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A Comparative Study of Effect of Sand Training on Male and Female Swimmers

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Abstract – The purpose of the study was to examine the effect of six weeks sand training on the leg strength of swimmers. To serve the purpose of the investigation, 16 male swimmers, and 10 female swimmers were selected as samples for the study. The students were studying in Lakshmibai National Institute of Physical Education, Gwalior, their age ranged between 18 – 25 years.

The variables selected for this study were as follows: Knee extension right, Knee extension left, Knee extension both, Knee flexion right, Knee flexion left, Knee flexion both, Abduction and Adduction .

The statistical technique applied in order to examine the hypothesis of the study were, descriptive statistics such as mean and standard deviation and comparative statistics of Pair Sample t Test and two sample t-test were used. SPSS 20.0 was used to assess and analyze the data.

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INTRODUCTION

Strength can be defined as the maximal force or torque (rotational force) a muscle or muscle group can generate. Strength is better defined as the ability of the neuromuscular system to produce force against an external resistance. Contemporary literature suggests that high levels of muscular strength are significantly related to sport performance. These data seem to support the contention that muscular strength is a major contributor to most sporting activities. Therefore, the resistance training can alter the neuromuscular system in a way that improves the athlete's capacity to produce force and improves sports performance.

The physical conditioning required for good swimming performance is made up of three major components: (1) strength, (2) endurance, and (3) flexibility.

Strength can be defined as the ability of a muscle or a group of muscles to overcome resistance or create tension-push, pull, or lift.

The use of heavy resistive exercises is now accepted practice for competitive swimmers. However, caution must be exercised when using them. While many calisthenics may be of little or no value, they generally are not harmful; in the case of a weight-training routine, it is entirely possible that a person might develop hypertrophy (enlargement) of the muscles to the point that their size becomes a handicap. In the program outlined in this chapter only those exercises have been selected which develop the muscles of prime importance in the propulsive phase of swimming the four competitive strokes. A swimmer planning his dry land exercise program should not enter into a general body building program. The exercises he uses should be designed specifically to strengthen and improve the endurance of the muscles that anatomists call the "prime movers." In swimming, these muscles are those that propel the swimmer through the water. It is also important that these muscles be exercised as much as possible in the same manner as they are used in the swimming strokes.

Sand training, like pool plyometric and other low impact methods, is a great way to get an intense, sports specific workout without taxing your joints too much. By itself it is not a long term solution to achieving a large functional vertical due to the lack of a reactive element. However, in short 4-8 week bursts, the variety, the challenge, and the fun of this style of training make it something well worth your consideration.[1]

Soft sand running is great for your joints. "The soft sand surface and barefoot running means your stabilizing muscles and joints work a little bit harder

[1]Jack Woodrup . retrieved from http://www.verticaljumping.com/sand_training.html on 21st Feb 2016.

to keep you balanced. It's insanely awesome strength work for your legs"[2]

METHODOLOGY

The subjects for this study were randomly selected from Swimming Match Practice Group of Lakshmibai National Institute of Physical Education, Gwalior, with the age group of range between 18– 25 years were selected as the subjects of the study. 8 male swimmers were kept as control group and another 8 male swimmers as experimental group similarly in case of female 5 were put in control group and 5 were kept in experimental group.

The literature shows that sand training is very helpful in improving the strength of the legs. So for the purpose of the present study the leg strength was taken as the dependent variable as it was dependent on the sand training.

Legs strength test were measured by using David 200 leg extensor machine. And the data was recorded in Nm (Newton)

A six weeks sand training program was designed. The training was given three days in a weeks on alternate days for one hour.

Pretest was conducted on the David 200 leg extensor machine and data was collected and then after completion of training program posttest was done and data was collected.

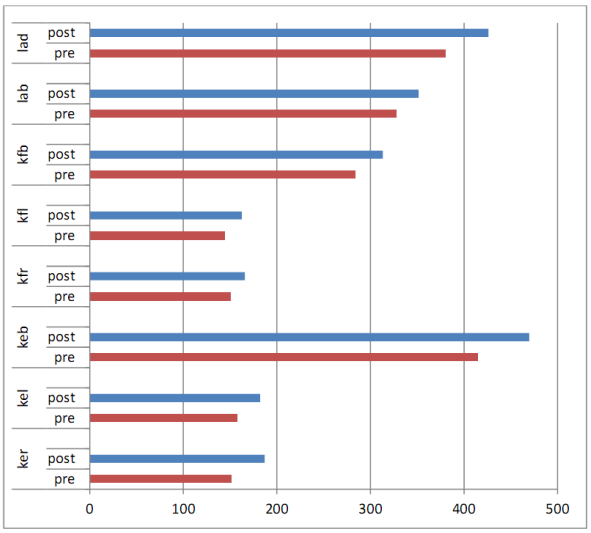
Statistical Technique

In this study, mean score of the leg strength was calculated which is obtained from the test. The pair sample t-test was used to analyze the data of pre and post data of the experimental groups separately for male and female and then the two sample t-test was used to analyze the difference between male and female experimental groups. The level of significance was fixed at 0.05.

