Comparison of Aquatic Training with and without Weight on Selected Physical Fitness Variables among Volleyball Players

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Abstract

The purpose of this study was to analyze the comparison of aquatic training with and without weight on selected physical fitness variables of volleyball players. To achieve these 40 physically active and interested undergraduate engineering volleyball players were selected as subjects and their age ranged between 18 and 20 years. The subjects are categorized into two groups randomly viz.; Aquatic Training with weight group (ATWG), Aquatic Training without weight group (ATWOG) and each group had 20 subjects. Both experimental groups underwent their respective experimental treatment for 12 weeks, 3 days per week and a session on each day. Speed, endurance and explosive power were taken as variables for this study. The data were collected prior and after the experimental treatment for both groups. The collected data was analyzed using analysis of covariance (ANCOVA) was employed. The result reveals significant differences in all the selected physical variables among volley ball players.

Key words: Aquatic training, Speed, Endurance and Explosive power.

Introduction

In recent years, aquatic training became one of the most important training to improve the physical and physiological variables (Beale et al, (2005), These aquatic exercises increase the strength, speed, endurance power, (Erin Rutledge (2007), Aquatic training consists of running, single leg jump, double leg jump, high knee action etc. The players performed these exercises in water at hip level. The experiment was performed with and without weight. An aquatic training program can decrease compression forces, vibration forces and torsional forces that a player may endure while training on land (Greg. J. Roswell 2009). The resistance of the water promotes strengthening. Water acts as a variable "accommodating" resistance. Jan H.Prins., (2009). Aquatic training resulted in similar training effects as land-based training with a possible reduction in stress due to the reduction of impact afforded by the buoyancy and resistance of the water upon landing.(John D.Stemm 2007).Aquatic exercise does not worsen the joint condition or result in injury (Tsae-Jyy Wang, 2006)

Methods

To achieve the purpose 40 physically active and interested undergraduate Engineering volleyball players were randomly selected as subjects and their age ranged between 18 and 20 years. The subjects are categorized into two groups randomly viz. Aquatic Training with weight group (ATWG), Aquatic Training without weight group (ATWOG) and each group had 20 subjects. The selected criterion variables such as Speed were assessed by 50 meter

sprint, Cardio vascular Endurance was assessed by coopers' test and leg explosive power was assessed by Standing Vertical Jump. Both experimental groups underwent their respective experimental treatment for 12 weeks, 3 days per week and a session on each day. Weight is assigned by (1 RM) test for each individual in (ATWG). The subjects are instructed to wear a weight jacket which is filled with sand in appropriate (1 RM) weights. Warming up exercise was performed in ground and water. The water level is above the hip level. The ATWG and ATWOG groups initially performed the warming up exercises. After that both the groups performed the following aquatic exercises. 1. Single leg jump (alternative leg), 2. Double leg jump, 3. High knee action, 4. Walking. These exercises were performed for 45 minutes in a day and for 3 days per week. Experiments for 12 weeks and then post test data were taken. The collected data was analyzed using analysis of covariance (ANCOVA).

Statistical Analysis

Means and standard deviations were calculated for speed, Cardio vascular endurance and explosive power for each training group. ANCOVA test were used to examine significance between the variables of testing groups (ATWG and ATWOG). Statistical significance was set to a priority at $p< 0.05$. All statistical tests were calculated using the Statistical Package for the Social Science (SPSS) for Windows (Version 15).

Results

In the initial data analysis, F-Test was applied to test Pre and Post test means between the groups of Aquatic Training with weight and Aquatic Training without weight groups on selected physical fitness variables such as speed, endurance and explosive power. The F-value needed for significance for df (1, 38) at 0.05 levels was 3.15. The obtained F-value for the pre-test mean on selected physical fitness variables such as speed, endurance and explosive power were 0.02, 0.006 and 0.06 respectively. It was found to be in significant. In post test analysis the F-ratio on the variables such as speed, endurance and explosive power were 9.65, 0.37 and 1.32 respectively. The F-value needed for significance for df (1, 38) at 0.05 level was. So, the variables namely speed and explosive power were found to be significant and incase of endurance it was found to be in significant.

The primary aim of analysis of covariance is adjusting the differences in pre means with post test means between the Aquatic Training with weight and without weight. The F-value needed for significance for df (1, 37) at 0.05 level was. The F-value obtained from testing the adjusted means between the control, Aquatic Training with and without weight groups on speed, endurance and explosive power were 42.5, 24.22 and 97.19. It was found to be significant.

