VALIDITY OF THE YO-YO INTERMITTENT RECOVERY TEST LEVEL 1 IN ASSESSING OR ESTIMATING VO_{2MAX} AMONG FEMALE SOCCER PLAYERS

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Introduction

The validity of the Yo-Yo Intermittent Recovery Test Level 1 (YIR1) (1) to assess aerobic capacity among male soccer players has been widely investigated. However, limited research exists in this area specific to female soccer players. For this reason, the purpose of the present study was to evaluate the validity of the YIR1 in assessing or estimating maximal oxygen consumption (VO_{2max}) among female soccer players when compared to a maximal laboratory treadmill test (LTT).

Methods

Eighteen female soccer players (age, 21.5 ± 3.4 years; height, 165.6 ± 7.5 cm; weight, 63.3 ± 7.4 kg) of the 2nd German National League completed a LTT and a YIR1 within one week during the second half of their competitive season. Players' VO_{2max} was measured during both tests using a portable spirometry system and was estimated from their distance covered in YIR1 using the formula suggested by Bangsbo et al. (1) (YIR1-est1) and from an own developed formula specific for female soccer players (YIR1-est2). Linear regression analysis and t-tests were conducted for data analysis.

Results

Strong to medium correlation coefficients (r) were found between the measured VO_{2max} in YIR1 and LTT, and between YIR1-est1 or YIR1-est2 (VO_{2max} (mL/min/kg) = YIR1 distance (m) x 0.0088 + 45.73) and the measured VO_{2max} in LTT. VO_{2max} mean difference between YIR1-est2 and LTT was non-significant (Table 1).

Table 1. Measured and estimated VO_{2max} from YIR1 and LTT.

Test Pair	VO2max (mL/min/kg)	Difference (mL/min/kg)	r
YIR1	49.9 ± 4.9	-5.1 ±3.0*	.83*
LTT	55.0 ± 5.3	(-9.3 %)	
YIR1-est1	45.2 ± 3.4	-9.8 ± 3.9*	.67*
LTT	55.0 ± 5.3	(-17.8 %)	
YIR1-est2	54.9 ± 3.5	-0.1 ±4.0	.67*
LTT	55.0 ± 5.3	(-0.2 %)	

Results presented as mean ± SD. * significant at $p < 0.01$

Conclusion

Although the direct and indirect VO_{2max} values were significantly related, the YIR1 significantly underestimated VO_{2max} among female soccer players compared to LTT (gold standard). Up to 9% or 18% underestimation resulted when player's VO_{2max} was directly assessed by portable spirometry in YIR1 or indirectly estimated from Bangsbo's formula (1), respectively. The estimation formula derived from our own data (YIR1-est2) yielded closer results to the real VO_{2max} values obtained in LTT.

References

1. Bangsbo, J. et al. (2008). *Sports Med.* 38(1): 37-51.