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ORIGINAL ARTICLE

CAUSE OF DIFFERENT CONDITIONAL RESISTANCE TRAINING ON ANAEROBIC POWER OF FOOTBALL PLAYERS

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Abstract:

The purpose of the study was to investigate the impact of different conditional resistance training on anaerobic power of football players. Forty five football players from the Department of Physical Education and Sports Sciences, Annamalai University were selected as subjects. The age, height and weight of the subjects ranged from 18 to 25 years, 158 to 169 centimetres and 55 to 66 kilograms respectively. The selected subjects were randomly assigned into three equal groups of 15 subjects each. Group I underwent linear progressive resistance training, group II underwent staircase progressive resistance training and group III acted as control. Prior to and after the training the subjects were tested on anaerobic power using standard test and procedures. Analysis of covariance was used to determine the significantly difference existing between pre test and post test on anaerobic power. The result of the study proved that due to different conditional resistance training significantly improved the anaerobic power of football players.

KEY WORDS:

Linear and Staircase progressive resistance training and anaerobic power.

INTRODUCTION

Physical training is to the body so it improves its capacity to exercise. Physical training is beneficial only as long as it forces the body to adapt to the stress of physical effort. Building strong leg, arm and abdominal muscles along with other muscle groups will assist in the execution of sports fundamentals and the enjoyment of the game. All strength training involves the microscopic tearing of the muscle fibers by exceeding their capacity to move a weight or resist a force. As the body rebuilds the fibers, strength increases. As strength increases, progressive resistance training techniques will have the weight or resistance increased progressively where it is thought that it will provide the muscles with adequate overload to stimulate further improvements.

Anaerobic exercise relies on power source that are accumulate in the muscles. Anaerobic exercise works on particular muscles and their size, endurance, and power. Weight lifting and resistance training are some of the examples of anaerobic exercise. This form of exercise offer many benefits and is a good complement to our aerobic exercise. It may also increase bone thickness. Muscle energy systems trained using anaerobic exercise develop differently leading to greater performance in short duration, high intensity activities, which last from mere seconds up to about 2 minutes (Medbo, 1988).

Anaerobic metabolism, or anaerobic energy expenditure, is a natural part of whole-body metabolic energy expenditure. Fast twitch skeletal muscle operates using anaerobic metabolic systems, such that any recruitment of fast twitch muscle fibers will lead to increased anaerobic energy expenditure.

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Intense exercise lasting upwards of about four minutes may still have a considerable anaerobic energy expenditure component. Anaerobic energy expenditure is difficult to accurately quantify, although several reasonable methods to estimate the anaerobic component to exercise are available (Scott, 2008).

METHODOLOGY

Subjects and Variables

The purpose of the study was to investigate the impact of different conditional resistance training on anaerobic power of football players. Forty five football players were selected as subjects from the Department of Physical Education and Sports Sciences, Annamalai University. The age, height and weight of the subjects ranged from 18 to 25 years, 158 to 169 centimeters and 55 to 66 kilograms respectively. The selected subjects were randomly assigned into three equal groups of 15 subjects each. Group – I underwent linear progressive resistance training, Group – II underwent staircase progressive resistance training and group – III acted as control. Margaria-Kalamen power test was used to measure the anaerobic power.

Training Protocol

The experimental groups performed the linear progressive resistance training and staircase progressive resistance training programs three sessions per week on alternative days for 12 weeks. The experimental groups performed the following resistance exercises namely shoulder press, leg curl, bench press, leg press, arm curl, half squat, side lateral raise and pull-downs. The subjects performed there exercises with the specified intensity under the strict supervision of the investigator. The intensity, volume and density of training for both the experimental groups are the same, however the training load for the experimental group I was increased by linear progressive training method and for experimental group II staircase progressive training method was followed. The recovery period between exercises was sixty seconds and between sets three minutes. The intensity was fixed based on 1 RM of the subjects. The load was fixed at 45% to 100 % for linear progressive resistance training and 65 % to 95 % for staircase progressive resistance training groups.

Experimental Design and Statistical Technique

The experimental design used in this study was random group design involving 45 subjects. The subjects were divided at random in to three groups of fifteen each. The collected data from the three groups prior to and after the training on selected dependent variables were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). The Scheffe's test was applied as post hoc test to determine the paired mean differences, if any.

