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EFFECT OF WATER POLO TRAINING ON LEG STRENGTH OF INTER-COLLEGIATE SWIMMERS

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ABSTRACT:

The purpose of this study was to investigate the effect of Water polo training on Leg Strength of inter-collegiate swimmers. ***Materials and Methods****: For achieving the purpose of this study total 50 male beginner inter-collegiate swimmers were selected as subject from Degree College of Physical Education, Amravati, Maharashtra. Their age was ranging from 18 to 25 years; Leg Strength was recorded in kilogram by using Leg dynamometer on both the selected groups i.e. Experimental and Control groups, Only experimental group underwent water polo training for 48 weeks. Pre, Mid and Post tests were applied for both the groups to find out the significant effect of water polo training Leg Strength.* ***Result:*** *The data were analyzed through 't'-test and ANOVA statistical techniques. The statistical findings revealed that experimental group significantly improved Leg Strength through swimming training.* ***Conclusions:*** *Leg Strength has significantly improve among the subjects of Experimental group after 48 weeks of swimming training, whereas insignificant effect has occurred due to 24 weeks of water polo training programme, whereas no significant improvement has been shown in Control group.*

KEY WORDS: *Water polo training, leg strength.*

INTRODUCTION:

Water polo, quite simply, is the supreme form of water Sport, challenging to the mind and the body, uplifting to the spirit and the flesh, water polo is a fascinating sports that can grab you, hold you, and keep you healthy for the rest of your life.

PURPOSE OF THE STUDY

The main purpose of the study was to find out the effect of water polo training on Leg Strength of inter-collegiate swimmers.

The other purpose of the study was to determine the effect of water polo training on each independent selected variables of Leg Strength of inter-collegiate swimmers. And also to find out the significant effect of two different duration of training (24 weeks and 48 weeks) on Leg Strength of the above mentioned subjects.

SIGNIFICANCE OF THE STUDY

The present study would be significant to get an idea about the Leg Strength of inter-collegiate swimmers. The findings would provide guidelines to health instructors, physical education teachers and coaches, parents and students to enhance health and fitness through water polo training. The results of study may help to maintain the health of the intercollegiate players through water polo training programme which could be suggested to include in school curriculum.

HYPOTHESIS

In the beginning of the study, it was hypothesized that there would be significant effect of water polo training on Leg Strength of school going boys. It was further hypothesised that there would be significant difference between the effect of 24 weeks and 48 weeks of training on the selected dependent variables

METHODOLOGY

The male inter-collegiate swimmers who used to come for regular practice at Hanuman Vyayam Prasarak Mandal's swimming pool, Amravati served as the sources of data. Total 50 male inter-collegiate swimmers were selected by employing purposive sampling method, who had the ability to swim at least 500 meters in any survival stroke. The average age of the subjects were twenty one (21) years, ranging between 18 to 25 years. Their age was verified from the college admission register. The subjects were divided randomly into two groups viz. Experimental group and Control group; each group consisted of twenty five subjects.

Criterion Measures

Leg Strength was recorded in kilogram by using Leg dynamometer.

Collection of Data

The data pertaining to the present study were collected at different stages of the experiment. The data were collected prior to the start of the experiment (pre-test), at the end of 6 months (24 weeks) training period (mid-test) and immediately after 12 months (48 weeks) of training period (post-test) by administering the aforesaid tests and instruments on both the selected groups i.e. Experimental and Control groups.

Analysis of the data

To determine the significance of difference between the means of the Control and Experimental groups, independent t-test was employed for Pre-test, Mid-test and Post-test separately for each variable. The data were further analysed by applying One Way Analysis of Variance (ANOVA) in order to determine the significant difference among the groups for each selected dependent variables. When the difference was found to be significant, the LSD Post Hoc Test was applied to assess the significance of difference between the paired means of the selected variables for the Pre, Mid and Post-test of Control and Experimental groups. All the data were analysed by using (SPSS) Statistical Package for Social Sciences. To test the hypothesis the level of significance was set at 0.05.

Table - 1
MEAN, STANDARD DEVIATION AND t-RATIO FOR THE PRE, MID AND POST-TEST OF CONTROL AND EXPERIMENTAL GROUPS IN LEG STRENGTH

Test	Group	Mean	Standard Deviation	Mean Difference	Standard Error	t-ratio
Pre-test	Control	56.214	9.830	0.350	2.534	0.138@
	Experimental	56.564	7.991			
Mid-test	Control	58.844	9.932	0.842	2.548	0.330@
	Experimental	59.686	7.977			
Post-test	Control	60.784	9.750	1.624	2.573	0.631@
	Experimental	62.408	8.393			

@ Not significant at 0.05 level Tabulated $t_{0.05(48)} = 2.0106$

From the above Table-42 it is evident that there is no significant difference between the Control and Experimental group in Pre-test, Mid-test and Post-test in Leg Strength as the calculated t-values of 0.138, 0.330 and 0.631 respectively are less than the tabulated t-value of 2.0106 at 0.05 level of confidence for the 48 degrees of freedom. The mean values of Leg Strength are graphically depicted in Figure-1.

