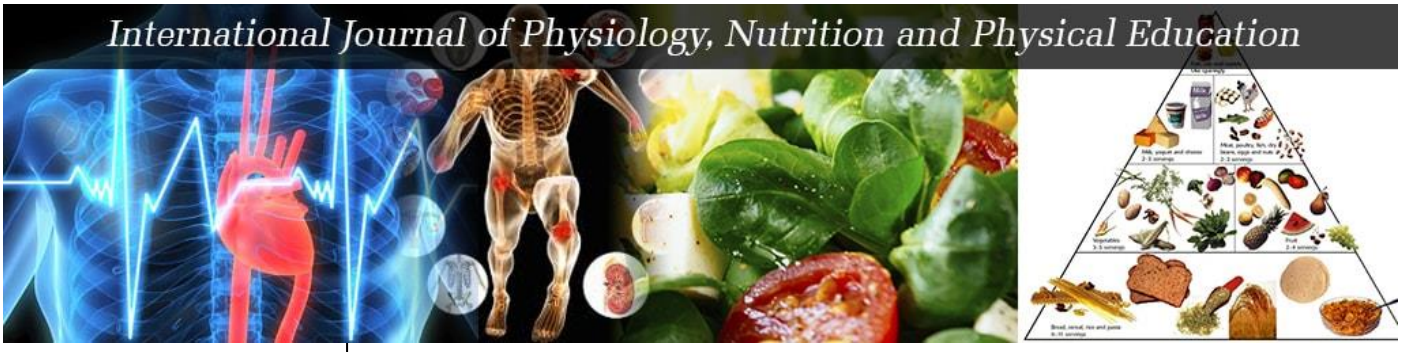

ISSN: 2456-0057
IJPNPE 2020; 5(1): 24-26

www.journalofsports.com
Received: 16-11-2019
Accepted: 20-12-2019

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Effect of circuit training with Kettlebell on performance related variables among volleyball players

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Abstract
The purpose of the study was to find out the effect of circuit training on explosive power and strength endurance among volleyball players. To achieve the purpose of the study thirty volleyball players were selected as subjects from Chennai, Tamil Nadu. The age of the subjects were ranged from 18 to 25 years. The subjects were further classified at random into two equal groups of 15 subjects, Group-I underwent Circuit Training (using kettlebell) and group-II acted as Control Group (CG). Training period limited with twice in a week for six weeks of training. The selected criterion variables explosive power and strength endurance assessed before and after the training period. The collected data were statistically analysed by using Analysis of Covariance (ANCOVA). From the results of the study it was found that there was a significant improvement on explosive power and strength endurance among the volleyball players.

Keywords: Circuit training, explosive power and strength endurance

Introduction
A sport is an overall wonder today. In no time of the world, history sports were so prevalent, composed and critical as today. The volleyball coordinate term last around an hour and a half comprise of five sets; during the match, players fail to meet expectations 250 to 300 activities with rapid developments and change of bearings. All the playing activities are overwhelmed by the explosive strength and strength (Kumar, 2014) [1], furthermore, it is an high intensity interval sport that expects players to contend in a continuous brief time of high-power work out, trailed by times of low-level force action (Kunstlinge, 1987) [2], Thus, volleyball players requires explosive power and strength endurance. “A circuit usually consists of 6 to 12 stages each focusing on one exercise, so that all areas of the body are covered in a complete circuit. The entire circuit should be completed as rapidly as possible repeating the circuit 3 times. A specific amount of work is pre-assigned for each stage. As one becomes better conditioned the amount of time it takes to complete the circuit is reduced and the amount of work accomplished at each stage is increase. In addition the circuit was designed for different levels of competence so that with improvement one moves up to the highest level. Each successive level requires a greater amount of work at each stage.

Methodology
The purpose of the study was to find out the effect of circuit training with kettlebell explosive power and strength endurance among volleyball players. To achieve the purpose 30 volleyball players were selected as subjects from Chennai, Tamil Nadu. The age of the subjects were ranged from 18 to 25 years. The subjects were further classified at random into two equal groups of 15 subjects Group-I underwent Circuit Training (using kettlebell) and group-II acted as Control Group (CG). The selected criterion variable explosive power and strength endurance assessed before and after the training period. Training period limited with twice in a week for six weeks of training.

Statistical technique
The collected data were statistically analysed by using Analysis of Covariance (ANCOVA).