Table-I

Comparison of ATWG and TWOG of Speed

	ATWG	ATWOG	Sources of variance	Sum of squares	DF	Means squares	F Ratio
Pre - test means SD (±)	7.56	7.58	Between Group	0.004	1	0.004	0.027
	0.38	0.38	Within Group	5.62	38	0.148	
Post - test means SD (±)	6.81	7.27	Between Group	2.07	1	2.07	9.65
	0.46	0.46	Within Group	8.14	38	0.21	
Adjusted - post test means	6.28	7.25	Between Group	1.87	1	1.87	42.5

* Significant at 0.05 level

Table-II

Comparison of ATWG and ATWOG of Cardio Vascular Endurance

	ATWG	ATWOG	Sources of variance	Sum of squares	DF	Means squares	F Ratio
Pre - test means SD (±)	2151	2145.55	Between Group	360	1	360	0.006
	263.55	252.03	Within Group	2270080	38	59738.94	
Post - test means SD (±)	2258	221.5	Between Group	20702.5	1	20702.5	0.377
	225.16	243.04	Within Group	2085695	38	54886.71	
Adjusted - post test means	2255.14	2215.35	Between Group	15823.76	1	15823.76	24.22
			Within Group	24171.34	37	653.28	

* Significant at 0.05 level

Table-III

Comparison of ATWG and ATWOG of Cardio Explosive Power

	ATWG	ATWOG	Sources of variance	Sum of squares	DF	Means squares	F Ratio
Pre - test means SD (±)	45.3	51	Between Group	2.02	1	2.02	0.06
	5.84	5.75	Within Group	1261.95	38	33.2	
Post - test means SD (±)	45.75	48.9	Between Group	44.1	1	44.1	1.32
	5.67	5.76	Within Group	1261.8	38	33.2	
Adjusted - post test means	51.22	48.67	Between Group	64.69	1	64.69	97.19
			Within Group	24.62	37	0.66	

* Significant at 0.05 level

Table-IV
Aquatic Training Workout Schedule

Exercises	Weeks	Weeks	Weeks	Weeks	Recovery
Names	1 to 3	4 to 6	7 to 9	10 to 12	minutes
Single leg jump (Alternative leg)	10 x 2 Sets	10 x 3 Sets	10 x 4 Sets	10 x 5 Sets	1 min
Double leg jump	10 x 2 Sets	10 x 3 Sets	10 x 4 Sets	10 x 5 Sets	1 min
Walking	10 x 2 Sets	10 x 3 Sets	10 x 4 Sets	10 x 5 Sets	1 min
High knee action	10 x 2 Sets	10 x 3 Sets	10 x 4 Sets	10 x 5 Sets	1 min

