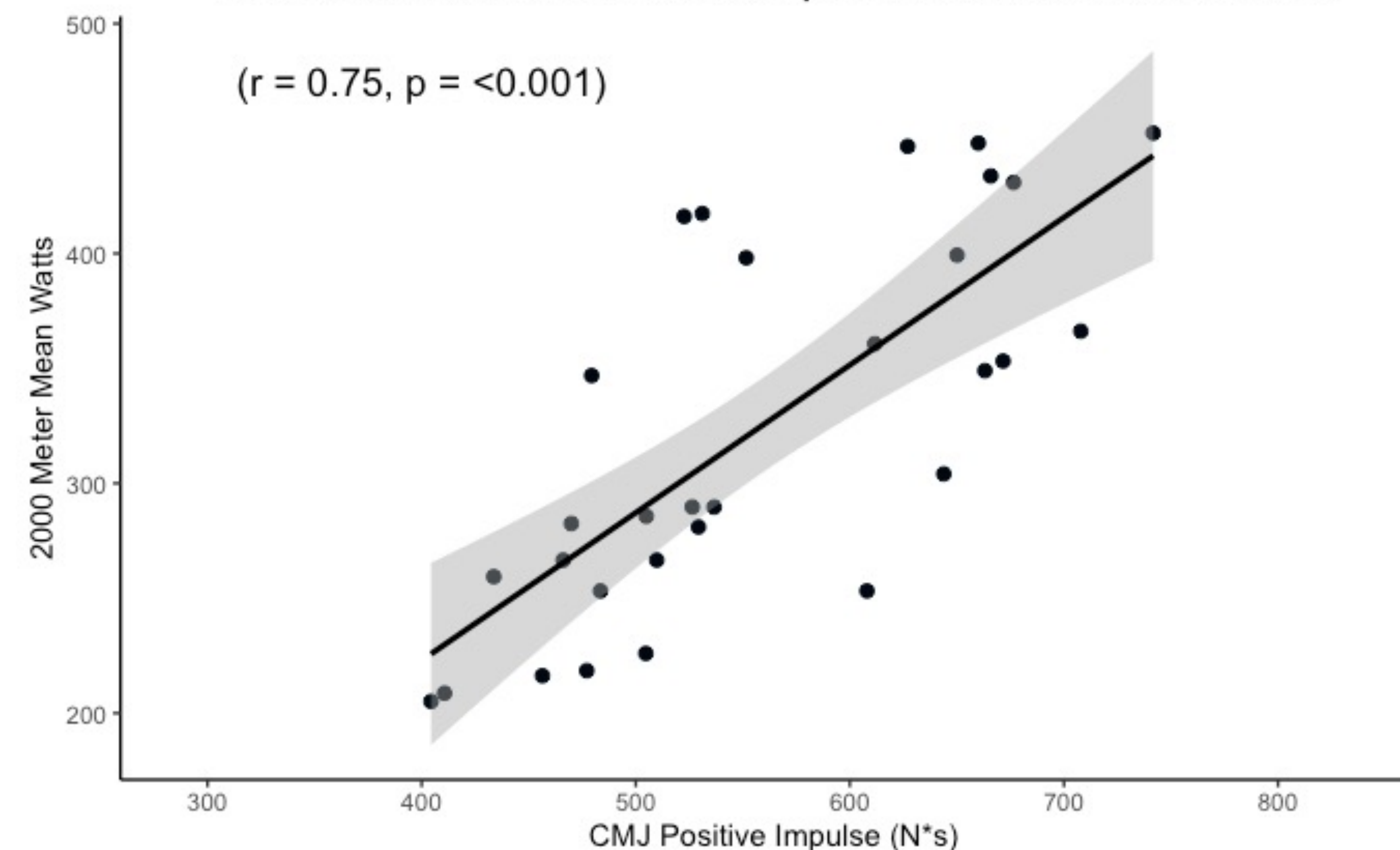
Results

Correlations Between 2,000-meter mean (Watts) and CMJ Variables

Variable	Pearson r	p-value
Concentric Mean Force (N)	0.65	< 0.001
Concentric Mean Power (W)	0.58	< 0.001
Concentric Peak Force (N)	0.61	< 0.001
Jump Height (Imp-Mom) (cm)	0.06	0.769
Peak Power (W)	0.61	< 0.001
Countermovement Depth (cm)	-0.31	0.101
Positive Impulse (N • s)	0.75	< 0.001

Bold values indicate a strong relationship. Correlation coefficients are classified as weak, $r = 0.1 - 0.39$, moderate, $r = 0.4 - 0.69$, strong, $r = > 0.7$

Correlation Between CMJ Positive Impulse and 2000 Meter Mean Watts



Conclusions

The force-time characteristics related to positive impulse and concentric mean force indicate a strong and moderate relationship to 2,000-meter rowing ergometer performance. These CMJ variables should be monitored longitudinally to see if increases in these variables coincide with improved 2,000-meter rowing performance. Jump height was not correlated to 2,000-meter rowing ergometer performance which contradicts previous research (1).

Practical Application

The CMJ variables of Positive Impulse and Concentric Mean Force should be monitored longitudinally to see if increases in these variables coincide with improved 2,000-meter rowing performance. This study supports that 2,000-meter rowing ergometer performance can be improved through endurance training and strength training (2,3).

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