



Effects of Varying Load During A Wingate Test

Author: Bobbie Cooks, KINE 4400
Sponsor: Judy R. Wilson, Ph.D.
Cardiovascular Research Laboratory, The University of Texas at Arlington, Arlington, TX;



Abstract

Effects of Varying Load During A Wingate Test
Author: Bobbie Cooks
Faculty Sponsor: J.R. Wilson, Ph.D.

INTRODUCTION: The Wingate Anaerobic Test (WAnT) also known as Wingate test is used for athletes to assess peak anaerobic power, anaerobic fatigue, and total anaerobic capacity. It is crucial in determining physiological profiles, training programs, and assessing human muscle capacity. The test requires the subject to pedal a mechanically braked bicycle ergometer for 30 seconds at an "all out" pace. They are advised to complete a 3-5 minute warm-up followed by a 1-2 minute cool down. Research shows that, depending on the study, and subjects, there are differences in results based on the resistance they pedal against.

PURPOSE: The specific purpose of this research study was to determine the effects of two different breaking loads during a Wingate test.

METHODS: Five women (W; age 22 ± 3yrs) students of The University of Texas at Arlington volunteered to participate in this study. Each subject came to the research laboratory on two different occasions at the scheduled time and the test was explained to them. Data was collected including: height, weight, and age. The resistances were a torque factor of 0.60 and 0.67. The order of the two different resistances was randomized among the subjects. The seat on the cycle was adjusted for each subject's leg length. Subjects pedaled for 1 min during a warmup of easy cycling before the resistance was increased. With the command "start," the subject pedaled as fast as possible against the resistance and was encouraged to pedal as hard and fast as they could for 30 seconds. They were not allowed to stand up during the 30 second test. The resistance was automatically removed at the end of 30 seconds. Resistance was removed and the subject continued to pedal as long as needed to cool down. During each test peak power, minimum power, fatigue slope, mean power, and peak power (body mass) were recorded. They were then scheduled to return to perform the WAnT using the second resistance.

RESULTS: At a torque factor of 0.60 [Nm/Kg] the means of each variable were calculated as follows: Peak Power 552±105.4, Mean Power 310±42.2, Minimum Power 135.8±60.5, Peak Power/Body Mass 8.5±0.3, and Fatigue slope 2.1±3.1. At the torque of 0.67 [Nm/Kg] Peak Power 523.3±102.5, Mean Power 288.9±41.6, Minimum Power 111±52.7, Peak Power/Body mass 8±0.59, Fatigue slope 2.6±2. Results show no significant difference between the two resistances (p>0.05).

CONCLUSION: The results of this study indicated that there was no significant difference in peak power, minimum power, mean power, peak power/BM, and fatigue slope when changing the resistance.

Purpose

The specific purpose of this research study is to determine the effects of 2 different breaking loads during a Wingate test.

Methods

- Subjects**
- 5 Healthy women ages 22 ± 3yrs
- Students of The University of Texas at Arlington
- Physically active on a least 3 days of the week

- Protocol**
- Each subject came to the research laboratory on two different occasions at the scheduled time and the test was explained to them.
- Data was collected including: height, weight, and age.
- The resistances were a torque factor of 0.60 and 0.67.
- The order of the two different resistances was randomized among the subjects.
- The seat on the cycle was adjusted for each subject's leg length.
- Subjects pedaled for 1 min during a warm-up of easy cycling before the resistance was increased.

Methods (cont'd)

- With the command "start," the subject pedaled as fast as possible against the resistance and was encouraged to pedal as hard and fast as they could for 30 seconds.
- They were not allowed to stand up during the 30 second test.
- The resistance was automatically removed at the end of 30 seconds.
- Resistance was removed and the subject continued to pedal as long as needed to cool down.
- During each test peak power, minimum power, fatigue slope, mean power, and peak power (body mass) were recorded.
- They were then scheduled to return to perform the WAnT using the second resistance.



