



Effects of Compression Shorts on Thermoregulation During Maximal Exercise

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Abstract

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INTRODUCTION: In response to exercise, heart rate, systolic blood pressure, breathing rate, oxygen consumption and body temperature increase. Since the body is homeothermic and attempts to remain in a narrow range of temperatures, the body attempts to regulate the temperature during exercise. Clothing insulates the body and reduces evaporation which is the main process of heat loss during exercise. Clothing fabrics such as compression have been advertised to promote cooling, improve performance and result in a faster recovery.
PURPOSE: The purpose of this study was to determine if wearing compression shorts during maximal exercise affects the body's ability to regulate temperature.
METHODS: Five subjects (22.8±1.3 yrs., 63.4±1.14 in, 147.6±22.1 lbs.), all female UTA students, volunteered to participate in this study. Each subject had resting heart rate (RHR), blood pressure (BP) and body temperature measured. Each subject performed an incremental maximal oxygen consumption (VO_{2max}) cycle test which included maintaining 50 rpm with a resistance that started at 50Watts and increased every three minutes until exhaustion. A mouth piece and headgear were worn during each test to measure respiratory values. Heart rate (HR) was recorded each minute from a chest strap and every three minutes the subject's blood pressure (BP) and body temperature (T) were measured.
RESULTS: The maximal values: T (cotton: 37.05 ±0.26 °C, compression: 36.95 ±0.32 °C); HR (cotton: 168.4 (±7.92) bpm, compression: 169 (±11.81) bpm); SBP (cotton: 136.8 ±4.60 mmHg, compression: 135.6 ±5.18 mmHg); VO₂ (cotton: 26.96 ±3.73 ml/kg/min, compression: 26.36 ±3.60 ml/kg/min) were not significantly different between cotton and compression shorts (p>0.05).
CONCLUSION: The results of the study indicate that there was no significant difference between the body's ability to regulate core temperature during maximal exercise which was measured by body temperature. The results could be attributed to a limited number of participants, human error, and mode of exercise.

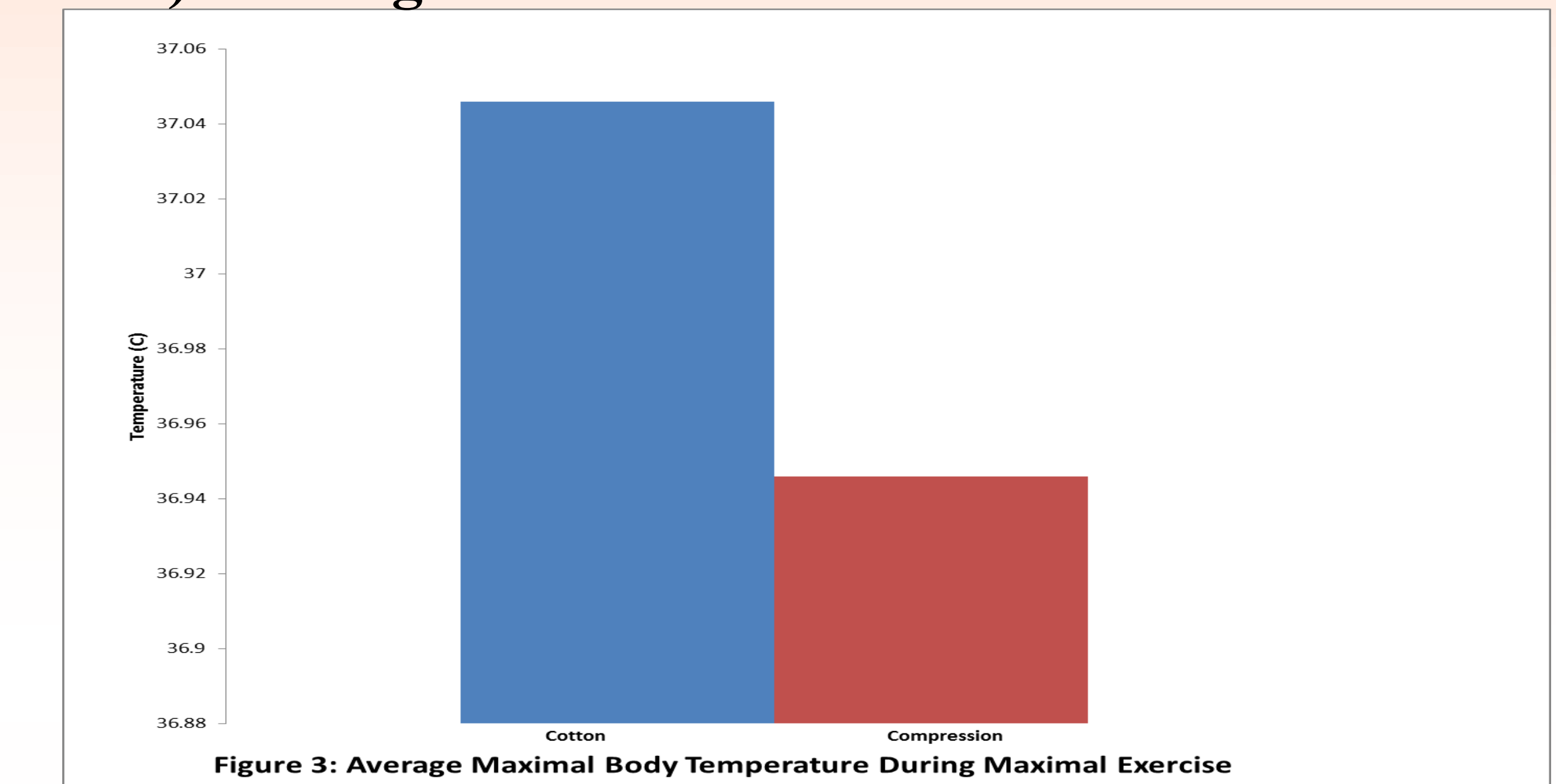
Methods (cont'd)

