EFFECT OF AQUATIC PLYOMETRIC WITH AND WITHOUT RESISTANCE TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AMONG VOLLEYBALL PLAYERS

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Abstract

These studies examined the aquatic plyometric training with and without the use of resistance on selected physical fitness variables among college male volleyball players. To achieve this purpose of the study thirty six physically active undergraduate volleyball players were selected from Alagappa university hostel students and they were randomly assigned into one control group and two experimental groups of towel each subject, such as aquatic plyometric training with resistance group (Group-I), aquatic plyometric training without resistance group (Group-II) and control group (Group-III). The experimental group I underwent aquatic plyometric training with resistance, experimental group II underwent aquatic plyometric training without resistance for four days per week for the period of ten weeks training program. The dependent variables namely speed and explosive strength was selected as a criterion variable and it was measured by administrating the 50 meter run test and standing broad jump. The data were collected from each subject before and after the training period and statistically analyzed by using an analysis of covariance (ANCOVA) was used to find out the significant difference, if any among the adjusted post test means of experimental groups on each variables separately. Whenever, the obtained F-ratio for adjusted post test means was found to be significant, the Scheffe's test was applied as post hoc test to determine which of the paired mean differences was significant. All the cases 0.05 level of confidence.

Key words: Aquatic Exercise, Speed, Explosive Power.

Introduction

The ability to rapidly apply force (reactive force) is the major goal of plyometric training. Plyometrics are used to apply an overload to the muscles with speed strength as goal. Plyometrics should not be considered an end in themselves, but part of an overall program

stretching, running, strength training, nutrition, etc. After the athlete has begun a proper strength and conditioning program, plyometrics are used to develop speed strength. **Chu.D (1999)**.

Besides in depth jumps, there are other types of plyometric drills with various intensity levels and directions, movements, these will be explained later. Jumping, hopping, skipping, and even running involve some degree of a stretch shortening movement, in that all of them utilize a counter movement of varying degree. Examples of the counter movement in sports are basketball players" preparing to jump up for a rebound, a volleyball player preparing to jump up for a spike, a high jumper preparing to jump over the bar, and a wrestler is preparing for the drop step. Plyometric training is similar to progressive resistance training in that both incorporate overload principles. Drills should progress gradually from basic difficult and from low to high intensity. Form and technique should be emphasized at all stages of the program. (**Fleck, S., and W.Karaemer, 2002).**

Methodology

To achieve this purpose, thirty six male students were selected from Alagappa University Hostel, Karaikudi, Tamil Nadu and India and they were randomly assigned into one control group and two experimental groups of towel each subject, such as aquatic plyometric training with resistance group (Group-I), aquatic plyometric training without resistance group (Group-II) and control group (Group-III). The experimental group I underwent aquatic plyometric training with resistance in the evening session and group II underwent aquatic plyometric training without resistance in morning session for four days per week (Monday, Tuesday, Thursday and Friday) for the duration of ten weeks. Group III underwent control group. The dependent variables namely speed and explosive strength was selected as a criterion variable and it was measured by administrating the 50 meter run test and standing broad jump. The data were collected from each subject before and after the training period and statistically analyzed by using an analysis of covariance (ANCOVA) was used to find out the significant difference, if any among the adjusted post test means of experimental groups on each variables separately. Whenever, the obtained F-ratio for adjusted post test means was found to be significant, the Scheffe's test was applied as post hoc test to determine which of the paired mean differences was significant. All the cases 0.05 level of confidence.

Statistical Analysis

The effects of dependent variables on selected speed and explosive strength was determined through the collected data by using appropriate statistical techniques and the results are presented below. Table I & II present speed and explosive strength pre and post test means and the results of the analysis of variance and co- variance of aquatic plyometric training with resistance, aquatic plyometric training without resistance and control groups on selected speed and explosive strength. Statistical significance was set to a priority at $\alpha<0.05$. All statistical tests

were calculated using the Statistical Package for the Social Science (SPSS) for Windows (Version 21).

