



Comparison of Body Composition, Aerobic and Anaerobic Fitness in Competitive Level Soccer Players With Regards to Position Played

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Abstract

Body composition can be thought of in several different terms. Body Mass Index (BMI) and body fat percentage (%bf) are the two most popular. The BMI is determined from the height and weight only, but the body fat percentage takes the age and ethnicity into account along with the actual measurement to estimate %bf. Body composition and aerobic and anaerobic fitness among high school age female soccer players has not been studied very extensively. Some studies have been conducted to examine body composition, but did not compare the positions each subject played or include the fitness level.

Purpose

The purpose of this research study were as follows: to compare body composition to aerobic and anaerobic fitness and to observe differences in body composition among different positions played by female, high school age soccer players.

Method

Participants

- Twenty competitive level female soccer players of ages ranging 15 – 18 yrs participated in the non-consecutive, three day study.
- All subjects had been playing soccer competitively for at least 2 years.
- Participants submitted signed consent forms and were approved for human subject study by the review board of the University of Texas at Arlington.
- All participants were in good health and approved by a doctor to participate in sports-type activity.
- Participants were asked not to partake in physical activity 4 hours prior to the testing to ensure validity.

Method (cont'd)

Procedure

- Subjects reported to the Polaris Soccer Training Facility for three non-consecutive days of testing
- The first day of testing involved determining each of the subjects' height, weight and seven site skinfold measurements
- The second day of testing involved each of the subjects ran two timed 40 yard sprints, that were averaged.
- The third day of testing consisted of a timed 1.5 mile run after a brief warm up and stretching session.
- From the height and weight, the body mass index (BMI) was calculated.
- From the skinfold measurements, the body fat percentage was calculated.
- With the measured and calculated data, a comparison was formed amongst the three different positions.

Instrumentation

- The measured dependent variables were the aerobic, anaerobic and percent body fat.
- A Lange Skinfold Caliper was used for the skinfold thickness measurements.
- The aerobic and anaerobic fitness was measured using a standard stopwatch.
- The height was measured with a standard tape measure and the weight was measured with a bathroom scale.

Statistical Analysis

- A two – tailed t-Test was used for the statistical analysis
 - Alpha level set at $\alpha = .05$
 - Data were analyzed using SPSS 18.0

Results

Table 1. Demographic Variables

Variable	Mean	± SD	Min.	Max.
Age (yr)	16.53	0.80	15	18
Weight (lbs)	129.71	16.41	98	160
Height (in)	66.09	3.01	60	73

Table 2. Related Variables

Variable	Position	Mean
Body Fat Percentage	Forwards	18.008
	Midfielder	16.466
	Defenders	20.038
Aerobic – 1.5 mile run (minutes)	Forwards	14:45
	Midfielders	13:15
	Defenders	14:29
Anaerobic – 40 yard sprint (seconds)	Forwards	5.756
	Midfielders	5.906
	Defenders	5.799
Body Mass Index (BMI)	Forwards	20.130
	Midfielders	20.514
	Defenders	22.768

Results (cont'd)

- Aerobic and anaerobic fitness along with BMI and percent body fat were examined using a two-tailed T-Test.
- Results indicate that there was significance with regards to aerobic fitness between the forwards and the midfielders, but no significance among the other values
- *Average Aerobic Fitness (FWD–MID) = 14:00, $p = 0.0301, p < 0.05$*
- *Average Aerobic Fitness (FWD–DEF) = 14:38, $p = 0.600, p > 0.05$*
- *Average Aerobic Fitness (MID–DEF) = 13:53, $p = 0.076, p > 0.05$*
- *Average BMI (FWD–MID) = 20.32, $p = 0.626, p > 0.05$*
- *Average BMI (FWD–DEF) = 21.45, $p = 0.0695, p > 0.05$*
- *Average BMI (MID–DEF) = 21.64, $p = 0.0794, p > 0.05$*
- *Average %bf (FWD–MID) = 17.237, $p = 0.4096, p > 0.05$*
- *Average %bf (FWD–DEF) = 19.063, $p = 0.525, p > 0.05$*
- *Average %bf (MID–DEF) = 18.252, $p = 0.22, p > 0.05$*
- *Average Anaerobic Fitness = 5.831, $p = 0.3599, p > 0.05$*
- *Average Anaerobic Fitness = 5.778, $p = 0.847, p > 0.05$*
- *Average Anaerobic Fitness = 5.853, $p = 0.493, p > 0.05$*

Conclusions

- Results of the study indicate that there was no significant difference with concerns to position played and body composition.
- The results of the study also indicate that there is a significance between the aerobic fitness of forwards and midfielders.
- Future related studies should examine a wider range of ages and also include males.

