

Updated Wingate Anaerobic Power Test Norms

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ABSTRACT

Wingate anaerobic power testing is a widely accepted lab test to measure an individual's ability to generate leg power on a cycle ergometer at a high rate for a 30 second period of time, similar to power demands in many American sports. Subjects in the study are college-age individuals of both genders, typically kinesiology students. Peak power, peak power relative to body weight, average power, and average power relative to body weight were analyzed. Peak power for both genders showed greater values than previously published data. Only female subjects showed a significant negative relationship between body weight and relative peak power. We conclude that mean values for Wingate data at UWEC are substantially higher than mean values for currently accepted norms.

INTRODUCTION

Wingate anaerobic testing is a widely accepted lab test to measure an individual's ability to generate power at a high rate for a 30 second period of time, similar to power demands in many American sports. The Wingate tests are completed on stationary cycle ergometers specially adapted to instantaneously apply the workload. Modern ergometers and software make it easy to conduct these tests and quickly compute the results.

The few available norming charts have been created using surprisingly few subjects, typically under 70. Additionally, the charts are nearly twenty years old. Because the UWEC Human Performance Lab tests and then evaluates the results of Wingate tests, we felt it necessary to update and expand the norming charts. Furthermore, we hypothesized that UWEC group means for both genders will be higher than available norms.

METHODS

All subjects had been tested on Monark Peak bikes and Monark Anaerobic Test Software version 1.0. Data was retrieved for retrospective analysis from the Monark database. Subjects in the study are college-age individuals, typically kinesiology students in exercise physiology classes with varied exercise habits. Peak power (Watts), peak power relative to body weight (Watts/kg), average power (Watts), and average power relative to body weight (Watts/kg) were analyzed using Microsoft Excel and SPSS 15.0. Mean, standard deviation, and percentile rank for both absolute power and power relative to body weight were calculated in each gender.

PURPOSE

The purpose of this study was to create current, local anaerobic power norms using retrospective data of subjects measured in the UWEC Human Performance Lab over two years time.

RESULTS

Table 1 shows peak power (Pk-AnP) in Watts and peak power relative to body weight (Rel-Pk-AnP) in Watts/kg for males as compared to the previous data.

Table 2 shows peak power (Pk-AnP) in Watts and peak power relative to body weight (Rel-Pk-AnP) in Watts/kg for females.

Table 1. Males

| %ile | Pk-AnP (UWEC) | Pk-AnP (Previous) | Rel-Pk-AnP (UWEC) | Rel-Pk-AnP (Previous) |
|------|---------------|-------------------|-------------------|-----------------------|
| 95 | 1184 | 867 | 12.9 | 11.1 |
| 75 | 953 | 768 | 11.6 | 10.4 |
| 50 | 874 | 689 | 10.2 | 9.2 |
| 25 | 721 | 646 | 9.3 | 8.3 |
| Mean | 854.8 | 699.5 | 10.4 | 9.2 |

Table 2. Females

| %ile | Pk-AnP (UWEC) | Pk-AnP (Previous) | Rel-Pk-AnP (UWEC) | Rel-Pk-AnP (Previous) |
|------|---------------|-------------------|-------------------|-----------------------|
| 95 | 690 | 602 | 10.0 | 9.3 |
| 75 | 564 | 518 | 8.7 | 8.6 |
| 50 | 498 | 449 | 7.7 | 7.6 |
| 25 | 441 | 396 | 6.7 | 6.8 |
| Mean | 507.5 | 454.5 | 7.8 | 7.6 |



SUMMARY AND CONCLUSIONS

The new data is substantially different than the previous charts. For example, our peak power for males was approximately 150 Watts higher at the mean (855 Watts versus 700 Watts). For the female data, the peak power was approximately 60 Watts higher. When expressed relative to body weight, males showed larger values compared to previous testing, from 11.1 to 12.9 Watts/kg. Females showed only slightly higher values, at 7.8 as compared to 7.6 Watts/kg.

There is no significant correlation in males between body weight and relative peak power (Watts/kg). There was a weak but significant correlation ($r = -.28, p < 0.01$) for females between body weight and relative peak power (Watts/kg). This would suggest that as body weight increases, it is less common for females to maintain a good power to weight ratio.

Future work in anaerobic power testing could test several hypotheses. For instance, maybe our population of students is indeed more powerful than a generation ago. However, it is possible that our selection of subjects (kinesiology majors) was across the board more athletic than subjects of previous studies. It is also possible that the current model of cycle ergometer, with electronic interface to a computer, gives somewhat higher results than the more crude manual methods of the past.

REFERENCE

Maud, P. J. and Schultz, B. B. (1989). *Research Quarterly for Exercise and Sport* 60, 147.