Effect of Sand Running and Weight Training on Selected Physiological Variables of College Men

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The purpose of this study was to determine the Effect of Sand Running and Weight Training on Selected Physiological Variables of College Men. For the purpose the investigator randomly selected 60 male subjects from St.Thomas College, Pala, St.Dominics College, Kanjirapally and S.B College, Changanaserry and their age ranged from 18 to 25 years. 20 subjects were assigned to do sand running and 20 subjects were assigned to do weight training. Other 20 subjects acted as control group. Prior to the administration of test the investigator held a series of meetings with the subjects and cleared their doubts about the objectives and purposes of the test. The testing procedure was explained to them in detail. They were requested to co-operate and participate actively as subjects for this study. The subjects assured their voluntary participation during treatment period.

This study was formulated as purposive random group design. Two groups were exposed to experimental training and other group was kept as control group. One experimental group was assigned the sand running, and the other was assigned the weight-training programme. and no training programme was given to control group except their day to day activities. The experimental groups were given training programme for a period of eight weeks. The intensity and repetitions were increased after every two weeks.

The following performance related physiological variables were selected
1) Aerobic Capacity
2) Resting Pulse Rate
3) Blood pressure

The criterion measures chosen for testing the hypothesis were:
1) Aerobic capacity - coopers 12-minute run/ walk
2) Resting pulse rate - pulse counted for one minute
3) Blood pressure
   The experimental group had to undergo the experimental training programme for a period of eight weeks, three days in a week. The control group did not involve in any training programme.

Schedule of sand training programme is given under:
The sand training group did the training on soft sand. They did the different types of running variations and jumping exercise for a period of eight weeks, three days in a week. The duration and intensity of training increased gradually after every two weeks.

Schedule of weight training programme was as follows
Intensity: 60% of their 1RM was given in the first two weeks and it increased to 70 %. After four weeks it increased to 75% and last two weeks it increased to 80% of their 1RM.

Duration: 90 minutes

Recovery: 4-6mins

Days	First two weeks	2-4 weeks	4-6 weeks	6-8 weeks
Monday	Rowing Leg press Military press	Dumbbell fly's Full squat Good morning exercise	Power clean Seated cable rows Military press	Rowing Leg press Military press
Wednesday	Bench press Upright rows Half squat	Bench press Leg press Military press	Bench press Upright rows Half squat	Power clean Seated cable rows Military press
Friday	Power clean Seated cable rows Military press	Rowing Leg press Military press	Dumbbell fly's Full squat Good morning exercise	Bench press Upright rows Half squat

Analysis of Covariance (ANCOVA) was used to determine the effect, if any, among the three groups on the selected criterion variables separately. Whenever the 'F' ratio for adjusted post test was found to be significant, the Scheffe's test was applied as post-hoc test to determine the paired mean differences.

Analysis of data
The detailed account of the statistical analysis is presented below.

TABLE- I
DESCRIPTIVE STATISTICS OF AEROBIC CAPACITY OF THE THREE GROUPS

GROUPS		Mean	Std. Deviation	N
SAND TRAINING	Pre test	45.9410	4.59492	20
	Post test	51.1935	4.64703	
WEIGHT TRAINING	Pre test	46.2525	5.80254	20
	Post test	48.2105	5.98071	
CONTROL	Pre test	48.6635	6.40390	20
	Post test	48.5205	6.34353	

Table I shows the mean and standard deviation for pre and post test scores in aerobic capacity of sand training, weight training and control groups

TABLE- II
ANALYSIS OF COVARIANCE ON AEROBIC CAPACITY OF SAND TRAINING, WEIGHT TRAINING AND CONTROL GROUPS

Source	df	Sum of squares of X	Sum of squares of Y	Sum of Squares of X.y	Sum of Squares of Y.x	MSS Y.x	F ratio
Between means	2	88.813	107.595	45562.3	278.985	139.49	61.035*
With in groups	57	1820.0	1854.47	1773.59	127.985	2.285	
Total	59	1908.8	1962.07	47335.9			

*F .05 (2.57) = 3.165, F .05 (2.56) = 3.159

Table II shows the adjusted means of the posttest scores between the three groups. The calculated f value of 61.035 was greater than the table value of 3.159 at 0.05 level of confidence. This indicates that there was a significant difference on the effect of training on aerobic capacity between the groups.

