International Journal of Physical Education and Sports Sciences

Vol. IV, No.I, October-2012, ISSN 2231-3745

EFFECT OF TRAINING IN WATER AND SAND ON PHYSICAL AND PHYSIOLOGICAL PARAMETERS

www.ignited.in

International Journal of Physical Education and Sports Sciences
Vol. IV, Issue I, October-2012, ISSN 2231-3745

Comparison of Sports Facilities and Physical Education Programme in Different Sectors of School in Patiala

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Abstract:- Water training and sand training is a safe form of exercise to develop physiological and physical variables. However, it is not known to what extent selected variables may be improved. Therefore, the aim was to assess the comparative effects of training in water and sand on selected variables. Thirty-three students aged 20.7 ± 2.23 were randomly selected from badminton match practice group of the Lakshmibai National University of Physical Education. Players were tested on the selected physiological parameters i.e. resting pulse rate, vital capacity and positive breath holding, and physical parameter i.e. specific speed. the subjects were divided into three groups randomly i.e. the group undergoing training in water and sand respectively, as well as one group was kept as control. The training programme for the experimental groups was a period of 35-40 minutes, three times a week for six weeks. After the intervention, there is a significant difference between water training group and control group as well as between sand training group and control group in vital capacity. No significant difference were found among water training group, sand training group and control group in speed, resting heart rate and positive breathe holding. In conclusion, paucity of time in training and less no. of participants might impart no significant differences in many variables.

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INTRODUCTION

Training is a process by which an athlete is prepared for the highest level of performance possible. The intent of training is to increase the athlete's skills and work capacity to optimize athletic performance. Training is undertaken across a long period of time and involves many physiological, psychological and sociological variables (Bompa and Haff, 2009). Proper training is required to enhance physical and physiological variables of the badminton players. Water and sand training are one of them which require extra efforts to sustain for longer durations. The training in water is more comprehensive and beneficial than land exercise for rehabilitation and fitness. Buoyancy, decreased compressive forces and hydrostatic pressure on submerged body parts are few unique properties of water (White, 1995). Therefore, water exercises helps to breathe more deeply, and breathing deeply and regularly is a great regulator of feelings of well being and being able to cope in everyday life (Bill And Rose, 1986). On the other hand sand training , like pool plyometrics and other low impact methods, is a great way to get an intense, sports specific workout without taxing the joints too much (Woodrup, 2008). Sand running is also being utilized in conjunction with other forms of training by the coaches. Sand running is characterized by hard work with little rest. It uses the nearness of the sea as an incentive to greater efforts. Hence the badminton is characterized by a great intermittent exercise, notably with the use of both aerobic and anaerobic energy metabolism (Wongt et al., 1995). Physiological and physical changes in the human body may be brought about by different types of conditioning programmes. There are many different programs that can be used in the water. Aquatic Step Training, Circuit Training, Interval Training, Aquatic Rehabilitative Assistance, Team Training, Deep Water Training, Shallow Water Training, and Plyometric Training are the main areas of aquatic fitness. Water training is simply training done in water. They are very low-impact and, due to the buoyancy of the water, are very good for overweight people. It is not necessary to know how to swim to do water training as they are usually done in a pool in waist-high water (Witten, 2005). Thus, the researcher is interested whether water and sand

training will bring certain changes on the selected variables.

2. METHODS

2.1 Participants

Thirty-three students were randomly selected from badminton match practice group of the Lakshmibai National University of Physical Education. Subjects provided written, voluntary, informed consent prior to participation and they were volunteered to participate in the training. All were regular players and accustomed to good level of exertion. The age of the subjects was 20.7 ± 2.23.

2.2 Design

Players were tested on the selected physiological parameters i.e. resting pulse rate, vital capacity and positive breath holding, and physical parameter i.e. specific speed. Pre test and post test randomized group design was adopted for the study.

2.3 Materials

Vital capacity was measured by spirometer (computer attached software) and the results were recorded in liters. Resting pulse rate was measured by total number of heart beats per minute in the resting condition. Positive breath holding time was measured by the use of nose clip & stopwatch and recorded in seconds. Specific speed was measured by one minute speed test which measures the specific speed i.e. footwork of the badminton and results was recorded in seconds.

2.4 Procedure

All the subjects were tested in the selected criteria of physiological variables. After the administration of pre-test, the subjects were divided into three groups randomly i.e. the group undergoing training in water and sand respectively, as well as one group was kept as control. The training programme for the experimental groups was a period of 35-40 minutes, three times a week for six weeks. After the administration of training, subjects were again tested on the same parameters for the post testing.

