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Impact of high intensity muscle exercise and stretching exercise on body composition variables of inter collegiate volleyball players

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Abstract

This study to find out the isolated and combined High intensity muscle exercise and stretching exercise on body composition variables of inter collegiate volleyball players. The subjects selected for this study forty women volleyball players (N = 40) age between 19 to 25 years from Bharathiar University affiliated college teams Coimbatore. In this design, subjects are assigned to the experimental and control group systematic sample and are given pre-test on the dependent variables for forty women volleyball players and divided into two equal groups of 20 each. Group-I consider as High Intensity Muscle Exercise (HIME) and Group-II consider as Combine as High Intensity Muscle Exercise with Stretching exercise (CHIWSE). The collected data were statistically analyzed with paired sample 't' test to find out the significant improvement between pre and post test means the groups. It was further concluded that Combine as High Intensity Muscle Exercise with Stretching exercise (CHIWSE) showed greater improvements on selected body composition variables.

Keywords: Body fat, lean body mass, visceral fat and subcutaneous fat

Introduction

Volleyball is a very dynamic sport which is characterized from short period of exercise alternating with rest. The long duration of the game makes the athlete's aerobic energy demand to increase. In contrast, the explosive nature of the game comprised by blocks, attacks and fast court movements requires an increased anaerobic capacity. Throughout the game, volleyball players need to perform a lot of maximal vertical jumps and thus they must have very well trained leg extensor muscles. Body composition (BC) is an important indicator of the physical fitness and health of volleyball players. Excess adipose tissue acts as dead weight in activities during which the body mass must be repeatedly lifted against gravity during locomotion and jumping. This in turn decreases performance and increases the energy demands of the activity. In contrast, fat-free mass contributes to the production of power during high-intensity activities and provides greater absolute strength for resistance to high dynamic and static loads.

The ability to quickly and forcefully use strength is essential in jumping. The amount of work done per unit of time produced by a muscle is represented as power. Improved performance cannot be achieved without an increase in power. The ability of an athlete to obtain a high vertical jump (VJ) quickly is critical for success in volleyball. The sport uses jumping during the jump set, jump serve, block and spike. To be successful in these tasks, a player must be able to not only jump high, but also reach that height quickly. To increase athletic performance, and therefore obtain the demands of the sport, it is necessary to not only increase strength, but also increase speed. Increasing speed, strength, and power can be achieved through training based around fast, explosive movements. Through neuromuscular adaptation, the rate of force development in type II muscle fibers can be enhanced through explosive training. Theoretically, this would reduce the movement time during a jump, therefore, explosive training should increase the amount of power produced. In women, peak power is most closely associated to vertical jump (VJ) performance of volleyball players. The quantity and efficiency in the development of force produced through the hip, knee, and ankle determine jump performance.

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Therefore, it could be beneficial to examine the forces produced through the high intensity exercise in women volleyball players.

Methods

The subjects selected for this study forty women volleyball players (N = 40) age between 19 to 25 years from Bharathiar University affiliated college teams Coimbatore. In this design, subjects are assigned to the experimental and control group

systematic sample and are given pre-test on the dependent variables for forty women volleyball players and divided into two equal groups of 20 each. Group-I consider as High Intensity Muscle Exercise (HIME) and Group-II consider as Combine as High Intensity Muscle Exercise with Stretching exercise (CHIWSE).

Result and Discussion

Table 1: Significance of mean gains & losses between pre and post test scores on selected variables of combined as high intensity muscle exercise with stretching exercise (CHIWSE)

S. No	Variables	Pre-Test Mean	Post-Test Mean	Mean difference	Std. Dev (±)	σ DM	't' Ratio
1.	Body fat	21.44	20.89	0.55	0.73	0.16	6.06*
2.	Lean Body Mass	83.29	81.20	2.09	0.50	0.11	28.64*
3.	Visceral Fat	3.27	2.87	0.4	0.58	0.13	13.48
4.	Subcutaneous Fat	4.14	2.42	1.72	1.01	0.22	7.62*

An examination of table 1 indicates that the obtained 't' ratios are 6.06, 28.64, 13.48, and 7.62 for Body fat, Lean body mass, Visceral Fat, Subcutaneous Fat respectively. The obtained 't' ratios on the selected variables are found to be greater than the required table value of 2.09 at 0.05 level of significance for 19 degrees of freedom. So it is found to be

significant. The results of this study showed that statistically significant and explained its effects positively. Ramirez-Velez, et al, (2017) [6] conducted to determine the Effect of Moderate Versus High-Intensity Interval Exercise Training on Heart Rate Variability Parameters in Inactive Latin-American Adults.

Table 2: Significance of mean gains & losses between pre and post test scores on selected variables of high intensity muscle exercise (HIME)

S. No	Variables	Pre-Test Mean	Post-Test Mean	Mean difference	Std. Dev (±)	σ DM	't' Ratio
1.	Body fat	21.43	20.46	0.97	0.73	0.16	3.75*
2.	Lean Body Mass	84.27	83.47	0.8	1.37	0.30	5.34*
3.	Visceral Fat	3.37	2.71	0.66	0.69	0.15	7.78*
4.	Subcutaneous Fat	4.17	2.59	1.58	1.07	0.23	5.41*

An examination of table 2 indicates that the obtained 't' ratios are 3.75, 5.34, 7.78, and 5.41 for Body fat, Lean body mass, Visceral Fat, Subcutaneous Fat respectively. The obtained 't' ratios on the selected variables are found to be greater than the required table value of 2.09 at 0.05 level of significance for 19 degrees of freedom. So it is found to be significant. The results of this study showed that statistically significant and explained its effects positively. Hornbuckle, et al. (2017) [2] conducted to determine the Effects of high-intensity interval training on cardio metabolic risk in overweight and obese African-American women.

Conclusion

1. It was concluded that individualized effect of High Intensity Muscle Exercise(HIME), showed a statistically significant positive sign over the course of the treatment period on selected body composition variables of inter collegiate women volleyball players.
2. It was further concluded that Combine as High Intensity Muscle Exercise with Stretching exercise(CHIWSE) showed greater improvements on selected body composition variables of inter collegiate women volleyball player as compared to their performance with either High Intensity Muscle Exercise(HIME).

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