WHAT DOES IT TAKE TO BE A NATIONAL CHEERLEADING CHAMPION?

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Abstract

Introduction: Cheerleading involves the performance of skills requiring a high degree of muscular strength, endurance, flexibility, balance, and determination. Despite the trend of cheerleaders performing increasingly difficult and athletic skills, very little is known about their physiological fitness levels.
Purpose: The purpose of the study was to create a physiologic profile of the fitness status of male and female collegiate cheerleaders.
Methods: Eight females (age: 19.4±1.1 yrs; ht: 156.3±6.9cm; wt: 55.3±8.6kg) and 4 males (age: 24.2±2.6 yrs; ht: 182.8±9.9cm; wt: 83.4±10.6kg) volunteered to participate in this study. Each subject completed a Bruce protocol maximal treadmill test, underwater weighing, and a WAnT (Wingate Anaerobic Test) on a cycle ergometer.
Results: The mean and SD were calculated to provide the fitness profile for each parameter. Maximal relative oxygen consumption (M: 47.9±1.1 ml/kg/min; F: 40.9±6.1 ml/kg/min), maximal absolute oxygen consumption (M: 4.3±0.1 L/min; F: 2.3±0.4 L/min), maximal heart rate (M: 204.7±13.6 bpm; F: 191.2±4.9 bpm), body composition (M: 9.2±5.8%; F: 16.0±4.6%), mean power (M: 733±122.5W; F: 638.1±187.6W), and peak power (M: 1290.3±337.1W; F: 638.1±187.6W).
Conclusion: When compared to norms from the *ACSM's Guidelines for Exercise Testing and Prescription*, the maximal relative oxygen consumption was above the 70th percentile for men and above the 65th percentile for women. Body composition percentages placed men above the 85th percentile and women above the 80th percentile. Absolute maximal oxygen consumption for men and women were both above the norms when compared to average untrained athletes (M: 4.3>3.5; F: 2.3>2.0 L/min). Future studies will include what is takes to be a world cheerleading champion and also adding an eating disorder inventory form to detect if there are any unhealthy eating habits with these athletes.

Purpose

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Methods

Participants who were asked to participate in this study were the UTA cheerleaders who were the 2010 National Champions in the National Collegiate Association (NCA) competition. Eight females (age: 19.4±1.1 yrs; ht: 156.3±6.9cm; wt: 55.3±8.6kg) and 4 males (age: 24.2±2.6 yrs; ht: 182.8±9.9cm; wt: 83.4±10.6kg) read and signed an informed consent document prior to testing. Each subject came on two separate days. Day One each subjects' demographics were recorded, then completed a WAnT (Wingate 30-sec Anaerobic Test) on a cycle ergometer. The test consisted of pedaling at a comfortable rate for a1-2 minute warm-up, followed by a 30-second full sprint, with a 1-2 minute recovery. Next, body composition was measured using hydrostatic (underwater) weighing. Subjects were asked to change into their swimsuits and shower in the locker room next to the underweighing area and get body, hair, and suit completely wet. The subjects then entered the water (about 3.5 feet deep), run their hands over their body to remove any bubbles, making sure that no bubbles were trapped in the suit, then they will take a seat on the swing suspended from a load cell.

Methods (cont'd)

Once ready, they were instructed to exhale completely and then submerge completely under the water until a reading of their underwater weight can be made (about 10 sec). The chain will be tapped as an indication that they can surface. Between 5-7 trials were done for each subject or until a consistent underweight was obtained. On day two, the subjects performed a graded exercise test on a treadmill to maximum exhaustion. The speed and elevation of the treadmill increased every 3 minutes until the subject could no longer continue. The subject had a heart monitor around his chest recording heart rate, each were placed a headgear that was fitted to their heads in order to hold the mouthpiece in place. A mouthpiece, similar to that used for snorkeling, will be used along with a nose clip to ensure that exhaled air can be collected in the metabolic cart during the exercise. This allows the calculation of aerobic fitness. Blood pressure was taken before each workload change and a cuff was placed around the upper arm in order for this to be done. Also during the test, a rate of perceived exertion score (RPE) with ratings from 6 (rest) to 20 (maximal exercise) will be taken at the end of each stage. Subjects were asked to communicate with hand signals. A "thumbs up" indicated continuing to exercise, a "waggle" of the hand side to side indicated that the subject will not be able to go much longer. They were asked to give a warning and not step off the treadmill to allow for some time to take final measures. The treadmill was then sent into recovery mode and the subject was allowed to slow down while heart rate and blood pressure continued to be monitored.

Results

MALES	Mean	SD	Max	Min
Peak Power (W)	1290.3	337.1	1417	814
Mean Power (W)	733	122.5	886	586
Max VO2 (ml/kg/min)	47.9	1.1	49.1	46.5
Max VO2 (L/min)	4.3	0.1	4.39	4.25
Heart Rate (bpm)	204.7	13.6	225	197
RPE	16.6	0.9	18	16
Time of Exercise (min:sec)	12:34	0.1	12:56	12:14

Results (cont'd)

FEMALES	Mean	SD	Max	Min
Peak Power (W)	638.1	187.5	829	327
Mean Power (W)	387.2	80.1	479	239
Max VO2 (ml/kg/min)	40.9	6.1	47.3	32.3
Max VO2 (L/min)	2.3	0.4	2.68	1.47
Heart Rate (bpm)	191	4.9	196	183
RPE	16.5	1.2	19	15
Time of Exercise (min:sec)	10:40	0.05	12:45	8:05

Conclusions

In this study, the results were compared to norms of moderately trained individuals from the *ACSM's Guidelines for Exercise Testing and Prescription*, indicated the maximal relative oxygen consumption was above the 70th percentile for men and above the 65th percentile for women. Absolute maximal oxygen consumption for men and women were both above the norms when compared to average untrained athletes (M: 4.3>3.5; F: 2.3>2.0 L/min). According to the *Exercise Testing and Prescription* Text by Nieman, young adults (18-25) norms for a WAnT are classified under peak power (5 sec) and mean power (30 sec) per kg of body weight. Results showed elite values for males and females based on peak and mean values above 10.2 W/kg & 8.2 W/kg (males) and 9.8 W/kg & 6.4 W/kg (females), respectively. 10 out of 12 subjects were considered elite in both peak and mean power values. Future studies will include what is takes to be a world cheerleading champion and also adding an eating disorder inventory form to detect if there are any unhealthy eating habits with these athletes.