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Effect of Ressitance and Aquatic Ressistance Training on Selected Strength Variables Among College Men

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ABSTRACT

The aim of the study was to analyze the effect of resistance and aquatic resistance training on maximum strength and explosive strength for college men. Thirty six students were randomly selected from Department of Physical Education, The M.D.T.Hindu College, Tirunelveli, Tamilnadu as subjects and their age ranged from 17 to 21. The subjects were divided into three groups (two experimental and one control group) Group 1 (n=12) as resistance training, Group 2 (n=12) aquatic resistance training and Control Group 3 (n=12). The experimental groups go to resistance and aquatic resistance training for 12 weeks, where as the control group did not do any training as par with their regular routine activities. The paired sample t-test was used to find out the significant improvement on selected criterion variable's pre and post test. The analysis of covariance (ANCOVA) was used to find out the significant difference among the groups, if any, separately for each criterion variable. It was found that there was a significant improvement and significant different existed due to the effect of resistance and aquatic resistance training on college men.

KEYWORDS Resistance Training, Aquatic Resistance Training, Strength

INDRODUCTION

The practice of physical activity in an aquatic environment has expanded greatly in recent decades because it is the only therapeutic and rehabilitation practice to be used in both recreational practice in healthy individuals and in high-performance practices. These new fields of application are supported by short-term improvements in muscle strength, power and fat-free mass in young, physically active men after aquatic strength training using aquatic devices that increase drag force.

In light of this, aquatic exercise programs employing aquatic devices that increase drag force with the aim of improving the physical capacity and body composition of individuals could be an alternative to land-based training.

Physical activity, especially resistance training, is a major determinant in maintaining muscle mass and reducing the accumulation of intramuscular fat. Selection of the appropriate physical activity is essential in order to avoid injuries and ensure exercise adherence. Recently, aquatic exercise has been proposed as an alternative mode of exercise for improving overall fitness, especially in individuals with low levels of physical fitness. The rationale for using aquatic balance training is seen in the various properties of water, the most important of which include buoyancy, hydrostatic pressure, and viscosity. Water acts as a variable 'accommodating' resistance. This resistance promotes strengthening of muscles. It has been hypothesized that viscosity and buoyancy may improve balance by the stimulation of muscle proprioception and deep muscles in water. Although water reduces the effects of weight on skeletal joints at rest, thus imposing little strain on low-joint extremities, the resistive effect of water provides exercise loading during limb movements, which enhances muscular tension and increases energy expenditure beyond that achieved with land exercise. While it is accepted that resistance training programmers can improve muscle mass, strength, power, and local muscular endurance less is known about the effects of different modes of resistance training, such as aquatic resistance on these parameters or other indicators of health.

SELECTION OF SUBJECTS

For this study thirty six male students from Department of Physical Education, The M.D.T. Hindu College, Tirunelveli District, Tamilnadu, were selected as subjects. All the subjects were informed about the nature of the study and their consent was obtained to cooperate till the end of the experiment. Their age varied from 17-21years. The subjects were divided into three groups as Resistance Group 1 (n = 12), Aquatic Resistance Group 2 (n = 12) and Control Group 3 (n = 12). The experimental groups attended Resistance and Aquatic Resistance Group training for 12 weeks. Group 3 (n=12) acted as a control group and they did not participate in any training program on par with experimental group. All the participants in this study were carefully monitored throughout the training program. The training program was scheduled between 6.30 am to 7.30 am in the morning session, three alternative days for 12 weeks. All the subjects underwent a medical check-up to ready- out that they are free from any medical ailments and the subject revealed that they were not consuming any drugs.

SELECTION OF VARIABLE

Physical variables were selected by reviewing and studying related literature in detail. A feasible analysis to which these variables could be taken for the investigation is made in consultation with the supervisor who himself is an, keeping in mind the availability of the equipments acceptability of the subjects and the suitable time that would be devoted for test as well as keep the entire study integrated. Following criterion variables were selected for this study.

TABLE -1
DEPENDENT VARIABLE AND TEST

S.No	Variables	Tests/Instruments	Unit of Measurements
1	Maximum Strength	1 Rm Leg Strength Test	Kilograms
2	Explosive Strength	Vertical Jump Test	In centimeters

TRAINING PROGRAM

During the training period, the experimental group underwent their respective training programs in addition to their regular program. Group 1 (n=12) underwent Resistance training with varied intensities. Group 2 (n=12) underwent Aquatic Resistance training with varied intensities for three alternative days per week for twelve weeks. Group 3 (n=12) acted as a control group and they did not participate in any training on par with the experimental groups. The training program was scheduled in the morning session between 6.30 am to 7.30 am.

ANALYSIS OF THE DATA

The effects of Resistance and Aquatic Resistance Training on selected criterion variables were analyzed and presented below.