A mouth piece and headgear were worn during each test to measure respiratory values. Heart rate was recorded each minute and every three minutes the subject's blood pressure and body temperature were measured. Due to the mouthpiece, the subject had to communicate with hand signals. A thumbs up meant that the subject was doing good and wanted to continue, a waggle of the hand meant the subject was close to exhaustion.

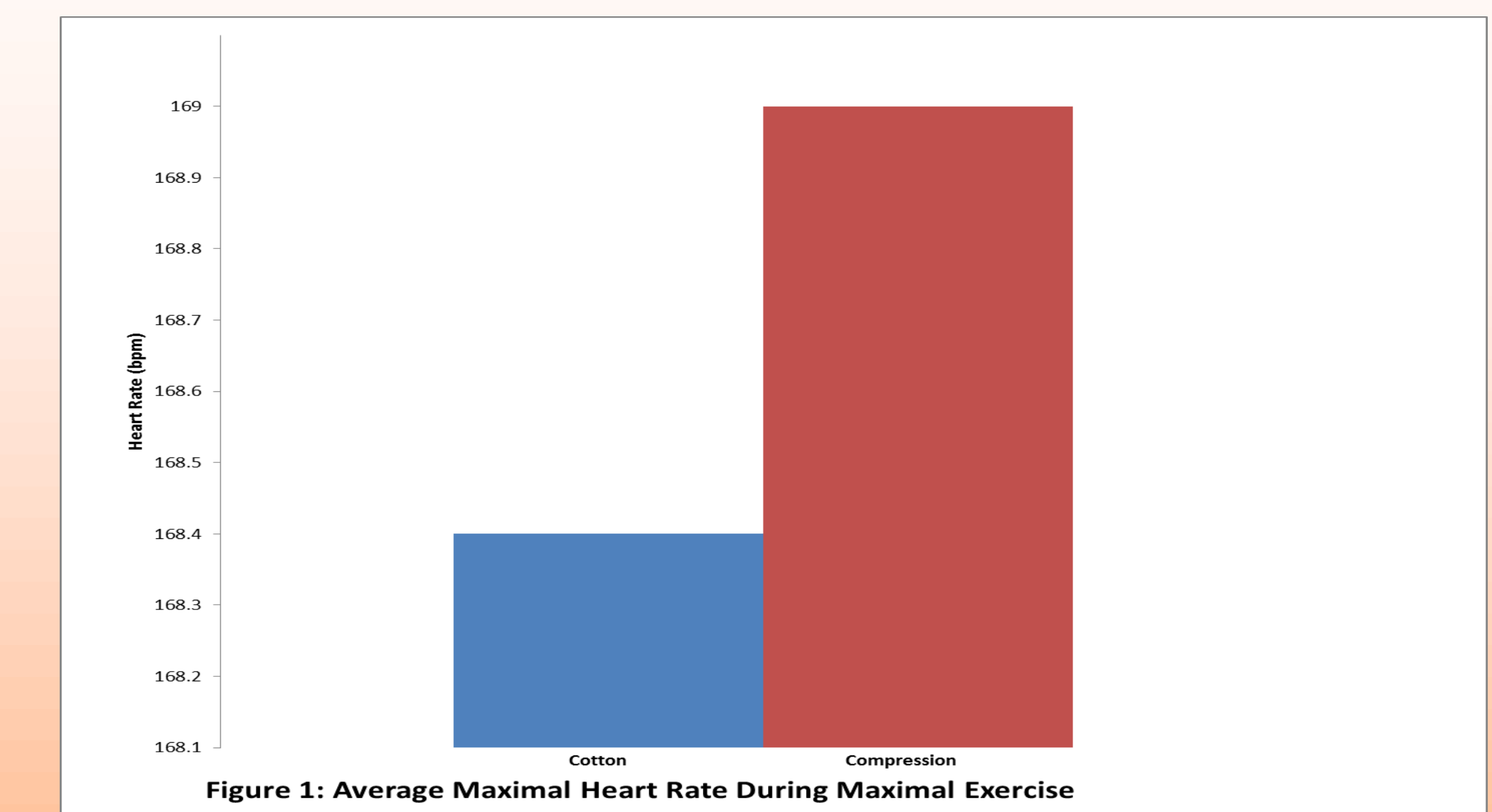
Statistical Analysis: Data was analyzed using a t-test in excel.

