

Effect of Aerobic Training Resistance Training and Concurrent Training on Speed Endurance and VO₂ Max

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Abstract

The purpose of the study was to find out the effect of aerobic training, resistance training and concurrent training on selected variables. For this study, sixty men students were selected randomly as subjects and divided into four groups as aerobic, resistance and concurrent training. Test namely speed endurance and VO₂Max were tested at the beginning and end of 12th week experimental treatment. The collected data was statistically analyzed by using analysis of covariance (ANCOVA). It was found that there was a significant improvement in experimental groups in speed endurance and VO₂Max.

Key Words: Aerobic training, Concurrent training, Speed endurance, Vo2 Max

Introduction

Successful athletes understand athletic programme and the real reason behind their efforts. It doesn't predominantly have anything to do with the improvement of their workouts and specific sport skills. The smart players are making themselves better athletes, which in turn make them better players. That is the key difference.

The most successful players know that they can maintain their specific sport skills; by spending their time hitting the weights and mastering the skills of athletic performance they get to better the specific sport skills. There has obviously been a shift in priorities of these more dominant players.

Most team sports such as the football, hockey, netball and basketball require the development of different physical capacities for optimal performance. For example, the physical capacity of speed is required to 'beat' opponents, strength is needed for body collisions and physical contacts and endurance capacity allows the player to recover and repeat sprint efforts.

Many sports are characterized by the need to blend multiple fitness components in order to achieve optimum performance. These include football, hockey, netball, basketball and many others. As an athlete involved in such a sport, one are unlikely to have the luxury of training any one of these components in isolation over a period of time, and one's conditioning programmes probably involve the concurrent training of several fitness components across a number of micro cycles.

Methodology

To achieve the purpose of this study, 60 male subjects were selected at random from Department of Physical Education and Sports Sciences, Annamalai University, Chidambaram, TamilNadu, India. The age of the participants ranged between 18 and 25 years. The selected participants were divided into three experimental groups and a control group with fifteen participants (n=15) in each group. Experimental group I (ATG=15) underwent aerobic training, Group II (RTG=15) underwent resistance training, Group III (CTG=15) underwent concurrent training and Group IV served as control group (CG=15). All the experimental groups underwent 12 weeks of training, 3 sessions per week. All the subjects were tested on selected variables prior to and immediately after the training period. The dependent variables namely speed endurance was assessed by conducting 120mts run test and VO_2 Max was assessed by using Spiro meter.

Analysis of Data

The data collected from all the four groups were statistically analysed with analysis of covariance (ANACOVA) as four groups were involved. Whenever the 'F' ratio was found to be significant, Scheffe's test was used as post hoc test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence ($P < 0.05$).

Table-I
Analysis of Covariance on Speed Endurance and VO_2 Max of
Aerobic Resistance Concurrent Training
and Control Groups

Variables	Tests/ Groups	ATG	RTG	CTG	CG	SV	SS	df	MS	F
Speed Endurance	Pre-Test Mean \pm SD	18.62 \pm 0.29	18.61 \pm 0.27	18.60 \pm 0.25	18.63 \pm 0.14	B W	0.0065 3.330	3 56	0.0216 0.059	0.036
	Post-Test Mean \pm SD	18.54 \pm 0.15	18.59 \pm 0.29	18.24 \pm 0.40	18.66 \pm 0.19	B W	1.576 4.282	3 56	0.525 0.076	6.871*
	Adjusted Post-Test Mean	18.543	18.595	18.243	18.657	B	1.517	3	0.506	7.007*
VO_2 Max	Pre-Test Mean \pm SD	2.85 \pm 0.22	2.66 \pm 0.17	2.77 \pm 0.23	2.65 \pm 0.19	B W	0.411 2.338	3 56	0.137 0.042	3.279*
	Post-Test Mean \pm SD	3.22 \pm 0.13	2.82 \pm 0.31	3.51 \pm 0.13	2.71 \pm 0.22	B W	6.153 2.561	3 56	2.051 0.046	44.85*
	Adjusted Post-Test Mean	3.180	2.843	3.501	2.740	B W	4.949 2.293	3 55	1.65 0.042	39.57*

*Significant at 0.05 level

(The table value required for 0.05 level of significance with f 3, 56 and 3,55 are 2.76 and 2.78 respectively)

The obtained f-ratio values were higher than the table value 2.76 with df 3 and 55 required for significance at 0.05 level. It indicates that there were significant differences among the adjusted posttest means of aerobic, resistance and concurrent training groups on speed endurance and VO₂Max.

Table-II
Scheffe's Test for Differences of the Adjusted Post-Test Paired Means of Speed Endurance and VO₂ Max

Variables	Adjusted Post-test means				MD	CI
	ATG	RTG	CTG	CG		
Speed Endurance	18.543	18.595			0.052	0.283
	18.543		18.243		0.3*	
	18.543			18.657	0.114	
		18.595	18.243		0.352*	
		18.595		18.657	0.062	
			18.243	18.657	0.414*	
VO ₂ Max	3.180	2.843			0.337*	0.216
	3.180		3.501		0.321*	
	3.180			2.740	0.44*	
		2.843	3.501		0.658*	
		2.843		2.740	0.103	
			3.501	2.740	0.761*	

* Significant at 0.05 level.

Discussions

The analysis of the data concludes that there is no significant improvement on speed endurance in ATG and RTG. At the same time there was a significant improvement in ATG in VO₂Max, but there was no significant improvement in RTG on VO₂Max. Concurrent training is found to be better in improving speed endurance and VO₂Max than ATG and RTG.

Conclusions

In the present investigation, as a result of resistance training programme the following improvements occurred on speed and agility.

1. After 12 weeks of concurrent training systems it is found that the speed endurance time is reduced. But no significant differences are found in the aerobic and resistance training groups in the reduction of speed endurance time. For developing the speed endurance, concurrent training was found to be better than aerobic and resistance training systems.
2. Systematic aerobic training increased VO₂Max. The aerobic training has increased VO₂Max significantly more than the resistance training systems. At the same time there was no improvement in VO₂Max due to the effect of 12 weeks of resistance training.
3. For developing the selected dependent variables such as speed endurance and VO₂max, concurrent training was found to be better than aerobic and resistance training systems.

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