



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2019; 4(1): 1027-1029

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www.theyogicjournal.com

Received: 22-01-2019

Accepted: 24-02-2019

CL Jackson Paul Durai

Ph.D., Scholar, Department of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India

Dr. P Arthur Daniel

Director of Physical Education, Scott Christian College, Nagercoil, Tamil Nadu, India

Dr. S. Sethu

Assistant Professor, Department of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu.

Effect of concurrent aerobic and circuit resistance training on selected health related physical fitness components of untrained men

CL Jackson Paul Durai, Dr. P Arthur Daniel and Dr. S Sethu

Abstract

The purpose of the study was to find out the effect of concurrent aerobic and circuit resistance training on selected health related physical fitness components of untrained men. For this purpose, (N=30) untrained men were selected from Tirunelveli District, Tamil Nadu, India. The participants' age ranged between 18 to 22 years. The selected participants were divided into two groups of n=15 participants Treatment group and waiting group (WG). Group I underwent concurrent aerobic and circuit resistance training for 6 weeks and 3 days (alternate) per week. Group II didn't participate any vigorous activity during the research duration. The selected physical fitness components are endurance and flexibility. The selected outcome variables were assessed by using the standardized test. The collected data on the selected outcome variables were treated with Univariate Analysis of Covariance at 0.05 level of significant. The results of the study indicate that there was significant difference between treatment and waiting groups on improvement of the selected physical fitness components.

Keywords: Concurrent aerobic and circuit resistance training, untrained men

Introduction

Concurrent endurance and strength training (CT) has been used to enhance athletic performance in a variety of sports, but its use as a health-promoting strategy for the general population should not be overlooked. By combining endurance and strength exercise modes, CT stresses both the cardiovascular and the neuromuscular systems. Besides traditional adaptation in endurance parameters (e.g. maximal aerobic capacity, lactate threshold, exercise economy) and skeletal muscle function (maximal strength, muscle power, muscular endurance, etc.), CT can also influence body composition, as well as traditional and non-traditional cardiometabolic risk factors. This chapter will discuss the effects of CT on health-related outcomes, with an emphasis on body composition and cardiometabolic biomarkers (Moritz Schumann & Bent R. Rønnestad, 2019) [2]. Training status has been shown to affect the response to a single exercise session and plays an important role in determining subsequent adaptations to training (Wang *et al.*, 2011) [7].

Many team sports require players to perform high-intensity efforts repeatedly and intermittently in competition. Specific training strategies such as concurrent strength and aerobic training are proposed to improve players' ability to repeat high-intensity efforts [1]. Development of the aerobic system aids in improving recovery between efforts by replenishing phosphocreatine and improving muscle buffer capacity, factors which are critical to performance in team sports [2, 3]. The aerobic energy system is also suggested to aid in post-match recovery following match-play. This quality has implications for team sport schedules where multiple matches are performed over a week (e.g. basket-ball, handball, volleyball, rugby, futsal, water polo) or a day and over consecutive days with only few hours separating matches (rugby sevens) Ross A, Gill N & Cronin J., 2014; Tomlin DL & Wenger HA, 2001; Bishop D, Girard O, Mendez-Villanueva A, 2011) [4, 6, 1].

The aim of the current study was to examine the influence of the intrasession sequencing of concurrent aerobic and circuit resistance training (i.e., aerobic training before resistance training in the same session) on endurance and flexibility development in males.

Correspondence

CL Jackson Paul Durai

Ph.D., Scholar, Department of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India

Based on previous findings, we hypothesized that endurance and flexibility would increase in all training group that performed treatment protocol.

Purpose of the study

The purpose of the study was to find out the effect of concurrent aerobic and circuit resistance training on selected health related physical fitness components of untrained men

Methodology

For this purpose, 30 untrained men were selected from S.T. Hindu College, Nagercoil, Kanyakumari District, Tamil Nadu, India. The participants' age ranged between 18 to 22 years. The selected participants were divided into two groups

of n=15 participants Treatment group and waiting group (WG). Group I underwent concurrent aerobic and circuit resistance training for 6 weeks and 3 days (alternate) per week. Group II didn't participate any vigorous activity during the research duration. The selected physical fitness components are endurance and flexibility. The selected outcome variables were assessed by using the standardized tests such as endurance with 12 min cooper run & walk test and flexibility with sit and reach test. The collected data on the selected outcome variables were treated with Univariate Analysis of Covariance at 0.05 level of significant.

Analysis of Data

Table 1: Analysis of covariance for pre and post data on endurance

Test	Treatment Group	Control Group	Source of variance	Sum of squares	df	Mean square	F
Pre-test mean	1702.78	1705.26	Between	15.68	1	15.68	0.001
			Within	38645.42	28	1380.18	
Post-test Mean	1813.46	1708.68	Between	120050.64	1	120050.64	11.06*
			Within	303914.67	28	10854.10	
Adjusted mean	1810.16	1707.79	Between	121423.12	1	121423.12	15.44*
			Within	212223.51	27	7860.13	

*Significant at 0.05 level of confidence. (The table value required for significance at 0.05 level of confidence with df 1 and 28 and 1 and 27 were 4.19 and 4.21 respectively).

The obtained F value (Table 1) on pre test scores $0.001 < 4.19$ with df $F_{(1,28)}$, Pre test scores $11.06 > 4.19$ with df $F_{(1,28)}$, and

Adjusted mean scores $15.44 > 4.21$ with df $F_{(1,27)}$.

Table 2: Analysis of covariance for pre and post data on flexibility

Test	Treatment Group	Control Group	Source of variance	Sum of Squares	Df	Mean square	F
Pre-test mean	15.40	15.55	Between	5.23	1	5.23	0.66
			Within	223.11	28	7.97	
Post-test Mean	19.97	15.57	Between	67.56	1	67.56	7.26*
			Within	266.75	28	9.53	
Adjusted mean	19.80	15.55	Between	120.25	1	120.25	63.27*
			Within	51.31	27	1.90	

*Significant at 0.05 level of confidence. (The table value required for significance at 0.05 level of confidence with df 1 and 28 and 1 and 27 were 4.19 and 4.21 respectively).

The obtained F value (Table 1) on pre test scores $0.066 < 4.19$ with df $F_{(1,28)}$, Pre test scores $07.26 > 4.19$ with df $F_{(1,28)}$, and Adjusted mean scores $63.27 > 4.21$ with df $F_{(1,27)}$.

Discussion on findings

The results from Table 1 the obtained F value of pre test scores shows here was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups. The obtained adjusted post test scores shows that treatment group found significance difference between experimental and control group on endurance.

The results from Table 2 the obtained F value of pre test scores shows here was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups. The obtained adjusted post test scores shows that treatment group found significance difference between experimental and control group on flexibility

The present findings of the study is confirmed by the studies conducted already related this area such as Parasuraman, & Mahadevan, (2018) [3]; Takeshima, N., Rogers, M. E., Islam, M. M., Yamauchi, T., Watanabe, E., & Okada, A. (2004) [5].

Conclusions

From the statistical analysis the following conclusions were drawn;

1. Treatment group found significant improvement on endurance due to 6 weeks of concurrent aerobic and circuit resistance training among untrained men.
2. Treatment group found significant improvement on flexibility due to 6 weeks of aerobic resistance training among untrained men.
3. Control Group did not find significant improvement on endurance and flexibility among the untrained men.
4. Significant difference on improvement exists between treatment and control groups on physical fitness components such as endurance and flexibility among the untrained men.

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