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IMPACT OF SHALLOW WATER DRILLS ON VO_2 MAX AMONG MEN ATHLETES

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Abstract

The purpose of the study was to find out the Impact of shallow water drills on maximum oxygen consumption (vo_2 max) of men athletes. To achieve this, 40 men athletes from Ayya Nadar Janaki Ammal College, Sivakasi were randomly selected as subjects and their age ranged between 17 and 23 years. The subjects were categorized into two groups namely control group, shallow water drills group with each 20 subjects. The experimental group underwent the shallow water drills for 6 weeks, 3 days per week and a session on each day with 45 min duration. Maximum oxygen consumption (vo_2 max) was assessed by using Beep Test before and after the training period. The data collected prior and after the experimental treatment was analyzed using analysis of covariance (ANCOVA). The result revealed that shallow water drills group shows significant improvement in maximum oxygen consumption.

Keywords: water training, shallow water drills, maximum oxygen consumption,

INTRODUCTION

In human movement we are constantly moving in a “fluid” environment i.e. air, water, or both. Obviously while training on land, we are only concerned with air which is much less dense than water. A very important physics concept relative to water training and conditioning is hydrostatic pressure. Pressure is the force/area and is exerted from all directions on both land and in the water. However, this fact can be particularly interesting in the water when we consider that every M3 of water weighs 9800 N/m2. Now, think about the amount of pressure that a normal athlete will experience in the water. Hydrostatic pressure is important because it can help us to understand physiological manifestations, e.g. cardiac output and the very commonly reported lower maximal heart rates associated with running in deep water.

As we all know, while running on land, our major force (resistance) to deal with is gravity. Over time our bodies adapt to our normal environment (gravity) and/or training stimuli, which in turn allows for the generation of momentum. A normal land-based efficient stride pattern includes the ability to utilize this momentum to maximize overall economy of energy utilization and enhance performances. On the other hand, while moving in water the major force to overcome is due to the multi-planar form drag that the runner feels. There is never a point in the water running cycle where the runner does not experience some resistance from this viscous and dense medium; this may be one of the best advantages derived from water running. The exposure of lesser trained or weaker muscles, e.g. hamstrings, tibialis anterior, etc. to this increased workload and the ability to adjust the workload virtually instantaneously, coupled with the inability to generate any palpable momentum in water, allows for larger metabolic demand through more muscular innervations, promoting better balance between muscle groups and increasing the overall muscular demand.

Aquatic running or jogging, when supported by floatation devices, offers additional benefits, most notably, the maintenance of rapid stride frequencies without the impact of landing and coordinated movements between the arms and legs (Cassidy & Nielsen, 1992; Tovin, 1994).

Many previous studies have reported metabolic and cardio respiratory responses during walking and jogging in a pool (Eva et al., 1978; Whitley & Schoene, 1987; Bishop et al., 1989; Ritchie & Hopkins, 1991; Town & Bradley, 1991; Gehring et al., 1992) but it was difficult to fix the physical and physiology intensity for walking and jogging in a pool, due to water density, approximately 800 times higher than air (Prampero, 1986).

METHODOLOGY

To achieve the purpose of the study, 40 men students from Ayya Nadar Janaki Ammal College, Sivakasi were randomly selected as subjects and their age ranged between 17 and 23 years. The selected subjects were further classified at random into two equal groups of 20 subjects each namely experimental group and control group. The experimental group under went shallow water drills for three alternate days in a week for a period of six weeks whereas control group who did not participate in any other training other than regular activities. The maximum oxygen consumption (vo_2 max) was assessed by using Beep Test before and after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significant difference, if any between groups. The 0.05 level of confidence were fixed to test the level of significance, which was considered as an appropriate.

RESULTS

The analysis of covariance on maximum oxygen consumption (vo2 max) of Control group and Shallow Water Drills Group are analysed and presented in table I

Table 1

Analysis of Covariance for Maximum Oxygen Consumption (vo_2 max) for Control and Shallow Water Drills Group

Test		Control Group	Shallow Water Drills Group	Source of Variance	Sum of squares	df	Mean of squares	'F' ratio
Pre test	Mean	2168.50	2145.00	Between	5522.501	1	5522.50	0.09
	S.D	224.66	252.03	Within	2165955	38	56998.81	
Post test	Mean	2137.50	2212.50	Between	56250.00	1	56250.00	1.12
	S.D	203.15	243.04	Within	1960655	38	50172.36	
Adjusted Post Test Mean		2126.59	2223.40	Between	93485.17	1	93485.17	84.85*
				Within	140765.3	37	1101.76	

*Significant at 0.05 level

Table 1 presents that the pre and post test means and standard deviation of control and shallow water drills group on maximum oxygen consumption (vo_2 max). The obtained 'F' value for pre and post test means on vo2 max was 0.09 and 1.12 respectively which was lesser than table value of 4.09 for degree of freedom 1 and 38 at 0.05 level of confidence; hence there was no significant difference in pre and post test data of control and shallow water Drills group. The analysis of adjusted post test mean data reveals that obtained 'F' value of 84.85 was greater than table 'F', hence there exist difference in vo_2 max among the control group and shallow water drills group.

DISCUSSION

Several research studies suggest that shallow water drills may be valuable for determining the physiological variables search as resting heart rate, maximum oxygen consuming, cardiac output sub maximal physiological responses, the respiratory index, chronic physiological response in water immersion. There is some scientific evidence supporting the success of athletes by aquatic based training.

Eckerson and Anderson (1992) observed the energy expenditure of shallow water aquatic exercise. In approximately 1 meter of water, 16 college females (20 yr) performed shallow water exercise routines. Maximal metabolic and cardiovascular data for the subjects was also obtained from land tests on a treadmill. When compared to treadmill effort, shallow water exercise resulted in mean heart rate responses that were 74% of heart rate reserve and 82% of HR max, while VO2 was 48% of VO2max (minimally meeting ACSM guidelines). Subjects burned an average of 5.7 kilocalories per minute during the aquatic exercises. In this present study, the results show that there was a significant difference between control and Shallow Water drills Group.

CONCLUSION

Shallow Water Drills Group showed significant improvement in maximum oxygen consumption (vo_2 max) among men athletes. However the control group had not shown significant change in VO2max.

REFERENCES

1. Becker, B.E. (2009). Aquatic Therapy: Scientific Foundations and Clinical Rehabilitation Applications, Physical Medicine and Rehabilitation 1: 859-872.
2. Mercer, J. A., and Jensen, R. L. (1998). Heart rates at equivalent sub-maximal levels of VO2 do not differ between deep water running and treadmill running. Journal of Strength and Conditioning Research, 12: 161-165.
3. Michaud, T. J., Brennan, D. K., Wilder, R. P., & Sherman, N. W. (1995). Aqua running and gains in cardio respiratory fitness. Journal of Strength and Conditioning Research, 9, 78-84.
4. Wilber, R. L., Moffatt, R. J., Scott, B. E., Lee, D. T., and Cucuzzo, N. A. (1996). Influence of water run training on the maintenance of aerobic performance. Medicine and Science in Sports and Exercise 28, 1056-1062.
5. Wilmore, J.H. and Costill D.L. (2005). Physiology of Sport and Exercise (3rd edition). Champaign, IL: Human Kinetics.