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INFLUENCE OF STEP UP TRAINING AND SAND TRAINING ON SELECTED STRENGTH VARIABLES.

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ABSTRACT

The aim of the study was to find out the influence of step up training and sand training on selected strength variables among athletes. To achieve the purpose pre and post test random group research design was adapted and thirty athletes were randomly selected from different colleges in Andhra Pradesh. They were divided into three groups Group I underwent step up and Group II underwent sand running for a period of six weeks and Group III acted as control group. Step up training group after a warm up for 5 minutes underwent climbing stairs having 18 steps with vertical height of 3 meters with variation of slow, medium, high, medium and slow speed walk and sprints alternatively and finished each session with cool down exercises. Sand running group, after a warm up for 5 minutes underwent sand running with variation of slow, medium, high, medium and slow speed running alternatively and finished each session with cool down exercises and the sessions lasted for 40 minutes in each day, on alternate days, forming three days a week. .The study measured leg strength and back strength as the strength variables for this study. The collected data from three groups prior to and after completion of the experimental period on selected variables were statistically examined by applying Analysis of Covariance (ANCOVA). The results proved that the adjusted mean differences among the groups, step up training, sand running and control was significant. The Scheffe's post hoc analysis proved that leg strength of the step up training group was significantly better than sand running and control group. However, the results on back strength showed that though the both the experimental treatments significantly improved back strength comparing to control group, there was no significant difference between the treatment groups. It was concluded It was concluded that the step up training and sand training significantly improved strength variables, leg strength and back strength of athletes.

Key Words: Step up training, Sand Running Training, Leg strength, Back Strength.

INTRODUCTION

Physical fitness is a capacity for sustained physical activity. It is to achieve success in every walk of life. The progress of one country depends mainly on the degree of physical fitness of the people. According to Willgoose(1961) "Physical Fitness provides capacity for doing all types of activities". Currently there is wide interest to identify the most effective methods of training for strength and endurance development and this is of special significance for physical education programmes in schools and colleges. Training is usually defined as systematic process of repetitive, progressive exercise or work involving the learning process and acclimatization. (Lawrence Gray Kumar, 2002). Evidences show the difference between the trained and untrained individuals that the former is able to increase the cardiac output and transport oxygen to the working muscles at a higher rate than the latter.(Clark and Albert, 1952) "Training programme which have been used to improve sprinting speed include weight training, wind sprint stairs sprinting. Such programmes are designed to develop leg strength, leg speed, speed endurance and explosive power.

A step-up is a basic exercise one can do at the gym, at home, or even outside to strengthen the legs and butt. As long as one has access to a sturdy step, box, bench, or chair, can do this lower-body, strength-training exercise. Aside from targeting leg and butt muscles, this is perfect for getting the heart rate up, too, so one can do it as part of warmup. This exercise requires balance, so focus on keeping your core strong for stability.

Training on sand is so beneficial to every type of martial artist and ten seconds into it and I'm sure the differences will be noticed from when training on a hard durable floor. When training in your dojo, home or wherever it is you normally train, its very easy to take for granted that the floor helps you with movement.

Having a hard floor surface makes this movement process a whole lot easier, but on dry sand it becomes harder as the surface is not durable and very soft and to move, one has to dig the feet (or hands) into the sand slightly so as to create the momentum needed to move. For this reason polymetric training becomes a whole lot harder but greater rewards can be obtained. Sparring on sand, either striking, grappling or both, becomes an extremely heavy, and hard workout, as the muscles are used more, but it is another out of the many other hundreds of great ways to improve the leg and arm muscles and stamina.

Pinnington HC, and Dawson B. (2001) measured the energetics of six elite surf iron men who participate in regular sand running training, performing steady-state running and found the lower lactate accumulation values recorded for the iron men on both grass and sand may indicate that running on sand potentially reduces metabolic fatigue when running on firm or soft surfaces. Impellizzeri FM, et.al. (2008) documented that the lower impact on the musculoskeletal system induced by plyometric exercise on sand compared to a firm surface might be useful to reduce the stress of intensified training periods or during rehabilitation from injury and concluded plyometric training on sand improved both jumping and sprinting ability and induced less muscle soreness. Muramatsu S, et.al. (2006) investigated the energy expenditure of

jumping on sand and on a firm surface and found the energy expenditure of jumping in the sand condition was equivalent to one in the force condition, which ratio was less than in walking and close to in running. In the website Merlino Fitness Service, Michael (2003) narrates in 'Building Your Own Weight Training Workout', the exercises for each part, that is, for legs squats, leg press, leg extensions, leg curls, glutei kicks, seated calf, leg raises and so on. The method of working larger muscle groups first like legs, back and chest girth followed by smaller muscle groups like shoulders, biceps and triceps followed by abdominal work. Clutch et al. (2001) examined the effect of depth jumps and weight training on leg strength and vertical jump in two studies. The effect of depth jumping (plyometrics) and traditional weight training on performance of vertical jump and other measures of length are reviewed below. Delecluse C et.al.(2005) studied the use Whole Body Vibration training among athletes, it is not known whether adding Whole Body Vibration training to the conventional training of sprint trained athletes will improve speed-strength performance. Zafeiridis A, et.al.(2005) examined the effects of resisted (RS) and un-resisted (US) sprint training programs on acceleration and maximum speed performance.Sprint training with 5 kg sled pulling for 8 weeks improves acceleration performance (0(-2)0), while un-resisted sprint training improves performance in maximum speed phase (20-40) in non-elite athletes. It appears that each phase of sprint run demands a specific training approach.

