

Relationship between Physical Fitness, Body Composition and

Cardiovascular Risk Factors in Healthy Individuals



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Introduction Worldwide obesity levels have more than doubled since 1980 and in 2008 1.5 Billion adults were overweight (WHO Fact Sheet N°311). Obesity is a leading risk factor of cardiovascular (CV) disease (CVD), while high body fat percentages are associated with Type 2 diabetes and further CV complications. Behavioural change such as an increase in physical activity has been suggested as a method of reducing these risks (Pedersen & Saltin 2006).

Purpose To assess the relationship between behaviour, as reflected by physical fitness markers: maximal aerobic capacity (VO2max) and muscular strength, health status and CV risk.

Methods 105 participants (73 female, 32 male), mean \pm SD age: 42.2 \pm 5.7 yrs, height: 168.8 \pm 8.4 cm, weight: 82.7 \pm 17.8 kg, predicted VO2max: 35.4 \pm 9.1 ml/kg/min, free from chronic health conditions, performed a battery of health assessments to measure; predicted VO2max (Modified Blake protocol – Fitmate Pro), muscular strength (sub-maximal 1rep max), estimated body fat percentage (BF%) using a BODPOD, blood pressure (BP), cholesterol (LDX Cholestech), resting heart rate (RHR) as a marker of CV efficiency, and C-Reactive Protein (CRP), a marker of chronic inflammation (n=39) using an ELISA kit.

Statistical Analysis Correlations were calculated using Pearson’s correlation coefficient with statistical significance set at $P < 0.05$.

Table 1. Significant correlations between markers of physical fitness and cardiovascular risk.

	VO2max	CP	LPD	LP	RHR	CRP	BF%
VO2max		R=0.317 P=0.002	R=0.308 P=0.002	ns	R=-0.295 P=0.006	R=-0.426 P<0.01	R=-0.583 P<0.001
CP	R=0.317 P=0.002		R=0.89 P<0.001	R=0.659 P<0.001	ns	ns	R=-0.34 P<0.001
LPD	R=0.308 P=0.002	R=0.89 P<0.001		R=0.673 P<0.001	ns	ns	R=-0.476 P=0.001
LP	ns	R=0.659 P<0.001	R=0.673 P<0.001		ns	ns	R=-0.340 P=0.001
RHR	R=-0.295 P=0.006	ns	ns	ns		ns	R=0.315 P=0.001
CRP	R=-0.426 P<0.01	ns	ns	ns	ns		R=0.667 P<0.001
BF%	R=-0.583 P<0.001	R=-0.34 P<0.001	R=-0.476 P=0.001	R=-0.340 P=0.001	R=0.315 P=0.001	R=0.667 P<0.001	

Results The significant correlations between markers of strength; Chest Press (CP), Lat Pull Down (LPD), Leg Press (LP), VO2max, BF% and CRP are presented in Table 1. Figures 1 and 2 show relationships between BF% and VO2max and CRP, respectively.

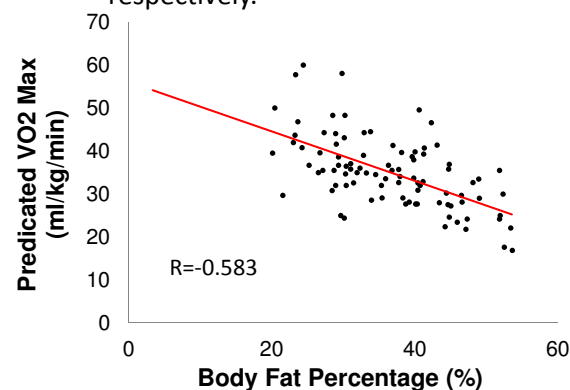


Figure 1. Relationship between Predicted VO2max and Body Fat Percentage

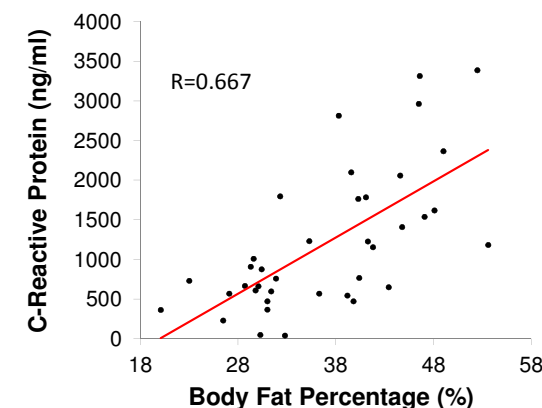


Figure 2. Relationship between Body Fat Percentage and CRP

Conclusion The initial findings show that increased predicted VO2max and muscular strength as indicators of physical fitness are associated with decreased BF%. Further, there is a strong correlation between increasing BF% and CRP, indicating greater CVD risk. No relationship between cholesterol and BP with levels of physical fitness was found within this cohort.

Acknowledgments

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References

Pedersen B, Saltin B. Evidence for prescribing exercise as therapy in chronic disease. *Scand J Med Sci Sports*. 2006; **16 Suppl 1**: 3-63.