Since the "F" ration was found to be significant, the data was subjected to post hoc analysis to make pair wise comparison to prove which of the groups proved better when compared with each other.

Table III
SCHEFFES POST HOC TEST FOR MEAN DIFFERENCE BE-TWEEN GROUPS ON AEROBIC CAPACITY

Sand training	Weight training	Control	Mean difference	Critical Value
52.178	48.892		3.286	2.9339
52.178		46.854	5.325	2.9339
	48.892	46.854	2.038	2.9339

Table III shows the pair wise comparison between the three groups the mean difference between sand training group and weight training group was 3.286, between the sand training and control group the difference in mean was 5.325, which was higher than the critical value of 2.9339 required to be significant. However the mean difference between weight training group and control group 2.038, which was less than the critical value. This indicates that the sand training group had a better improvement when compared with the weight training group and control group.

TABLE- IV
DESCRIPTIVE STATISTICS OF RESTING PULSE RATE OF THE THREE GROUPS

GROUPS		Mean	Std. Deviation	N
SAND TRAINING	Pre test	59.84	5.02913	20
	Post test	58.4500	4.50117	
WEIGHT TRAINING	Pre test	61.6000	4.61576	20
	Post test	61.1000	4.62146	
CONT	Pre test	63.0500	4.90408	20
	Post test	62.9500	4.93617	

Table IV shows the mean and standard deviation for pre and posttest scores in resting pulse rate of sand training, weight training and control groups.

TABLE- V
ANALYSIS OF COVARIANCE ON RESTING PULSE RATE OF SAND TRAINING, WEIGHT TRAINING AND CONTROL GROUPS

Source	df	Sum of squares of X	Sum of squares of Y	Sum of Squares of Y.x	MSS Y.x	F ratio
Between means	2	102.700	204.633	20.007	10.003	24.176*
With in groups	57	1342.300	1253.700	23.171	.414	
Total	59	1445.00	1458.333			

*F .05 (2.57) = 3.165, F .05 (2.56) = 3.159

Table V shows the adjusted means of the posttest scores between the three groups. The calculated f value of 24.176 was greater than the table value of 3.159 at 0.05 level of confidence. This indicates that there was a significant difference on the effect of training on resting pulse rate between the groups.

Since the "F" ration was found to be significant, the data was subjected to post hoc analysis to make pair wise comparison to prove which of the groups proved better when compared with each other.

TABLE- VI
SCHEFFES POST HOC TEST FOR MEAN DIFFERENCE BE-TWEEN GROUPS RESTING PULSE RATE

Control	Weight training	Sand training	Mean difference	Critical Value
62.95	61.1		0.462	0.26156
62.95		58.45	1.436	0.26156
	61.1	58.45	0.974	0.26156

Table VI shows the pair wise comparison between the three groups the mean difference between sand training group and weight training group was 0.974, between the sand training and control group the difference in mean was 1.436 and between weight training group and control group 0.462, which was higher than the critical value of 0.26156 required to be significant. This indicates that the sand training group had a better improvement when compared with the weight training group and control group.

TABLE- VII
DESCRIPTIVE STATISTICS OF RESTING SYSTOLIC BLOOD PRESSURE OF THE THREE GROUPS

GROUPS		Mean	Std. Deviation	N
SAND TRAINING	Pre test	119.400	5.03043	20
	Post test	119.150	4.28843	
WEIGHT TRAINING	Pre test	119.100	5.71148	20
	Post test	119.00	4.86664	
CONT	Pre test	121.550	5.55807	20
	Post test	121.550	5.54859	

Table VII shows the mean and standard deviation for pre and post test scores in systolic blood pressure of sand training, weight training and control groups.

