



Effect of Weight Training and Circuit Weight Training on Strength Endurance and Tidal Volume

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Abstract

The purpose of the study was to find out the impact of weight training and circuit weight training on strength endurance and tidal volume. Forty five male students aged between 17 and 21 years were selected for the study. They were divided into three equal groups, each group consisting of fifteen subjects in which two experimental groups and one control group, in which the group I (n=15) underwent weight training, group II (n = 15) underwent circuit weight training for three days (alternative days) per week for twelve weeks, and group III (n=15) acted as control, which did not participate in any training. The subjects tested on selected criterion variables such as strength endurance and tidal volume at prior to and immediately after the training period. For testing the strength endurance, push-up test was used and to measure the tidal volume expirograph was used. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between the experimental groups and control group on selected criterion variables separately. Since there were three groups involved in the present study, the Scheffé S test was used as post-hoc test. The selected criterion variables such as strength endurance and tidal volume were improved significantly for the training groups when compared with the control group. Moreover, there were no significant difference was occurred between the training groups on selected criterion variables.

Keywords: Weight training, circuit weight training, strength endurance and tidal volume.

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Introduction

Training is a methodical procedure by which the people attain knowledge and/or skill for particular purpose.[1] It also helps to carried out for an important purpose of helping the working peoples to acquire and apply the knowledge, abilities, attitudes and skills needed for the particular work. It is also a methodological procedure of continuous and progressive exercise of performing work which involving, learning and acclimatization.[2] Regular trainings effects are, muscle tone will be increased, the strength ability increases, flexibility, circulation will be facilitated, agility, and also improves the rate of bowel movement. Recovery time after the strenuous exercise period will also be speeds up and which enables the body to manage more effectively with the demands of training. Speedy recovery from injury and illness will be enhanced by training and improves the mental health, concentration and increases the self-esteem. In physical education, sport training is a proper method and significant one that take care of overall health and well-being of sportsperson.

There are some important types of training like circuit training, continuous training, weight training, mobility training and interval training which are all important. The term FITT, Frequency, Intensity, Time and Type, are the key factors when designing proper training programme for a particular sport or activity. This will help the sportsperson to train them in specific training zone that helps to achieve maximum fitness goal. Optimum level of this particular training also enhances the aerobic and anaerobic capacities.[3] The word training in sports is commonly unwritten that it is a synonym of performing physical exercise and in broad sense; sport training is doing physical exercises to improve the overall performance.[4] Dale S. Beach[5] defines coaching as 'the geared up system by means of which humans analyze know-how and/or ability for a precise purpose'. It is a technique of instructing of unique talent to somebody, both human or animal and the intention is to enhance the capacity, overall performance ability or productiveness of an character.[6]

The weight education additionally refers as a kind of bodily exercise, makes use of resistance which decorate the muscular contraction which contributes the strength, amplify the measurement of skeletal muscle and anaerobic endurance. It can enhance the normal fitness and well-being, consisting of the measurement of muscle, tendon, improve and improves the durability of

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ligament and joint function, decreased for injury[7] expanded the bone density, fitness, metabolism and cardiac function.[8,9]

There are some basic principles are in weight training which are essential to those of improving the strength, and involve an alteration in the number of repetitions, sets, tempo, types of exercise and the weights which causes and increase in strength, endurance and size of the muscle. An individual doing the weight training should alter the exact combination of repetitions, sets, type of exercise and weights which depends on own. The term “Circuit Weight Training”, (CWT) was introduced during early 1950’s for increase muscular strength and endurance in a single training programme. In CWT, the weight training exercises should be performed one weight exercise station to the next with minimal rest. Usually, CWT exercises have to do between 6 – 12 exercise stations, with two to three sets on each circuit, which will increase the total body condition. [10]

The enchantment of athletic performance in young athletes is a complicated task, and to obtain high-levels of athleticism requires a strong long-term plan. Sports participation alone, in many cases, does not provide the enough stimuli to gain this. Resistance education in all types (e.g. strength, power or speed training) can assist to attenuate these troubles via defending towards injuries and positively affecting childhood athlete’s bodily literacy, thus, diminishing the affect of low bodily physical jerks and early activity specialisation amongst youths.[11]

Stronger younger athletes will be higher organized to research complicated movements, grasp game tactics, and maintain the needs of coaching and competition.[12] Thus, resistance coaching prescription need to be based totally on an fabulous development in accordance to coaching age, motor ability competency, technical talent and present energy levels. Another aspect to think about is the organic age and psychosocial maturity degree of the infant or adolescent.[13,14] There is evidence to indicate that the precursors of cardiovascular diseases have their origin in childhood and adolescence [15, 16, 17].

