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Impact of sports loading programme on selected strength and power parameters of handball

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Abstract
The purpose of this study was to examine the impact of effect of eight weeks of supervised Sports Loading Programme on enhancing the quality of performance in selected strength and power parameters such as leg strength, muscular strength, explosive power and anaerobic power of handball players. For this purpose 30 handball players, aged 18 to 22 years took part in the study. Subjects were randomly assigned to either Sports Loading Programme (n=15) or control (n=15) group. The training regimen lasted for eight weeks. The selected criterion variables were assessed using standard tests and procedures, before and after the training regimen. Analysis of covariance was used to determine the significant difference existing between pretest and posttest on selected criterion variables. The analysis of data revealed that eight weeks of Sports Loading Programme had an impact of 10.63% on leg strength, 13.91% on muscular strength, 25.57% on explosive power, 6.19% on anaerobic power. These results suggest that Sports Loading Programme has the significant influence on improving selected criterion variables.

Keywords: Sports Loading Programme, Strength and Power Meters, Leg Strength, Muscular Endurance, Explosive Power and Anaerobic power.

Introduction
Sports Loading Programme is a form of exercise that uses a number of training exercise sets separated by short intervals. This number may vary according to the design of the program. This type of training is an excellent choice for developing general, all round physical and cardiovascular fitness. Generally, a good training programme will involve each muscle group' getting worked by several different exercises. The number of exercises per muscle group depends on the training effect to be achieved, the desired volume of work to be completed during a training session, the desired intensity of effort and the structure of the programme. To improve or maintain a desired level of physical fitness, there is a need to constantly administer an adequate training intensity while exercising. Sports Loading Programme is one of the effective means to improve all round physical and cardiovascular fitness.

Moving circuit consists of a path or course equipped with obstacles or stations distributed along its length for exercising the human body to promote good health. In general, fitness trails can be natural or manmade, located in areas such as forest, transportation rights-of-way, parks, or urban settings. Equipment exists to provide specific forms of physiological exercise, and can consist of natural features including climbable rocks, trees, and river embankments, or manufactured products (stepping posts, chin-up and climbing bars) designed to provide similar physical challenges. The degree of difficulty of a course is determined by terrain slope, trail surface (dirt, grass, gravel, etc.), obstacle height (walls) or length (crawls) and other features. To know the efficacy of Sports Loading Programme and its significant contribution to one's level of fitness, it was decided to take up this study.

Methodology
Subjects and Variables
For the purpose of this study, thirty male handball players from the department of physical education, Annamalai University in the age group of 18 to 22 years were recruited, with their

consent. The selected subjects were randomly assigned to both the Sports Loading Programme and control groups of 15 each. The experimental group subjects underwent Sports Loading Programme for three days a week for eight weeks. In the Sports Loading Programme regimens, a serious of eight exercise stations were formed in a standard 400 meters track. The number of repetition was progressively increased once in two weeks.

The selected criterion variables were assessed using standard tests and procedures, before and after the training regimen. The variables and tests used are presented in table-I.

Table 1: Criterion Variables and Test

Sl. No.	Variables	Tests / Instruments	Unit of Measurement
1.	Leg strength	Leg Dynamometer	Kilograms
2.	Muscular Strength	Bent Knee sit-ups	Numbers
3.	Explosive power	Sarjent Jump test	Centimeter
4.	Anaerobic power	Margariya Kalaman anaerobic power test	kg/m/sec

Experimental Design and Statistical Procedure

The experimental design used for the study was random group design involving thirty subjects, who were divided at random into two groups such Sports Loading Programme group and control group of fifteen each. The data collected from the two groups prior to and after experimentation on leg strength, muscular strength, explosive power and anaerobic power were statistically examined for significant differences, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package. In determining the significance of 'F' ratio the confidence interval was fixed at 0.05 level.

Results and Discussions

The descriptive analysis of data collected on selected strength and power parameters before and after eight weeks of Sports Loading Programme is presented in table_II.

Table 2: Computation of Mean and Standard Deviation on Selected Strength and Power Parameters

Variables	Groups	Pretest		Posttest	
		$\bar{X}$	σ	$\bar{X}$	σ
Leg strength	Experimental	92.82	4.46	102.69	4.02
	Control	93.59	4.57	93.84	3.98
Muscular Strength	Experimental	24.87	2.29	28.33	3.68
	Control	24.67	2.28	25.07	3.08
Explosive power	Experimental	45.68	2.68	57.36	3.71
	Control	46.73	2.78	48.13	2.18
Anaerobic power	Experimental	88.39	1.16	93.86	0.88
	Control	88.76	0.89	89.37	0.80

The data collected from the two groups prior to and after experimentation on leg strength, muscular strength, explosive power and anaerobic power were statistically examined for significant differences, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package and it is presented in table-III.

Table 3: Analysis of Covariance on Selected Strength and Power Parameters of Sports Loading Programmeand Control Groups

Variables	Groups	Adjusted Mean	SOV	Sum of Squares	df	Mean Square	'F' ratio
Leg strength	Experimental	101.26	B	236.71	1	236.71	36.93 *
	Control	93.72	W	173.04	27	6.41	
Muscular Strength	Experimental	28.13	B	248.83	1	248.83	45.57*
	Control	24.93	W	147.47	27	5.46	
Explosive power	Experimental	55.42	B	332.62	1	332.62	156.16*
	Control	47.69	W	57.46	27	2.13	
Anaerobic power	Experimental	92.64	B	3.88	1	3.88	38.80*
	Control	88.95	W	2.72	27	0.10	

Required table value for significance at 0.05 level of confidence for df of 1 and 27 is 4.21

* Significant at 0.05 level.

The findings of the study shows that significant difference existing between Sports Loading Programmeand control group on leg strength, muscular strength, explosive power and anaerobic power, since the obtained 'F' ratio of 36.93, 45.57, 156.16 and 38.80 respectively were greater than the required table value of 4.21 for significance at 0.05 level of confidence for df of 1 and 27.

The literature thoroughly supports the evidence that a higher dose of Sports Loading Programme produces greater increases in strength and power parameters. Studies have shown improvement in aerobic capacity from participation in training (Kass & Castriotta, 1994; Peterson, Miller, Quinney, & Wenger, 1988). Kaikkonen and others (2000) observed significant improvement on cardiovascular and muscular fitness due to the effect of a 12-week low resistance circuit weight training. Gettman and others (1978) conducted a study to determine the changes elicited by circuit weight training and running (RN) programs conducted 3 days per week for 20 weeks. It was concluded that the circuit weight training program was most specific in improving strength and changing body composition and aerobic capacity.

Conclusions

The result of this study demonstrated that, Sports Loading Programme has significant impact on selected strength and power parameters such as leg strength, muscular strength, explosive power and anaerobic power of handball players.

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