Results

| Table 1. Demographics | | |
|-----------------------|--------|--------|
| Variable | Mean | SD |
| Age (yrs) | 22 | ±1.79 |
| Height (inch) | 63.33 | ±2.58 |
| Weight (lbs) | 142.83 | ±22.61 |

Results (cont'd)

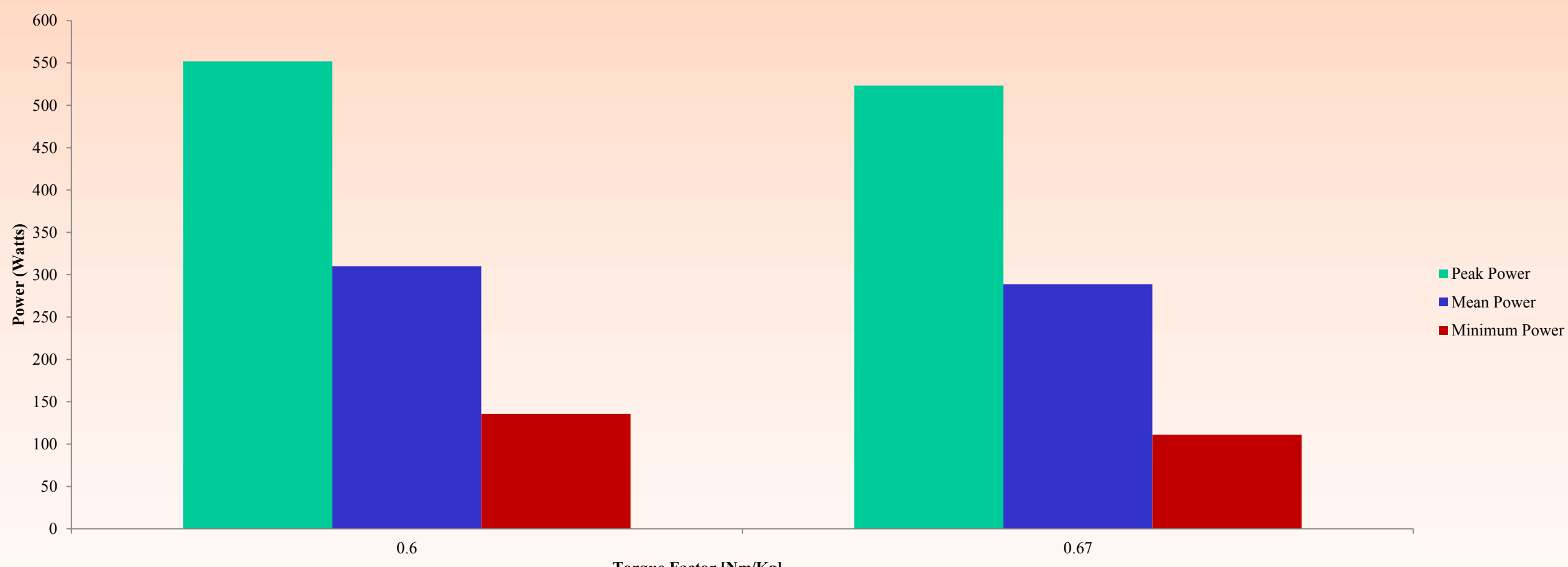


Figure 1: Comparison of Peak Power, Mean Power, and Minimum Power at 0.60[Nm/kg] and 0.67[Nm/Kg]

| Table 2. Means and Standard Deviations | | | | | |
|----------------------------------------|-------|--------|--------------------|--------|--------|
| Torque Factor 0.60 | | | Torque Factor 0.67 | | |
| Variables | Mean | SD | Variables | Mean | SD |
| Peak Power | 552 | ±105.4 | Peak Power | 523.33 | ±102.5 |
| Mean Power | 310 | ±42.2 | Mean Power | 288.94 | ±41.6 |
| Minimum Power | 135.8 | ±60.5 | Minimum Power | 111 | ±52.7 |
| Peak Power / BM | 8.5 | ±0.3 | Peak Power / BM | 8.05 | ±0.6 |
| Fatigue Slope | 2.1 | ±3.1 | Fatigue Slope | 2.65 | ±2 |

PARVO 2 Analysis

- Peak Power: p= 0.63, p>0.05
- Mean Power: p= 0.50, p>0.05
- Minimum Power: p=0.45, p>0.05
- Peak Power/BM: p=0.08, p>0.05
- Fatigue slope: p=0.66, p>0.05
- Significant difference was not found between the values of power and resistance

Conclusions

The results of this study indicated that there were no significant differences in peak power, minimum power, mean power, peak power/BM, and fatigue slope when changing the resistance. This does not support previous literature, however, the variation in resistances in that study were much greater than those used in the current study.