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Effect of Concurrent Strength and Endurance Training on Selected Physiological Variables among College Level Kabaddi Players

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Abstract

The purpose of this study was to find out the effect of concurrent strength and endurance training on selected Physiological Variables among college level kabaddi players, namely Cardio-respiratory endurance and Resting pulse rate. To achieve this purpose, thirty students from Selvam College of Physical Education, Namakkal, TamilNadu, India were selected as subjects at random. Their age ranged between eighteen to twenty two years. The selected subjects were divided into two equal groups of fifteen each namely concurrent strength and endurance training group and control group. The experimental group has undergone twelve weeks of concurrent strength and endurance training, whereas the control group maintained their daily routine activities and no special training was given. The subjects of the two groups were tested on selected variables namely Cardio-respiratory endurance and Resting pulse rate standardized tests, namely Cooper's 12 minute walk/run test and counting on radial artery/minute at prior and immediately after the training period. The collected data were statistically analyzed through analysis of covariance (ANCOVA) to find out the significant difference, if any between the groups. The.05 level of confidence was fixed to test the level of significance which was considered as an appropriate. The results of the study showed that there was significant differences exist between concurrent strength and endurance training group and control group. Also, concurrent strength and endurance training group showed significant improvement on Cardio-respiratory endurance and Resting pulse rate compared to the control group.

Keywords: Concurrent Strength and Endurance Training, Cardio-Respiratory Endurance, Resting Pulse Rate.

Introduction

The sequential exercise regime is referred to as 'concurrent training'. Concurrent strength and endurance training is undertaken by numerous athletes in various sports in an effort to achieve adaptations specific to both forms of training. Literature findings to date, investigating the neuromuscular adaptations and performance improvements associated with concurrent strength and endurance training (referred to as concurrent training) have produced inconsistent results. Some studies have shown that concurrent training inhibit the development of strength and power, but does not effect the development of aerobic fitness when compared to either mode of training alone. Other studies have shown that concurrent training has no inhibitory effect on the development of strength and endurance. Cardio-respiratory endurance of the ability to carry a work load for a relatively prolonged period. The endurance is that enables the heart, blood vessels and lungs to receive oxygen and take it to the muscular and to do it as often and effortless as possible.

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Strength and endurance training regimes represent and induce distinctly different adaptive responses when individually performed. Typically, strength-training programs involve large muscle group activation of high-resistance low-repetition exercises to increase the force output ability of skeletal muscle . In contrast, endurance-training programs utilize low-resistance, high-repetition exercises such as running or cycling to increase maximum O_2 uptake ($VO_{2\ max}$). Accordingly, the adaptive responses in skeletal muscle to strength and endurance training are different and sometimes opposite. Strength training has been reported to cause muscle fiber hypertrophy, associated with an increase in contractile protein, which contributes to an increase in maximal contractile force. Strength training also reduces mitochondrial density and suppresses oxidative enzymes activity which can cause impede endurance capacity, but has minimal impact on capillary density or in the conversion of muscle fibre types from fast twitch (type II fibres) to slow twitch (type I fibres). In contrast, endurance training usually causes little or no muscle fibre hypertrophy, but it does induce increases in mitochondria content, citric acid enzymes, oxidative capacity and the possibility of muscle fibre conversion from fast twitch to slow twitch. Many competitive endurance athletes incorporate resistance training into

their training in a hope to improve endurance performance. However, as previously mentioned adaptations to exercise are generally considered to be specific to the training type of stimulus. Although, many adaptations are specific to the type of training, some changes that occur with resistance training could influence endurance performance, which include: muscle fibre transformations and muscle fibre (type I) hypertrophy, as less motor units need to be activated for the same work load.

Materials and Methods

The purpose of this study was to investigate the effect of concurrent strength and endurance training on selected physiological variables among college level kabaddi players. The subjects this study were randomly selected from Selvam College of Physical Education, Namakkal, Tamil Nadu, India, on age group ranged between eighteen to twenty two. A total of thirty subjects were selected at random and they were divided into two equal groups that are experimental and control groups, each group consist of fifteen subjects, their age ranged from eighteen to twenty two. The experimental group has undergone concurrent strength and endurance training such as incline leg press, bench press, jump to box, jump from box, alternate leg squat, alternate leg hops in place, jogging and cycling three days in a week for the period of twelve weeks and the control group was not undergoing concurrent strength and endurance training. To find out the cardio-respiratory endurance and resting pulse rate the investigator conducted the Cooper's 12 minute walk/run test and Counting on radial artery/minute. The data were analyzed using analysis of covariance (ANCOVA).

Selection of Variables and Tests

The research scholar reviewed the available scientific literature pertaining to available the present study, the following variables were selected.

S.NO	Variables	Test Items
1	Cardio-respiratory endurance	Cooper's 12 minute walk/run test
2	Resting pulse rate	Counting on radial artery/minute

Statistical Analysis

Data were collected from the both groups, the selected variables on cardio-respiratory endurance and resting pulse rate was statistically examined by using the "F" ratio used to find out the significance difference between experimental group and control group, the level of significance was fixed at 0.05 level of confidence.

Results

Table I. One way analysis of covariance (ANCOVA) for pre test and post test scores of Cardio-respiratory endurance of control and experimental group

Test	CSE Group	Con Group		Sum of Squares	Df	Ms	F
Pre Mean	50.19	51.49	B	10.25	1	10.25	1.387
SD	2.265	3.04	W	206.78	28	7.385	
Post Mean	55.17	50.34	B	193.92	1	193.92	58.45*
SD	1.26	2.37	W	92.94	28	3.319	
Adjusted Post Mean	52.64	50.89	B	216.35	1	216.31	87.68*
			W	66.64	27	2.467	

Table value of (1, 27) at 0.05 level was 4.21.

Table I shows that the adjusted post-test means of concurrent strength and endurance training group and control group are 52.64 and 50.89 respectively. The obtained 'F' ratio of 87.68 for adjusted post-test means is more that the table value of 4.21 for df 1 and 27 of.05 level. The result of the study indicated that there was a significant difference between the concurrent strength and endurance training group and control group on cardio-respiratory endurance.

Table II. One way analysis of covariance (ANCOVA) for pre test and post test scores of Resting pulse rate of control and experimental group.

Test	CSE Group	Con Group		Sum of Squares	Df	Ms	F
Pre Mean	74.4	74.67	B	3.33	1	3.33	0.38
SD	3.397	2.743	W	242.67	28	8.67	
Post Mean	70.93	75.33	B	90.133	1	90.133	10.07
SD	2.520	3.132	W	250.533	28	8.95	
Adjusted Post Mean	72.67	75.00	B	86.86	1	86.86	9.39
			W	249.647	27	9.25	

Table value of (1, 27) at 0.05 level was 4.21.

Table II shows that the adjusted post-test means of concurrent strength and endurance training group and control group are 72.67 and 75.00 respectively. The obtained 'F' ratio of 9.39 for adjusted post-test means is more that the table value of 4.21 for df 1 and 27 of.05 level. The result of the study indicated that there was a significant difference between the concurrent strength and endurance training group and control group on resting pulse rate.

Conclusion

The finding of this study indicated that the effects of concurrent strength and endurance training showed significantly improved the Cardio-respiratory endurance and reduced Resting pulse rate when compared with control group.

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