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Greater relative anaerobic contribution to 1500 m than 2000 m maximal ergometer rowing performance

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INTRODUCTION:
World Rowing recently announced that the official Olympic racing distance for the 2028 Olympic Games will be shortened from 2000 m to 1500 m [1], which has implications for competition preparation and race performances. Previous studies have estimated that the anaerobic energetic contribution to 2000 m ergometer rowing performance ranged 12-30% [2]. The shorter event distance means that energetic contribution to performance may differ compared to the traditional distance, yet has never been quantified. Therefore, this study aimed to compare energetic contribution to 2000 m and 1500 m maximal ergometer rowing.
METHODS:
On separate visits (>48 h apart, random order), eighteen trained junior (16.9 ± 0.5 y) male rowers (maximal oxygen uptake: 56.1 ± 5.0 mL/kg/min) completed three trials on a rowing ergometer: 1) 7x4 min graded exercise test to determine the relationship between power output and oxygen uptake; 2) a maximal 2000 m time trial (TT); 3) a maximal 1500 m TT. Respiratory gases were measured continuously by a metabolic cart. The power to rate of oxygen consumption relationship from the graded exercise test was used to determine the accumulated oxygen deficit or each TT. A repeated-measures ANOVA was used to detect differences, with effect sizes (ES) expressed as partial-eta squared, in mean power output, anaerobic contribution, maximum heart rate, rate of perceived exertion, and post-effort blood lactate concentration between TTs.
RESULTS:
Completion times were 6:51.3 ± 0:10.2 and 5:03.6 ± 0:08.0 min for 2000 m and 1500 m TTs, respectively. Mean power output was lower for 2000 m (324 ± 25 W) than 1500 m (341 ± 28 W) TT ($p<0.001$, ES=0.70). Anaerobic contribution was significantly greater for 1500 m than 2000 m TT (15.2 ± 4.7 vs. 9.8 ± 3.6%; $p<0.001$, ES=0.71). Compared to 1500 m TT, heart rate (190 ± 6 bpm vs. 192 ± 6 bpm; $p = 0.032$, ES = 0.24), rate of perceived exertion (18.7 ± 1.3 au vs. 19.3 ± 0.7 au; $p = 0.023$, ES = 0.27) and blood lactate concentration (10.7 ± 2.7 vs 12.9 ± 2.6 mmol/L; $p = 0.003$, ES = 0.41) were all significantly higher for 2000 m TT.
CONCLUSION:
This study identified a significantly greater (+5.4%) relative anaerobic contribution to the maximal performance of a 1500 m ergometer TT, which coincided with a ~5% increase in mean power output and approximately 100 s decrease in performance time, compared to a 2000 m TT. In the lead up to the 2028 Olympic Games, these findings may provide evidence for a required change in how elite rowers prepare for optimal performance. Coaches and athletes should consider whether changes to their pacing strategies, technical set up (such as gearing), and training periodisation toward the adoption of more high-intensity training may aid performance in the shorter race distance where anaerobic contribution appears greater. Future research should investigate physiological differences between maximal on-water 1500m and 2000m rowing.

1. Astridge et al. (2022) 2. De Campos Mello et al. (2009)

Topic: **Training and Testing**

Presentation **Oral**