FINDINGS AND DISCUSSIONS

Analysis was done with the help of Pair Sample t-Test was employed as a measure for the present data (SPSS 20 was used). Abbreviations used in the tables and discussions:

- Knee extension right - KER
- Knee extension left - KEL
- Knee extension both - KEB
- Knee flexion right - KFR
- Knee flexion left - KFL
- Knee flexion both - KFB
- Abduction - AB
- Adduction - ADD



Graphical Representation of paired t-test for male

Table-1

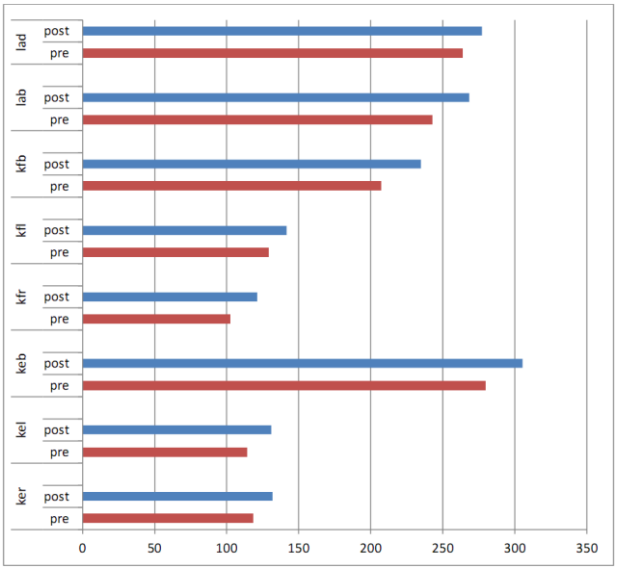
Paired Samples of Pre Test and Post Test of Male Experimental Group

Variables	Mean differences	t	Sig. (2-tailed)
Pre male KER – post male KER	-35.75000	-2.154	.068
Pre male KEL – post male KEL	-24.12500	-2.365	.050
Pre male KEB – post male KEB	-54.62500	-2.347	.051
Pre male KFR – post male KFR	-14.75000	-3.046	**.019***
Pre male KFL – post male KFL	-17.87500	-2.267	.058
Pre male KFB – post male KFB	-29.12500	-3.890	**.006***
Pre male AB – post male AB	-23.50000	-1.702	.132
Pre male ADD – post male ADD	-46.00000	-3.128	**.017***

From the above table-1. it can be seen that incase of Knee flexion right was found to be significant as the calculated t-value obtained at 0.05 level is 3.046 which is more than the tabulated t-value of 0.05 level at 7 df. Knee flexion both was found to be significant as the calculated t-value obtained at 0.05 level is 3.89 which is more than the tabulated t-value of 0.05 level at 7 df. Adduction was found to be significant as the calculated t-value obtained at 0.05 level is

[2]Anna Warwick. retrieved from https://www.12wbt.com/blog/fitness/soft-serve-soft-sand-running-is-a-low-impact-full-body-workout/ on 21st Feb 2016.

3.128 which is more than the tabulated t-value of 0.05 level at 7 df. Whereas in all other variables the difference was not found to be significant as the calculated t-value obtained are less than the tabulated t-value.



Graphical Representation of paired t-test for female

Table-2

Paired Samples of Pre Test and Post Test of Female Experimental Group

Variables	Mean differences	t	Sig. (2-tailed)
Pre female KER – post female KER	-13.20000	-5.242	**.006***
Pre female KEL – post female KEL	-17.00000	-10.159	**.001***
Pre female KEB – post female KEB	-25.80000	-4.475	**.011***
Pre female KFR – post female KFR	-18.60000	-4.034	**.016***
Pre female KFL – post female KFL	-12.60000	-1.066	.346
Pre female KFB - post female KFB	-27.80000	-2.885	**.045***
Pre female AB – post female AB	-25.40000	-4.201	**.014***
Pre female ADD – post female AD	-13.60000	-6.440	**.003***

From the above table-2. it can be seen that incase of knee extension right, knee extension left,knee extension both , Knee flexion right , Knee flexion both ,Abduction and Adduction was found to be significant as the calculated t-value obtained at 0.05 level for these variables was more than the tabulated t-value of 0.05 level at 4 df.. . Whereas in only one variable i.e. knee flexion left the difference was not found to be significant as the calculated t-value obtained are less than the tabulated t-value.