TABLE II

SUMMARY OF MEAN AND DEPENDENT 't' – TEST FOR THE PRE AND POST TESTS ON SELECTED VARIABLES OF RESISTANCE, AQUATIC RESISTANCE TRAINING GROUP AND CONTROL GROUP

S.No	Variables		Pre Test		Post Test		Adjusted Post test mean	t-value
			mean	sd	mean	sd		
1	Leg strength	Resistance Group	48.42	2.64	49.58	2.50	49.45	5.19*
		Aquatic Resistance Group	48.17	2.21	49.00	2.17	49.10	5.00*
		Control Group	48.25	3.22	48.58	3.03	48.61	1.77
2	Vertical jump	Resistance Group	2.44	0.16	2.52	0.15	2.50	5.79*
		Aquatic Resistance Group	2.41	0.14	2.47	0.15	2.48	4.70*
		Control Group	2.43	0.15	2.44	0.15	2.43	1.65

*Significant at 0 .05 level

Table Value required for 0.05 level of significance with df 11 is 2.20

The obtained t" ratio value of the experimental groups resistance and aquatic resistance on leg strength 5.19, 5.00 and vertical jump are 5.79, 4.70 respectively which were greater than the required table value of 2.20 for df 11 which was significant at 0.05 level of confidence . However the obtained t ratio value of the control group on leg strength and Vertical jump were 1.77, 1.65 respectively which were lesser than the required table value of 2.20 for significant at 0.05 level of confidence. It reveals that significant differences between the pre and post test means of experimental groups on leg strength and vertical jump. However no significant differences existed between the pre and post test means of the control group on leg strength and vertical jump.

Table III

Results of Analysis of Covariance for the Selected Dependent Variables among Experimental AND CONTROL Groups

Variables	Obtained 'F'Ratio	ETA2	Account of Variance	Sig.
leg Strength	5.12	0.243	24%	.012
Vertical jump	11.35	0.415	42%	.000

Table Value required for significance 0.05 level of confidence for df 2and 32 is 3.30

*Significant at 0.05 level.

The F ratio of leg strength (2, 32) is 5.12 (p=.012). This means that the training methods had main effects on leg strength. This effect is accounted for 24% of the variance on leg strength (Eta^2 =0.243). The F ratio of vertical jump (2, 32) is 11.35 (p=.000). This means that the training methods had main effects on vertical jump. This effect is accounted for 42% of the variance on vertical jump (Eta^2 =0.415). It is concluded that due to the effect of 12weeks of resistance and aquatic resistance training the variables leg strength and vertical jump were significantly improved.

Table iv

Summary of the Scheffe's Post Hoc Pairwise Comparisons on LEG Strength AMONG EXPERIMENTAL and Control Groups

Resistance Group	Aquatic Resistance Group	Control Group	Mean Difference	C.I. Value
49.45	49.10		0.35*	0.06
49.45		48.61	0.84*	0.06
	49.10	48.61	0.49*	0.06

CI Value- Confidence Interval Value of Scheffe's post hoc test.

*Significant at 0.05 level

The Resistance Group (Adjusted Post test Mean = 49.45) significantly outperformed the Aquatic Resistance Group (Adjusted Post test Mean = 49.10) in leg strength with adjusted mean differences of 0.35 (CI = 0.06) and also the experimental groups, Resistance Group and Aquatic Resistance Group significantly outperformed the control group (Adjusted Post test Mean = 48.61) in leg strength with adjusted mean differences of 0.84 and 0.49 (CI = 0.06).

Table v

Summary of the Scheffe's Post Hoc Pair wise Comparisons on VERTICAL JUMP among Experimental and Control Groups

Resistance Group	Aquatic Resistance Group	Control Group	Mean Difference	C.I. Value
2.50	2.48		0.02*	0.06
2.50		2.43	0.07*	0.06
	2.48	2.43	0.05*	0.06

CI Value- Confidence Interval Value of Scheffe's post hoc test.
*Significant at 0.05 level

The Resistance Group (Adjusted Post test Mean = 2.50) significantly outperformed the Aquatic Resistance Group (Adjusted Post test Mean = 2.48) in vertical jump with adjusted mean differences of 0.02 (CI = 0.06) and also the experimental groups, Resistance Group and Aquatic Resistance Group significantly outperformed the control group (Adjusted Post test Mean = 2.43) in vertical jump with adjusted mean differences of 0.07 and 0.05 (CI = 0.06).

DISCUSSION OF FINDINGS

The results of the study indicates that there was significant improvement on selected dependent variables namely leg strength and vertical jump due to the effect of resistance and aquatic resistance training.

The results of the study also indicates that resistance training group significantly outperformed aquatic resistance training group on all the selected dependent variables namely leg strength and vertical jump.

is inferred from the literature and from the result of the present study that, designed training develops improvement in the selected dependent variables namely leg strength and vertical jump and also both group out performed on the dependent variables when compared with control group.

CONCLUSIONS

- From the analysis of the data, the following conclusions were drawn.

- There was a significant improvement of resistance and aquatic resistance training group on leg strength and vertical jump.
- There was a significant differences existed between experimental groups and control group on selected variables in favor of resistance and aquatic resistance training group

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