Results

Table I
Analysis of Covariance on Anaerobic Power of Experimental and Control Groups

	Linear Progressive Resistance Training	Staircase Progressive Resistance Training	Control Group	S O V	Sum of Squares	df	Mean squares	'F' ratio
Pre test Mean	118.73	118.60	119.01	B	1.24	2	0.62	0.02
SD	6.36	6.28	5.80	W	1592.53	42	37.91	
Post test Mean	125.53	126.46	119.40	B	442.13	2	221.06	8.82*
SD	2.41	6.19	5.56	W	1053.06	42	25.07	
Adjusted Post test Mean	125	126	119	B	457.98	2	228.99	10.93*
				W	858.29	41	20.93	

(The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 41 is 3.23 and degree of freedom 2 and 41 is 3.22)
*Significant at .05 level of confidence

Table-I shows that the pre test mean and standard deviation on anaerobic power of linear progressive resistance training, staircase progressive resistance training and control groups were 118.73 + 6.36, 118.60 + 6.28 and 119.01 + 5.80 respectively. The obtained 'F' ratio value of 0.02 for pre test mens on anaerobic power of linear progressive resistance training, staircase progressive resistance training and control groups were less than the required table value of 3.23 for the degrees of freedom 2 and 42 at 0.05 level of confidence. It revealed that there was statistically insignificant difference among the linear progressive resistance training, staircase progressive resistance training and control groups during pre test period. It was inferred that the random assignment of the subjects for the three groups was successful.

The post test mean and standard deviation on anaerobic power of linear progressive resistance training, staircase progressive resistance training and control groups are 125.53 + 2.41, 126.46 + 6.19 and 119.40 + 5.56 respectively. The obtained 'F' ratio value of 8.82 for post test means on anaerobic power of linear progressive resistance training, staircase progressive resistance training and control groups are greater than the required table value of 3.23 for the degrees of freedom 2 and 42 at 0.05 level of confidence.

The adjusted post test means on anaerobic power of linear progressive resistance training, staircase progressive resistance training and control groups are 125.54, 126.52 and 119.32 respectively. The obtained 'F' ratio value of 10.93 on anaerobic power were greater than the required table value of 3.22 for the degrees of freedom 2 and 41 at 0.05 level of confidence. It was observed from this finding that significant differences exist among the adjusted post test means of experimental and control groups on anaerobic power.

Since, the adjusted post test 'F' ratio value was found to be significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, and it is presented in Table-II.

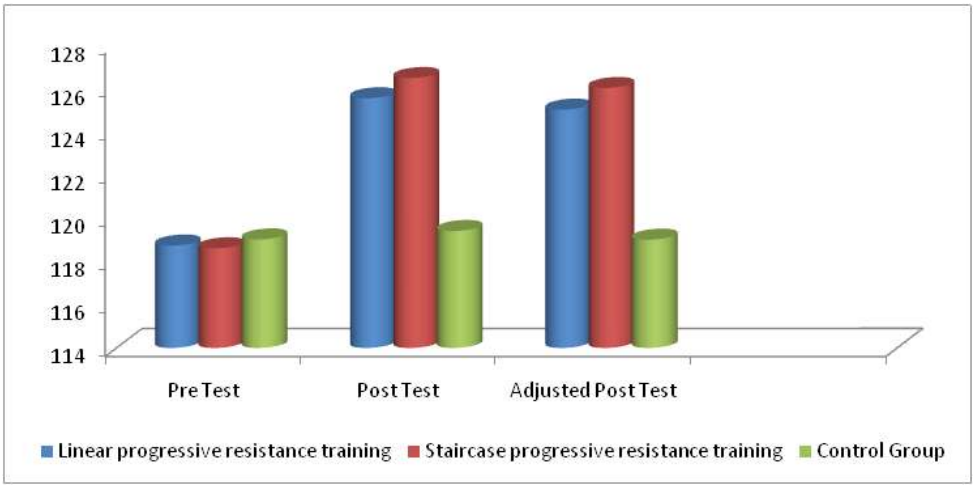
Table-II
Scheffe's Test for the Difference between the Adjusted Post Test Paired Means of Anaerobic Power

Adjusted Post Test Means			DM	CI
Linear Progressive Resistance Training	Staircase Progressive Resistance Training	Control Group		
125.54	126.52		0.98	3.75
125.54		119.32	6.22*	3.75
	126.52	119.32	7.20*	3.75

*significant

Table-II shows the Scheffe's test results that there was significant difference exists between the adjusted post tests means value 6.22 and 7.20 of linear progressive resistance training and control groups, staircase progressive resistance training and control groups respectively on anaerobic power. And also the adjusted post tests mean value 0.98 showed that there was no significant difference exists between linear progressive resistance training and staircase progressive resistance training. However both experimental groups had significantly improved on anaerobic power when compared to control group.

Figure – I
Mean Scores of Pre, Post Test and Adjusted Post Test of Liner and Staircase Progressive Resistance Training and Control Groups Anaerobic Power



DISCUSSION AND CONCLUSIONS

The present study results revealed that both the experimental groups had significant improvement on anaerobic power when comparing to the control group, however among the experimental groups statistically no significant difference on anaerobic power, these findings are supporting with the following studies. Swensen and others (2000), concluded intensity training improves anaerobic power. Pearson and others (2000) strength training improves power out put in endurance task. Newberry and flowers (1999) high repetition strength training added to sprint training, increases muscular endurance. Fincher (2001) strength exercise produces greater anaerobic performance gain. The present study results concluded that due to the twelve weeks of different conditional resistance training had an impact of anaerobic power improvements of football players.

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