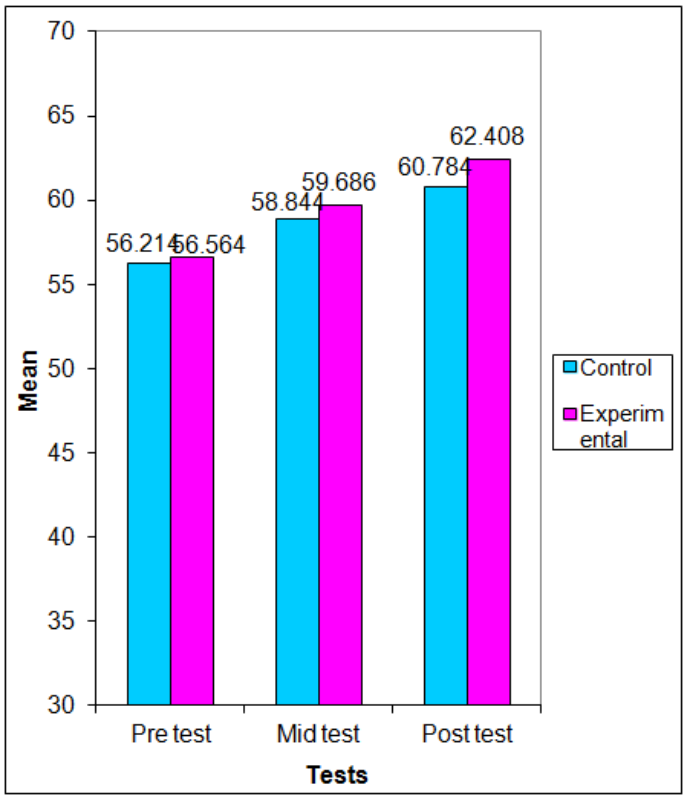

Figure – 1
Comparison of Means Among the Pre, Mid and Post-Test of Control and Experimental Groups in Leg Strength

Table - 2

SUMMARY OF ONE WAY ANALYSIS OF VARIANCE FOR THE DATA ON LEG STRENGTH OF PRE, MID AND POST-TEST OF CONTROL GROUP

Source of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-ratio
Between the Groups	K-1 3 – 1 = 2	263.045	131.523	1.359@
With in Group	N – K 75 – 3 = 72	6968.538	96.785	

@ Not Significant at 0.05 level Tabulated $F_{0.05\,(2,\,72)} = 3.123$

Findings of Table-43 indicate that there is no significant difference among the Pre, Mid and Post-test of Control group in Leg Strength, because the calculated F-ratio of 1.359 is less than the tabulated F-value of 3.123 at 0.05 level of confidence for the 2/72 degree of freedom.

Since the obtained F-ratio was found to be not significant, to determine the paired Mean Difference Among the three tests' mean scores, Least significant difference (LSD) Post Hoc Test was not employed.

Table - 3

SUMMARY OF ONE WAY ANALYSIS OF VARIANCE FOR THE DATA ON LEG STRENGTH OF PRE, MID AND POST-TEST OF EXPERIMENTAL GROUP

Source of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-ratio
Between the Groups	K-1 3 – 1 = 2	427.571	213.785	3.240*
With in Group	N – K 75 – 3 = 72	4750.394	65.978	

* Significant at 0.05 level Tabulated $F_{0.05\,(2,\,72)} = 3.123$

Findings of Table-44 reveal that there is significant difference among the Pre, Mid and Post-test of Experimental group in Leg Strength, because the calculated F-ratio of 3.240 is greater than the tabulated F-value of 3.123 at 0.05 level for the 2/72 degrees of freedom.

Since the obtained F-ratio was found to be significant, to determine the paired Mean Difference Among the three tests' scores, Least Significant Difference (LSD) Post Hoc Test was employed.