Competitive athletes and non-athletes alike might also be fascinated in strength training for a number of reasons, such as their athletic prowess and structure of body. Interested in off-season conditioning, parents and

preadolescent athletes regularly flip their interest to strength training. This schedule can gain many teenagers and preadolescents via enhancing not solely their power, however additionally their bone density, balance, lipid profiles, fat-free mass, and non-public self-esteem.[18,19,20,21,22] The primary concerns regarding strength training are safety and its effectiveness. Health care and fitness professional groups—including the American Academy of Pediatrics, the American College of Sports Medicine, the American Orthopaedic Society for Sports Medicine, and the National Strength and Conditioning Association—agree that a supervised strength training program that follows the recommended guidelines and precautions is safe and effective for adolescent.[23,24,25,26]

Materials and Methods

In this study it was aimed to find out the effect of weight training and circuit weight training on strength endurance and tidal volume. To achieve the purpose forty five male students from Krishna Polytechnic College, Arakkonam, Tamilnadum, were selected as subjects at random from the total population of 90 students. They were divided into three equal groups of fifteen each and further divided as two experimental groups and one control group, in which the group I (n=15) underwent weight training, group II (n = 15) underwent circuit weight training for three days (alternative days) per week for twelve weeks, and group III (n=15) acted as control which did not participate in any special training apart from the regular curricular activities. For every training programme there would be a change in various structure and systems in human body. So, the researchers consulted with the experts and then selected the following variables as criterion variables: 1. Strength endurance, 2. Tidal volume.

Analysis of the Data

Analysis of covariance was used to determine the differences, if any, among the adjusted post test means on selected criterion variables separately. Whenever the ‘F’ ratio for adjusted post test mean was found to be significant, the Scheffé *S* test was applied as post-hoc test. The level of significance was fixed at .05 level of confidence to test the ‘F’ ratio obtained by analysis of covariance.

Table 1. Analysis of Covariance and ‘F’ ratio for Strength endurance and Tidal volume of Weight training Group, Circuit weight training Group and Control Group

Variable Name	Group Name	Weight Training Group	Circuit Weight Training Group	Control Group	‘F’ Ratio
Strength endurance (in Nos./Min.)	Pre-test Mean ± S.D.	28.93 ± 1.87	29.53 ± 2.53	29.53 ± 2.33	0.331
	Post-test Mean ± S.D.	31.53 ± 1.77	33.00 ± 1.93	30.00 ± 2.53	7.63*
	Adj. Post-test Mean	31.850	32.842	29.842	33.36*

Tidal volume (in Liters)	Pre-test Mean \pm S.D.	0.581 \pm 0.021	0.576 \pm 0.015	0.584 \pm 0.016	0.824
	Post-test Mean \pm S.D.	0.639 \pm 0.025	0.672 \pm 0.016	0.577 \pm 0.017	85.92*
	Adj. Post-test Mean	0.638	0.675	0.575	139.4*

* Significant at .05 level of confidence. (The table value required for significance at .05 level of confidence with df 2 and 42 and 2 and 41 were 3.22 and 3.23 respectively).

Table – 2 shows that pre and post test means 'f' ratio of weight training group, circuit weight training group and control group on strength endurance was 0.331, which is insignificant at 0.05 level of confidence. The post and adjusted post test mean 'f' ratio value of experimental groups and control group was 7.63 and 33.36 which was significant at 0.05 level of confidence. The pre test means 'f' ratio of weight training group, circuit weight training group and control group on tidal

volume was 0.824, which is insignificant at 0.05 level of confidence. The post and adjusted post test mean 'f' ratio value of experimental groups and control group was 85.92 and 139.4, which was significant at 0.05 level of confidence. The overall study shows that there was a significant decrease in strength endurance and tidal volume. Further, to find out which of the paired mean significantly differ, the Scheffé S test was applied and presented below.

Table 2. Scheffé S Test for the Difference Between the Adjusted Post-Test Mean of Strength endurance and Tidal volume

Weight training Group	Circuit weight training Group	Control Group	Mean Difference	Confidence Interval at 0.05 level
Adjusted Post-test Mean Difference on Strength endurance				
31.850		29.842	1.978*	0.95
31.850	32.842		0.992*	0.95
	32.842	29.842	3.00*	0.95
Adjusted Post-test Mean Difference on Tidal volume				
0.638		0.575	0.063*	0.015
0.638	0.675		0.037*	0.015
	0.675	0.575	0.10*	0.015

* Significant at 0.05 level of confidence.

Table – 2 shows that the Scheffé S Test for the difference between adjusted post-test mean of weight training group and control group (1.978), weight training group and circuit weight training group (0.992) and circuit weight training group and control group (3.00) which were significant at 0.05 level of confidence. But there was no significant difference between weight training group and circuit weight training group (1.138) on strength endurance after the respective training programme.

Table – 2 shows that the Scheffé S Test for the difference between adjusted post-test mean difference in tidal volume between weight training group and control group (0.063), weight training group and circuit weight training group (0.037) and circuit weight training group and control group (0.10) were significant at 0.05 level of confidence in favour of circuit weight training group.

Conclusions

1. The weight training and circuit training groups has shows their improvement in strength endurance than the control group. Rajamohan et al [27] found that there was a significant

improvement in muscular endurance after the weight training and circuit weight training programme. Ramakrishnan and Gopinath [29] reported in their study that weight and circuit weight training have improved the muscular endurance significantly.

2. Tidal volume were significantly improved for all the training groups, such as, resistance training group and circuit weight training group when compared with the control group. Khosravi, Tayebi and Safari, [29] has found that there was a significant improvement in inspiratory reserve volume, expiratory reserve volume and tidal volume but not in tidal volume after the circuit resistance training. The result of the study was revealed that the circuit weight training group has significantly improved the selected physiological variables such as, Tidal volume, inspiratory reserve volume, expiratory reserve volume, tidal volume and mean arterial pressure than the weight training group and control group and weight training group have significantly improved than the control group.

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