The previous studies proved that there was further scope for research to compare the effect of step up training and sand training on strength variables. Thus this investigator was aimed at investigating the influence of step up training and sand training on selected strength variables among athletes.

METHODOLOGY

To achieve the purpose pre and post test random group research design was adapted and thirty athletes were randomly selected from different colleges in Andhra Pradesh. They were divided into three groups (n = 10) as Group I, Group II and Group III, in which Group I underwent step up and Group II underwent sand running for a period of six weeks and Group III acted as control group. Step up training group after a warm up for 5 minutes underwent climbing stairs having 18 steps with vertical height of 3 meters with variation of slow, medium, high, medium and slow speed walk and sprints alternatively and finished each session with cool down exercises. Sand running group, after a warm up for 5 minutes underwent sand running with variation of slow, medium, high, medium and slow speed running alternatively and finished each session with cool down exercises and the sessions lasted for 40 minutes in each day, on alternate days, forming three days a week. .The investigator selected leg strength and back strength as the strength variables for this study. The collected data from three groups prior to and after completion of the experimental period on selected variables were statistically examined by applying Analysis of Covariance (ANCOVA). In all the cases to test the significance, 0.05 level of confidence was fixed. Since three groups were involved, whenever significant results were found, Scheffe's post-hoc test was used to find out the significant difference between the paired means of groups.

RESULTS

Tab 1: Results on Calculation of Analysis of Covariance on Strength

Calculation of Analysis of Covariance on Leg Strength								
	Step up Training Group	Sand Running Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	119.40	121.50	120.00	Between	23.4	2	11.70	0.26
Std Dev	8.02	6.20	5.83	Within	1230.9	27	45.59	
Post Test Mean	126.70	124.20	121.70	Between	125.0	2	62.50	1.36
Std Dev	7.45	5.94	6.85	Within	1239.8	27	45.92	
Adjusted Post Test Mean	127.55	123.06	121.98	Between	173.3	2	86.66	16.70*
				Within	134.9	26	5.19	
Mean Diff	7.30	2.70	1.70					
Calculation of Analysis of Covariance on Back Strength								
Pre Test Mean	50.20	48.70	48.10	Between	23.4	2	11.70	1.51
Std Dev	3.46	2.45	2.28	Within	208.6	27	7.73	
Post Test Mean	53.50	53.20	49.00	Between	126.6	2	63.30	11.24*
Std Dev	2.55	2.35	2.21	Within	152.1	27	5.63	
Adjusted Post Test Mean	52.58	53.43	49.69	Between	74.6	2	37.28	32.32*
				Within	30.0	26	1.15	
Mean Diff	3.30	4.50	0.90					

Required $F_{(0.05)\,(2,27)} = 3.354$, $F_{(0.05),\,(2,26)} = 3.369$ *Significant

Tab 2: Scheffe's Post Hoc Analysis Results

Post Hoc Analysis for Leg Strength				
Step up training Group	Sand Running Group	Control Group	Mean Difference	Reqd. C.I
127.55	123.06		4.49*	2.64
127.55		121.98	5.57*	2.64
	123.06	121.98	1.08	2.64
Post Hoc Analysis for Back Strength				
52.58	53.43		0.85	1.25
52.58		49.69	2.89*	1.25
	53.43	49.69	3.74*	1.25

*Significant

DISCUSSIONS

The results presented in Table 1 proved that the adjusted mean differences among the groups, step up training, sand running and control was significant as the obtained F value 16.70 was greater than the required table F value of 3.369. The Scheffe's post hoc analysis (Table 2) proved that leg strength of the step up training group was significantly better than sand running and control group. However, the results on back strength showed that though the both the experimental treatments significantly improved back strength comparing to control group, there was no significant difference between the treatment groups. Dreher M, et.al. (2008) found

that step up training resulted in more prolonged hyperinflation of the lungs, higher blood lactate production and more dyspnea than walking. In sand running, though the subjects were asked to run, in sandy surface their exercise movements were very slow and hence, they may not be able to improve the leg strength at par to the step up training group. However, the exercise settings in step up training and sand running brought significant improvement in back strength of the subjects as found in this study.

CONCLUSIONS

The step up training and sand training significantly improved strength variables, leg strength and back strength of athletes.

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