Table - 4

PAIRED MEAN DIFFERENCE FOR THE DATA ON LEG STRENGTH OF PRE, MID AND POST-TEST OF EXPERIMENTAL GROUP

Mean			Mean Difference	Critical Difference
Pre Test	Mid Test	Post Test		
56.564		62.408	5.844*	4.579
56.564	59.686		3.122@	4.579
	59.686	62.408	2.722@	4.579

* Significant at 0.05 level of confidence

@ Not Significant at 0.05 level of confidence

It is evident from the Table-45 that mean difference between Pre and Post-test is 5.844 which is greater than the Critical Difference value of 4.579. Hence significant difference is found in between Pre and Post-test of Experimental group in Leg Strength.

The Table also show that the mean difference in between Pre and Mid-test and Mid and Post-test are 3.122 and 2.722 which are less than the Critical Difference value of 4.579. Hence there is no significant mean difference in between Pre and Mid-test and Mid and Post-test of Experimental group in Leg Strength. The mean differences are graphically shown in Figure-2

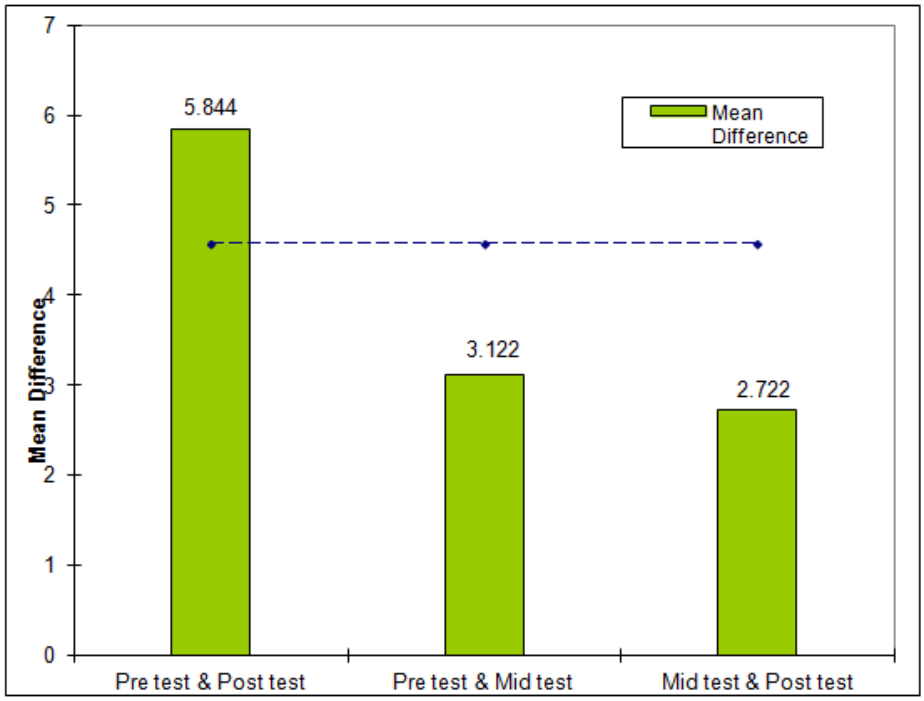

Figure - 2
Comparison of Mean Differences Among the Pre, Mid and Post-Test of Experimental Group in Leg Strength Along with Critical Difference

DISCUSSION ON FINDINGS:

The result of the statistical analysis further revealed that there was significant improvement among the subjects of Experimental group in Leg Strength due to 12 months of water polo training. It may be attributed to the fact that swimming is such an activity through which all the muscles are given exercises specifically shoulder, chest, back, trunk, abdominal and leg muscles. Because of systematic progressive water polo training the optimal development in muscular strength due to muscular hypertrophy i.e. increase in size and number of myofibrils, and muscular endurance increase in myoglobin content and capillary density surrounding the muscles might have occurred within the selected subjects and therefore such results are shown in this study.

DISCUSSION ON HYPOTHESIS :

It was also hypothesized that there would be significant effect of water polo training on Leg Strength of inter-collegiate swimmers . The findings of statistical analysis indicated that significant improvement has occurred with the subjects of Experimental group due to water polo training. Hence the hypothesis stated earlier is accepted.

It was also hypothesised that there would be significant difference between the effect of 24 weeks and 48 weeks of water polo training on Leg Strength. The result of the statistical analysis revealed that there was significant difference between the improvement of 24 weeks and 48 weeks of swimming training. Hence the hypothesis stated earlier is accepted.

CONCLUSIONS :

Within the limitations of the present study and on the basis of the findings, the following conclusions are drawn-

1. Significant improvement in Leg Strength has been shown by the Experimental group due to 48 weeks Experimental treatment, whereas no significant improvement has been shown in Control group.

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