Table -I

Computation of analysis of variance and co- variance of the pre test and post test on speed of training groups (in seconds)

	Control group	Experimental Group I	Experimental Group II	Source of variance	Sum of Squares	Df	Means Squares	F Ratio
Pre test Means	6.936	6.932	6.954	B W	0.003 0.439	2 33	0.002 0.003	0.119
Post-test Means	7.108	6.759	6.828	B W	0.820 1.284	2 33	0.410 0.039	10.539
Adjusted post-test Means	7.111	6.821	6.764	B W	0.830 1.151	2 32	0.415 0.036	11.531

*** Significant at .05 level of confidence with degrees of freedom 2 & 33 and 2 & 32 is 3.28**.

Results

Table-I shows the analyzed data on speed assessed through 50 meters run test. Pre-test means of speed for a control group (group I), aquatic plyometric training with resistance group (group II), and aquatic plyometric training without resistance groups (group III) were 6.936, 6.932 and 6.954 respectively. The obtained F ratio 0.119 was lesser than the required table value of 3.28. Hence the pre test was insignificant. The post test means for 7.108, 6.759 and 6.828 respectively. The obtained F ratio was 10.539 which is greater than the required table value of 3.28. Hence the post test was significant the adjusted post test means for 7.111, 6.821 and 6.764 respectively. The obtained F ratio was 11.531 which is greater than the required table value of 3.28. Hence the adjusted post test was significant at 0.05 level of confidence for the degrees of freedom 2 and 32.

Table -II

Computation of analysis of variance and co- variance of the pre test and post test on Explosive Strength training groups (in meters)

	Control Group	Experimental Group I	Experimental Group II	Source of variance	Sum of Squares	Df	Means Squares	F Ratio
Pre test Means	2.026	2.027	2.042	B W	0.002 0.313	2 33	0.001 0.009	0.100
Post-test means	2.068	2.186	2.145	B W	0.086 0.209	2 33	0.043 0.006	6.826

Adjusted post-test means	2.072	2.189	2.136	B W	0.083 0.031	2 32	0.042 0.001	42.45

*** Significant at .05 level of confidence with degrees of freedom 2 & 33 and 2 & 32 is 3.28**.

Results

Table-II shows the analyzed data on Explosive Strength assessed through standing broad jump test. Pre test means of explosive strength for a control group (CG), aquatic plyometric training with resistance group (Experimental group I), and aquatic plyometric training without resistance group (Experimental group II) were 2.026, 2.027 and 2.042 respectively. The obtained F ratio 0.100 was lesser than the required table value of 3.28. Hence the pre test was insignificant. The post test means for 2.068, 2.186 and 2.145 respectively. The obtained F ratio was 6.826. Which is greater than the required table value of 3.28.Hence the post test was significant. The adjusted post test means for 2.072, 2.189 and 2.136 respectively. The obtained F ratio was 42.45 which is greater than the required table value of 3.28. Hence the adjusted post test was significant at 0.05 level of confidence for the degrees of freedom 2 and 32.

Table -III

Adjusted Final Mean Differences on Speed and Explosive Strength of Experimental and control Groups

Name of the Variable	Control group	Experimental group I	Experimental group II	Mean Difference	CI value
Speed	7.111	6.821		0.29	3.643
		6.821	6.764	0.057	
	7.111		6.764	0.347	
Explosive strength	2.072	2.189		0.117	1.147
		2.189	2.136	0.053	
	2.072		2.136	0.064	

Post-hoc test was conducted to evaluate the pair-wise difference among the adjusted post test means for control group and two experimental groups in speed and explosive strength. The Scheffe's test was used to three pair-wise comparisons with confidence interval value of speed and explosive strength is 3.643 and 1.147. The adjusted mean difference between the control group and experimental group I, experimental group I and experimental group II, control group and experimental group II speed and explosive strength are 0.29, 0.057 and 0.347. 0.117, 0.053 and 0.064 respectively. All the mean differences were less than the confidence interval value of

speed and explosive strength. It shows that there is insignificance difference between the control group and two experimental groups.

RESULTS AND FINDINGS

The results of the present study demonstrated that ten weeks training programme of aquatic plyometric training with resistance training group, aquatic plyometric training without resistance training group and control group has showed significant improvement in the selected dependent variable of speed and explosive strength. It is also found that there were insignificant differences between the control group and experimental group I, experimental group I and experimental group II, control group and experimental group II on selected speed and explosive strength among volleyball players.

CONCLUSION

1. It was concluded that there were significance improvement on speed and explosive strength due to the effects of aquatic plyometric training with resistance group, aquatic plyometric training without resistance group and control group among volleyball players
2. There is insignificance difference between the control group and two experimental groups on selected speed and explosive strength among volleyball players.

RECOMMENDATION

The following recommendation for future research is based on the results of this investigation and the related literature.

The results of this research study clearly indicate that the aquatic plyometric training with resistance training programme enhances the speed and explosive strength. Hence it is recommended that physical education experts and coaches should give importance to the aquatic plyometric training with resistance training programme for the school and college students which will helps to develop speed and explosive strength. Hence the students can be very active and alive in the class room and also healthy in their life style.

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