



Body Composition Assessment in Subjects Involved in Aerobic Physical Activities: a Comparison Between Water-based and Land-based Exercise

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Introduction

The American College of Sports Medicine, in its latest position stand, emphasized that aerobic physical activity (APA), performed according to the recommended quantity and quality, is usually associated with loss of body mass and fat mass. This means that a favourable body composition can be achieved also with a correct APA. The aim of this study was to evaluate if Water Based Exercise (WEX), compared to Land Exercise (LEX), performed twice a week for 45'-50', as usually happens in fitness programs, can significantly modify body composition in middle-aged women.

Methods

A program of 24 weeks of APA was carefully outlined and 20 middle-aged women were chosen amongst regular participants in fitness activity and randomly assigned to two groups. The first group performed APA in Deep Water (DWEX group), the second one on land (LEX group). Both groups were recommended not to modify their dietary habit.

Group	N° Sub	Sex	Age (yrs)	Height (cm)	Exercise Prescription	Duration
WEX	10	F	44.4 ± 8.1	157.8 ± 4.8	24 weeks; 2d/week.	45'/50'
LEX	10	F	46.6 ± 8.0	161.8 ± 3.6		

Table I. – Characteristics of subjects and exercise program

Body weight (BW), wrist, waist, hips and thighs circumferences, skinfold thickness (Harpender, British Indicators LTD, West Sussex, UK) and total body water (TBW), fat free mass (FFM), fat mass (FM) (Multi Frequency Segmental Bioelectrical Impedance Analysis, Human-Im Plus, DS Medigroup, Italy) were measured before and after the exercise period. All statistical analyses were conducted by means of the SPSS software (release 10.1). Physical data characteristics are presented in Table I as mean ± standard deviation (SD). Analysis of variance for repeated measures was used for comparing the variables measured pre and post treatment as follows: 1) effect of exercise condition and duration on the variables measured; 2) effect of group x duration interaction. The significance was fixed at an alpha level of 0.05. A quasi-significant level was defined as $0.05 \leq p \leq 0.10$.

Results

Table II shows the percent differences of the measured variables between pre and post exercise program.

Group	BW diff%	BMI diff%	TBW diff%	FFM diff%	FM diff%	Sum of Skinfolds diff%	Circumferences diff %			
							Wrist	Waist	Hip	Thigh
WEX	0.21	0.19	- 5.70	- 0.39	1.96	- 9.68	- 0.13	- 2.20	- 1.17	0.76
LEX	- 2.31	- 2.24	- 2.51	1.28	- 2.91	- 2.27	- 1.79	- 2.92	- 1.83	- 1.45

Table II. – Body composition changes after 24 weeks of aerobic exercise

In table III are reported the quasi-significant differences between variables measured before and after the APA program. All the other variables were not significantly different

	BW	BMI	FFM%	FM%
F =	3.327	3.007	3.283	3.202
dlg =	1;18	1;18	1;18	1;18
p =	0.085	0.100	0.087	0.090
Significance	qs	qs	qs	qs

Table III. – Effect of interaction group - time



Discussion and conclusions

Altogether our results show that WEX did not modify significantly body composition. Nevertheless, other studies reported significant decrease of FM (from 2.6% to 11.9%) without any substantial change of BW. The duration of these studies was between 8 and 12 weeks, but they practised WEX at least 3 times per week.

We found no significant differences between DWEX group and LEX group although it appears that LEX might cause larger effects, probably because of the higher workload due to gravity. In agreement with other authors our findings show that: i) APA performed twice a week is probably not enough to affect body composition; ii) land-based exercise, when conducted in similar conditions compared to water-based exercise, appears to be more effective; iii) further studies, with larger groups of subjects, are essential to gain a better insight about general physiological responses of subjects who regularly participate in WEX.

References

- ACSM (1998). Med. Sci. Sports Exerc., Vol. 30, 6, Position Stand.
- Abraham A., Szezerba J., Jackson M. (1994). Med. Sci. Sports Exerc. 26, S103 (Abstract).
- Hoeger W. K., Gibson T., Moore J., & Hopkins D. (1992) National Aquatics Journal, Winter Ed., 13-16.
- Michaud T. J., Brennan D. K., Wilder R. P., Sherman N. W. (1995) Journal of Str. and Cond. Res., 1995, 9, 78-84.
- Takehima N., Rogers M. E. et al. (2002). Med. Sci. Sports Exerc., Vol. 33, 3, 544-551