

POSTER PRESENTATION

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# Contribution of aerobic and anaerobic capacity to 2000 m rowing performance

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## Background

Previous studies strongly have supported importance of aerobic capacity for 2000m rowing performance [1-3] and there are few studies that demonstrated anaerobic capacity had critical role in rowing performance [4-6]. The purpose of the present study is to investigate the relationship between 2000m rowing performance and anaerobic capacity, which were estimated by critical power (CP) model [7,8] and by all-out tests of short duration as well. We also examined aerobic capacity.

## Subjects and methods

Nine male collegiate rowers (age:  $20.0 \pm 1.0$  yrs, height:  $174.5 \pm 4.5$  cm, weight:  $70.1 \pm 7.5$  kg) performed 1) incremental exercise tests to determine  $VO_{2max}$ , 2) CP test (400m, 600m, 800m and 1000m), and 3) 2000m test. For each subjects, the amount of work (power  $\times$  time) was plotted against exercise time. The CP was determined as the slope of the linear regression between the work and time. The anaerobic work capacity (AWC) was determined as the y-intercept of the linear regression. AWC was evaluated with standard error of estimation (SEE) [8] for the sake of accurate observation. If SEE of regression line was greater than 10 % of AWC, it was recalculated except one trial that had largest error.

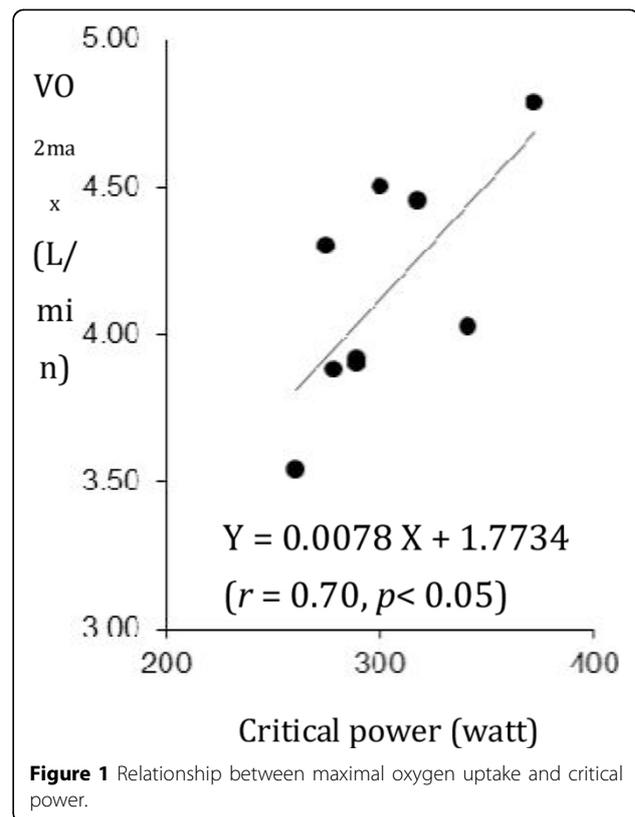
## Results

CP ( $302.7 \pm 35.2$  watt) was correlated with  $VO_{2max}$  ( $4.1 \pm 0.4$  L  $\cdot$  min<sup>-1</sup>,  $r = 0.70$ ,  $p < 0.05$ , Figure 1) and power output during 2000 m test (P2000,  $326.9 \pm 29.3$  watt,  $r = 0.86$ ,  $p < 0.01$ , Figure 2). AWC ( $11.4 \pm 3.8$  kJ) was not correlated with P2000 ( $r = 0.33$ ). Our data demonstrated that there was significant correlation

between AWC and residual error between CP and P2000 ( $r = 0.79$ ,  $p < 0.01$ , Figure 3).

## Discussion

These results are in accordance with the established interpretation by which contribution of aerobic capacity to rowing performance are well recognized [1-6]. However, our data suggest that anaerobic capacity estimated by AWC also have a pivotal role for rowing performance. Since CP and AWC are affected by familiarity of



**Figure 1** Relationship between maximal oxygen uptake and critical power.

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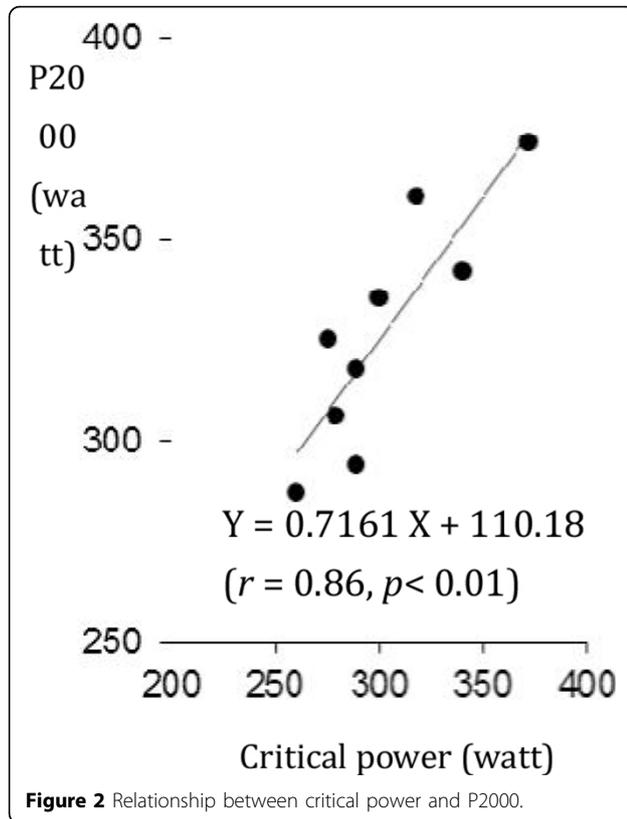


Figure 2 Relationship between critical power and P2000.

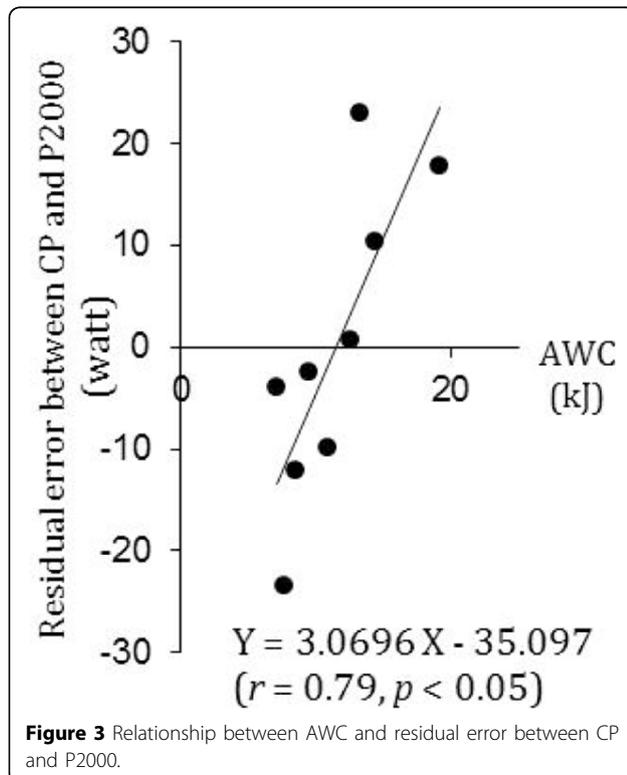


Figure 3 Relationship between AWC and residual error between CP and P2000.

subject to intensive exercise [8] and physiological condition such as fatigue caused by consecutive training sessions, examination of anaerobic capacity might predict rowing performance more precisely in practical competitive situation.

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