Results (cont'd)

The average maximal body temperature during maximal exercise (Cotton: 37.05 ±0.26 °C, Compression: 36.95±0.32 °C) showed no significant difference between cotton and compression shorts (p=.495). See Figure 1.



The average maximal heart rate (Fig. 2) during maximal exercise (Cotton: 168.4±7.9bpm, Compression: 169±11.8 bpm) had no significant difference between cotton and compression shorts (p=.87).



Conclusions

The results of this study indicate that there was no significant difference in thermoregulation as well as heart rate, systolic blood pressure and VO_{2max} between cotton and compression shorts during maximal exercise. The results could be attributed to a limited number of subjects, amount of clothing worn and exercise mode.

Purpose

The purpose of this study was to determine the effects of compression shorts on thermoregulation, which is the body's ability to regulate heat.

Methods

Subjects: Five subjects (22.8±1.3 yrs., 63.4±1.14 in, 147.6±22.1 lbs.), all female UTA students, volunteered to participate in this study. Consent forms were signed by all subjects before testing began.

Instrumentation: Systematics cycle, Metabolic cart, Head gear, Sensor, Nose clip, Blood pressure cuff, Stethoscope, Polar FT1 heart rate watch with strap, Tympanic Ear thermometer- Braun and Sporti Solid Compression Swim Jammers.

Procedure: Each subject entered the lab wearing 100% cotton shorts and either told to remain in those shorts or change into compression shorts for the test. Each subject had resting heart rate (RHR), blood pressure (BP) and body temperature measured. Each subject performed an incremental VO_{2max} cycle test which included maintaining 50 rpm with a resistance that started at 50Watts and increased every three minutes until exhaustion. Resistance increased by 25W.

Results

Table 1: Subject Demographics

	Mean	SD
Age (years)	22.8	1.3
Height (in)	161.04	±2.9
Weight (lbs)	67.18	±10.04

Table 2: Average Maximal Values Recorded During Maximal Exercise

	Cotton		Compression		P-value
	Mean	SD	Mean	SD	
Heart Rate (bpm)	168.4	±7.9	169	±11.8	.87
Temperature (°C)	37.05	±.26	36.95	±.32	.495
Systolic BP (mmHg)	136.8	±4.6	135.6	±5.18	.67
VO ₂ (ml/kg/min)	26.96	±3.73	26.36	±3.6	.69