



Mid Atlantic Regional Chapter of the American College of Sports Medicine

Annual Scientific Meeting, November 4th- 5th, 2017
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 6



Association of Body Composition to Aerobic Capacity and Swimming Performance in Adult Fitness Swimmers

Meghan M. Schmidt¹, Elizabeth Nagle¹, Takashi Nagai¹, Anne Beethe¹, Mita T. Lovalekar¹, Chris Connaboy¹, John P. Abt², FACSM, Scott M. Lephart², FACSM, Bradley C. Nindl¹, FACSM. ¹University of Pittsburgh, Pittsburgh, PA, ²University of Kentucky, Lexington, KY

The ability to examine and track lean mass and anthropometric characteristics in swimmers is necessary to determine training modalities and volumes for optimal performance, injury prevention, and ensure optimal levels of body fatness for overall health. Few studies have examined the relationship of body composition (BC) to swimming performance or aerobic capacity ($VO_{2max_{sw}}$) in water. **PURPOSE:** To examine the relationship of BC to sidestroke and freestyle performance swimming (PS) and a freestyle flume $VO_{2max_{sw}}$ ($ml \cdot kg^{-1} \cdot min^{-1}$) test (VO_2). **METHODS:** Six males and 9 females (27.1 ± 7.9 yrs.; 174.1 ± 7.6 cm; 72.1 ± 13.3 kg) performed both PS tests [500 yard freestyle (475.5 ± 95.4 s) and 500 yard sidestroke (Mean 662.5 ± 88.2 s) in a swimming pool and a VO_{2max} in the swimming flume. Percent Body Fat (BF) was measured using the Body Plethmography (Bod Pod). The relationship of PS times (s) and VO_2 was correlated to BF, fat-free mass, BMI ($kg \cdot m^{-2}$), height (cm), and body weight (kg). Data was assessed using Pearson correlation coefficients ($p < 0.05$) after assessing normality. **RESULTS:** Relationships between BC and PS variables are presented in Table 1. BF was significantly associated with the flume $VO_{2max_{sw}}$ test ($r = -0.854$, $p < 0.001$), but neither PS tests ($p > 0.05$). **CONCLUSIONS:** BC of swimmers is an important determinant of health and performance. Future studies should use a larger cohort and compare land based measures in order to examine the relationships of BC and anthropometrics to PS, measures of propulsive force, and swimming economy. Furthermore, multiple observations of swimmers over a training season would provide further evidence in order to identify key factors related to swimming performance.

Statement of Disclosure: Supported by ONR: N00014-14-1-0022/N00014-15-0069

Table 1.

Variable	N	PS (Sidestroke)	PS (Freestyle)	VO2max _{sw}
		r-value (p-value)	r-value (p-value)	r-value (p-value)
Height (cm)	15	-0.301 (.275)	-.250 (.369)	0.215 (.441)
Weight (kg)	15	0.495 (.061)	-0.403 (.136)	0.174 (.536)
BMI (kg·m ²)	15	-0.614* (.015)	-0.508 (.053)	0.132 (.639)
Percent Body Fat (%)	15	0.299 (.278)	0.422 (.117)	-0.854* 0.000)
Fat Free Mass (kg)	15	-0.501 (.057)	-0.469 (.078)	0.420 (.119)

*p<0.05