Table-3

Two sample t-test between male and female experimental group

	t-test for Equality of Means			
	t	df	Mean Difference	Sig. (2-tailed)
Po KER	1.442	11	55.20000	.177
Po KEL	1.572	11	51.12500	.144
Po KEB	2.758	11	164.22500	.019*
Po KFR	3.200	11	44.55000	.008*
Po KFL	1.065	11	20.90000	.310
Po KFB	2.262	11	78.32500	.045*
Po AB	2.319	11	82.97500	.041*
Po ADD	4.268	11	148.80000	.001*

From the above table-3 it can be seen that incase of Knee Extension both was found to be significant as the calculated t-value obtained at 0.05 level is 2..758 which is more than the tabulated t-value of 0.05 level at 11 df. Knee flexion right was found to be significant as the calculated t-value obtained at 0.05 level is 3.200 which is more than the tabulated t-value of 0.05 level at 11 df. Knee flexion both was found to be significant as the calculated t-value obtained at 0.05 level is 2.262 which is more than the tabulated t-value of 0.05 level at 11 df.,in case of Abduction was found to be significant as the calculated t-value obtained at 0.05 level is 2.319 which is more than the tabulated t-value of 0.05 level at 11 df. Adduction was found to be significant as the calculated t-value obtained at 0.05 level is 4.268 which is more than the tabulated t-value of 0.05 level at 11df. Whereas in all other variables the difference was not found to be significant as the calculated t-value obtained are less than the tabulated t-value.

DISCUSSION OF FINDINGS

The analysis of data using the pair t-test shown that there was significant difference on some variables i.e. in case of male Knee flexion right, Knee flexion both and Adduction and in case of female except Knee flexion left, all other variables showed significant difference after six weeks sand training on the leg strength of swimmers . This means that sand training seems to be effective in the improvement of strength of legs .Literature also shows that sand training develops more strength in the lower limbs.Similarresult was found by Asadi, 2011).

The study also shown that there was insignificant difference in some variables i.e. Knee extension right, Knee extension left, knee extension both, Knee flexion left and Abduction, in case of male and knee flexion left in case of female. It may be

attributed to the fact that the swimmers are using leg kick during swimming for keeping the streamlined position in the water which in turn develops the leg strength.

The swimmers of the institute are engaged in regular physical education, sport activities and program in their curriculum. All the subjects belonged to swimming match practice group. Swimmers do vigorous leg kick during swimming so developed good amount of leg strength specially the knee extensor group of muscles. The small size might have been one of the reason for above finding. Similar result was found by Mirzaei, B., et al. (2014).

The results of the two sample test reveals that there is significant difference in case of KEB, KFR, KFB, AB, ADD. The present six week training might be one of the reason for the present result but there are also possibility that some other factors might also be the cause of the above findings

REFERENCES

Asadi, A. (2011). The effects of a 6-week of plyometric training on electromyography changes and performance. *Sport Science*, *4*(2), pp. 38-42. (http://www.sposci.com/PDFS/BR0402/SVEE/04%20CL%2007%20AA.pdf). Baechle ,Thomas R, , Roger W. Earle 2008: 4

Bompa ,Tudor O. (2009). PhD (York University) G. Gregory Haff, PhD, West Virginia University 2009: 261

Counsilman, James E. (1985). Ph.D. Swimming Coach and Professor of Education, Indiana University Bloomington, Indiana 1985: 276, pp. 277-279.

Mirzaei, B., Asghar Norasteh, A., Saez de Villarreal, E., & Asadi, A. (2014). Effects of six weeks of depth jump vs. Countermovement jump training on sand on muscle soreness and performance. *Kineziologija*, *46*(1), pp. 97-108. http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=182788)

Warwick (2016). Anna retrieved from https://www.12wbt.com/blog/fitness/soft-serve-soft-sand-running-is-a-low-impact-full-body-workout/ on 21st Feb 2016.

Woodrup (2016). Jack retrieved from http://www.verticaljumping.com/sand_training.html on 21st Feb 2016.

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