2.5 Statistics

In order to examine the hypothesis of the study, descriptive statistics such as mean and standard deviation was used. To compare the effects of training in water and sand on physiological parameters, the one way analysis of co-variance (F-ratio) was employed and the level of significance was set at 0.05. In case of significant results, post hoc test (LSD) was employed, to find the mean difference among the groups. The SPSS statistical software package was used for statistical calculations.

3. RESULTS

For the analysis of the data, the following results were drawn. The descriptive statistics of physiological and physical parameters are shown in table 1.

Table 1

Mean and S.D. of selected Physiological and physical parameters of badminton players before and after training on different surfaces

Surface	Vital Capacity	Resting Heart Rate	Positive Breath Holding	Speed
Water pre	4.72 ± 0.31	56.36 ± 3.66	60.57 ± 29.50	13.09 ± 1.01
Water post	4.82 ± 0.38	55.36 ± 2.73	69.01 ± 30.51	12.94 ± 0.90
Sand pre	4.31 ± 0.39	58.18 ± 4.42	61.01 ± 26.74	13.33 ± 0.74
Sand post	4.48 ± 0.41	57.09 ± 3.59	76.62 ± 24.62	13.15 ± 0.66
Control pre	4.36 ± 0.76	55.09 ± 4.67	71.48 ± 21.86	13.36 ± 0.74
Control post	4.35 ± 0.70	54.63 ± 3.95	77.17 ± 20.82	13.38 ± 0.86

Table 1 showed that the Mean and standard deviation of all the physiological and physical parameters before and after training on different surfaces. All the participants gone under the training actively and regularly, still the greater changes in the mean value takes place in sand training group in all the physiological and physical parameters i.e. 4.31 ± 0.39 to 4.48 ± 0.41 in vital capacity, 58.18 ± 4.42 to 57.09 ± 3.59 in resting heart rate, 61.01 ± 26.74 to 76.62 ± 24.62 in positive breath holding and 13.33 ± 0.74 to 13.15 ± 0.66 in speed respectively.

Analysis for co-variance (ANCOVA) for the means of physiological and physical parameters among different surfaces has been shown in Table 2

Variables	Variance	Df	SS	MSS	F	Sig
Vital Capacity	Between	2	0.18	0.09	**4.42***	0.02
	Within	29	0.61	0.02		
Resting Heart Rate	Between	2	0.58	0.29	**0.89**	0.41
	Within	29	9.45	0.32		
Positive Breath Holding	Between	2	467.78	233.89	**1.82**	0.17
	Within	29	3710.48	127.94		
Speed	Between	2	0.35	0.17	**0.89**	0.41
	Within	29	5.79	0.20		

*** The mean difference is significant at the 0.05 level.**

Table 2 showed that there is no significant differences among water training group, sand training group and control group on speed, resting heart rate and positive breath holding as their respective F-ratios of 0.89, 0.89 and 1.82 were less than the F-value of 2,29 df. But, there is a significant difference among water training group, sand training group and control group on vital capacity as the

obtained F-ratio of 4.42 was found to be more than the tabulated F-value of 3.33 at .05 level of significance. As the obtained F-ratio for vital capacity was found to be significant, LSD post hoc test was applied to determine the significance of differences between the paired means. The analysis pertaining to post hoc test is given in table 3.

Table 3: Post hoc test (LSD) for mean comparison among three groups in vital capacity

(I) treatment group	(J) treatment group	Mean Difference (I-J)	Sig.
Water	control	.13*	.04
Sand	control	.17*	.00

*. The mean difference is significant at the 0.05 level.

It is evident from table 3 that the post hoc test (LSD) shows significant differences between water training group and control group as well as between sand training group and control group in vital capacity. There is no significant difference between water training group and sand training group in vital capacity.

4. DISCUSSIONS

Findings of the present study showed that there is a significant difference between water training group and control group as well as between sand training group and control group in vital capacity.

Vital capacity and total lung capacity are related to body size and vary approximately as the cube of linear dimensions such as body height, up to age of twenty five. The water and sand training has brought significant changes which might be attributed due to continuous and long duration of vigorous training which increases the total lung volume capacity as well as pulmonary function.

No significant difference were found among water training group, sand training group and control group in speed, resting heart rate and positive breathe holding.

The results might be attributed due to the paucity of time in training. The time duration in which the training was imparted to the subject by researcher was insufficient to bring about significant differences or might be due to the less no. of participants in the study.

Similar results were also seen in the study of Broman et. al., 2006 and barabara et al., 1983.

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