TABLE- VIII
ANALYSIS OF COVARIANCE ON SYSTOLIC BLOOD PRESSURE OF SAND TRAINING, WEIGHT TRAINING AND CONTROL GROUPS

Source	df	Sum of squares of X	Sum of squares of Y	Sum of Squares of X.y	Sum of Squares of Y.x	MSS Y.x	F ratio
Between means	2	71.443	81.900	21.386	2.577	1.289	1.342
With in groups	57	1687.550	1379.500	1325.749	53.757	.960	
Total	59	1758.983	1461.400				

*F .05 (2.57) = 3.165, F .05 (2.56) = 3.159

Table VIII shows the adjusted means of the posttest scores between the three groups. The calculated f value of 1.342 was lesser than the table value of 3.159 at 0.05 level of confidence. This indicates that there was no significant difference on the effect of training on systolic blood pressure between the groups.

TABLE- IX
DESCRIPTIVE STATISTICS OF DIASTOLIC BLOOD PRESSURE OF THE THREE GROUPS

GROUPS		Mean	Std. Deviation	N
SAND TRAINING	Pre test	79.9500	3.39466	20
	Post test	79.3000	3.32613	
WEIGHT TRAINING	Pre test	79.6000	5.22544	20
	Post test	79.2000	4.73064	
CONTROL	Pre test	81.5000	5.32620	20
	Post test	81.5000	5.33607	

Table IX shows the mean and standard deviation for pre and post test scores in diastolic blood pressure of sand training, weight training and control groups.

TABLE- X

ANALYSIS OF COVARIANCE ON DIASTOLIC BLOOD PRESSURE OF SAND TRAINING, WEIGHT TRAINING AND CONTROL GROUPS

Source	df	Sum of squares of X	Sum of squares of Y	Sum of Squares of X.y	Sum of Squares of Y.x	MSS Y.x	F ratio
Between means	2	40.900	67.600	5.679	5.950	2.975	2.225
With in groups	56	1276.750	1176.400	1101.515	74.885	1.337	
Total	58	1317.650	1244.000				

*F .05 (2.57) = 3.165, F .05 (2.56) = 3.159

Table X shows the adjusted means of the posttest scores between the three groups. The calculated f value of 2.225 was lesser than the table value of 3.159 at 0.01 level of confidence. This indicates that there was no significant difference on the effect of training on diastolic blood pressure between the groups.

DISCUSSION OF FINDINGS

All the subjects of the experimental groups involved in this study had under gone sand training and resistance training programme for a period of eight weeks. From the tables it was evident that in the case of selected physiological variables such as aerobic capacity and resting pulse rate there were significant changes noticed after eight weeks of training programme.

Aerobic capacity of the experimental groups improved after following eight weeks of training programmes. This may be attributed to the fact that as muscles has exercised the heart rate, respiratory functions and the muscles undergone the workload for eight weeks. This load had caused the physiological changes such as the cardio respiratory system had adjusted slowly and thus improved in efficiency, when the mean score of the experimental group in aerobic capacity was compared with norms of Cooper Vo2 max test. The above finding is in agreement with the findings of **Chtara and** Semih.

The resting pulse rate for the experimental group was decreased due to adaptation of following the sand training and weight training programme. This is due to the vigorous work out done by men, which increased the parasympathetic activity in the heart while decreasing the sympathetic drive, which would have probably improved the efficiency of the heart.

From these findings it is quiet interesting to know that the college males have positive influence upon their physiological variables due to the training programme. The above finding is in consonance with the findings of Yigit and Tuncel.

DISCUSSION ON HYPOTHESIS

The hypothesis stated that there would be a significant effect of sand running and weight training on the selected physiological variables of college men, is accepted in the case of Aerobic capacity and resting pulse rate and rejected in case of systolic blood pressure and diastolic blood pressure.

CONCLUSIONS

The results of the study permit the scholar for the following conclusions:

1. Participation in eight weeks of sand training and resistance training programme resulted in improvement on aerobic capacities.
2. Participation in eight weeks of sand training and resistance training programme resulted in decrease of pulse rate.

RECOMMENDATIONS

In the light of conclusions drawn, the following recommendations are made:

1. Similar studies may be under taken for different age groups and sex other than this study.
2. Similar longitudinal studies may be undertaken by increasing the duration and intensity of training programme.

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