Figure-1
Comparison of ATWG and ATWOG of Speed

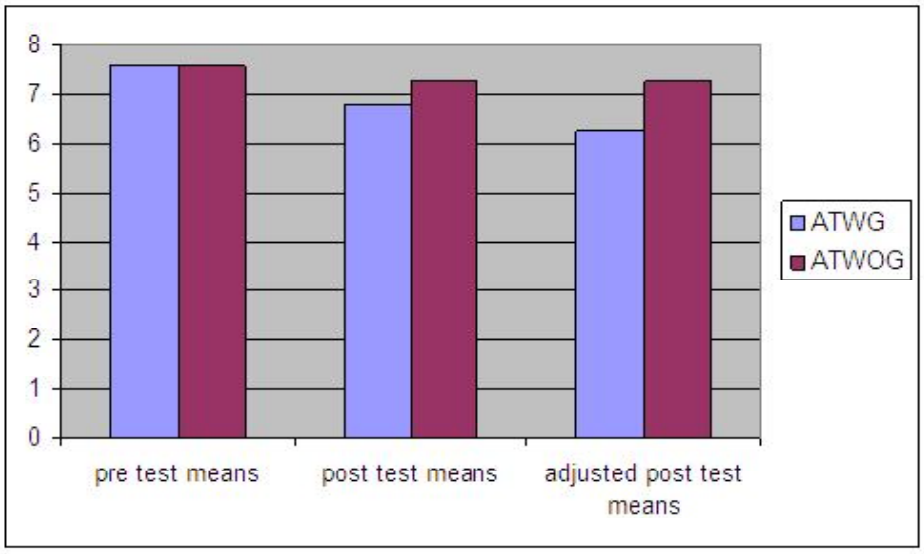


Figure-2
Comparison of ATWG and ATWOG of Cardio Vascular Endurance

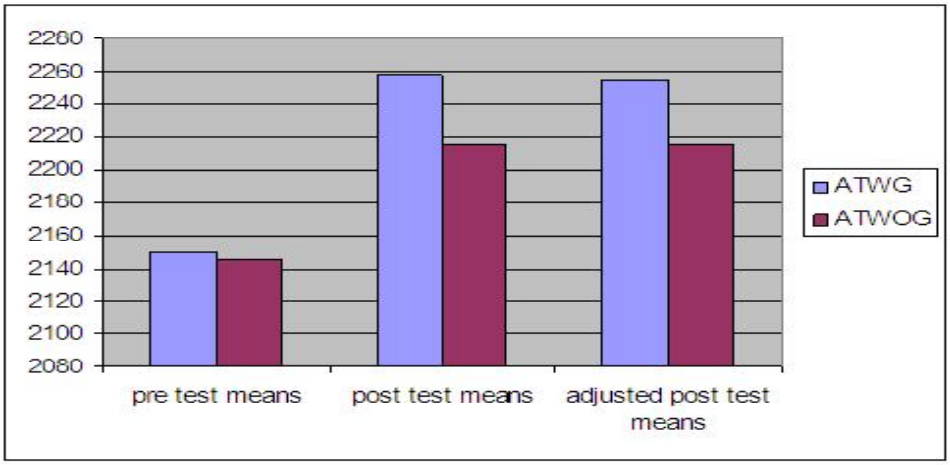
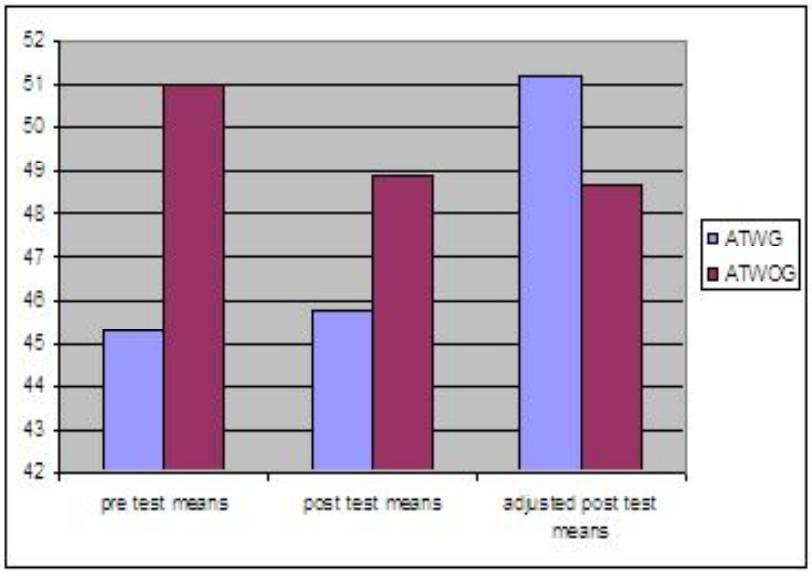


Figure-3
Comparison of ATWG and ATWOG of Explosive Power



Discussion and Conclusions

The majority of these studies suggest that adding deep-water running to an athlete's training regimen has the potential to increase fitness and ultimately improve performance (Burns & Lauder, 2001). The aquatic environment may be used to provide a workload sufficient to create fatigue and produce strength gains in both de-conditioned adults and trained athletes (Tsourlou, et.al. 2006). Martel and co-workers (2005) demonstrated the ability to increase vertical jump in female volleyball players using specific aquatic plyometric training and these improvements could be accomplished with less muscle pain as well. The present study also revealed regarding the speed that there was a significant difference occurred between the two groups in which Aquatic Training with weight group is the top, followed by Aquatic Training without weight. In endurance there was a significant difference occurred between the Aquatic Training with weight group in which the Aquatic Training with weight group is the top. In explosive power there was a significant differences occurred between the two groups in which Aquatic Training with weight group is the top, followed by Aquatic Training without weight group.

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