Table 1: Analysis of co variance on explosive power of experimental and control group

	Ex- 1	CG	Source of Variance	Sum of Squares	df	Means Squares	F ratio
Pre-Test Means	204.33	205.47	BG	9.63	1	9.63	0.12
			WG	2235.06	28	79.82	
Post-Test Means	229.33	204.87	BG	4489.63	1	4489.63	44.59*
			WG	2819.07	28	100.68	
Adjusted Post-Test Means	229.77	204.42	BG	4800.57	1	4800.57	89.48*
			WG	1448.44	27	53.65	

*significant at .05 level of confidence.
(The table values required for significance at 0.05 level of confidence with df 2 and 28 and 2 and 27 were 4.20 and 4.21 respectively).

Discussion on findings of explosive power

The obtained F value on pre test scores 0.12 was lesser than the required F value of 4.20 to be significant at 0.05 level. This proved that there was no significant difference between the experimental and control group at initial stage and the randomization at the initial stage were equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 44.59 was greater than the required F value at 4.20. This proved that the differences between the post-test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 89.48 was greater than the required F value at 4.21. This proved that there was Significant differences among the means due to six weeks of circuit training with kettlebell on explosive power among volleyball players.

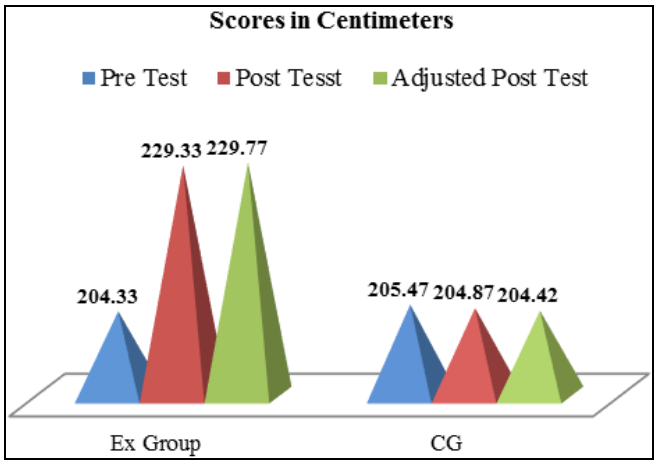

Fig 1: Bar Diagram showing Pre, Post and Adjusted Means on Explosive Power

Table 2: Analysis of co variance on strength endurance of experimental and control group

	Ex- 1 (LFCT)	CG	Source of Variance	Sum of Squares	df	Means Squares	F ratio
Pre-Test Means	55.87	52.00	BG	112.133	1	112.13	2.64
			WG	1189.733	28	42.49	
Post-Test Means	72.40	61.87	BG	832.133	1	832.13	25.74
			WG	905.333	28	32.33	
Adjusted Post-Test Means	71.03	63.23	BG	417.074	1	417.07	36.19
			WG	311.129	27	11.52	

*significant at .05 level of confidence.
(The table values required for significance at 0.05 level of confidence with df 2 and 28 and 2 and 27 were 4.20 and 4.*21* respectively).

Discussion on findings of strength endurance

The obtained F value on pre test scores 2.64 was lesser than the required F value of 4.20 to be significant at 0.05 level. This proved that there was no significant difference between the experimental and control group at initial stage and the randomization at the initial stage were equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 25.74 was greater than the required F value at 4.20. This proved that the differences between the post-test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 36.19 was greater than the required F value at 4.21. This proved that there was Significant differences among the means due to six weeks of circuit training with kettlebell on strength endurance among volleyball players.

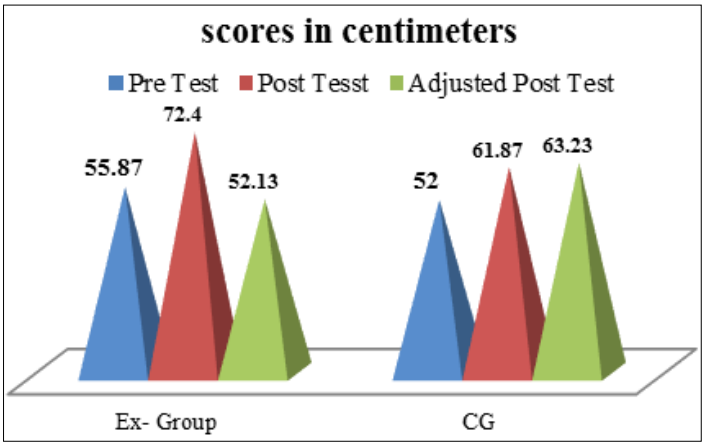

Fig 2: Bar diagram showing pre, post and adjusted means on strength endurance

Conclusions

On the basis of the interpretation of the data, there was a significant difference between experimental group and control group on selected variable of explosive power and strength endurance, further it was concluded that six weeks of circuit training programme with kettlebell significantly improve on selected variables such as explosive power and strength endurance among volleyball players.

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