



A Comparative Effect of In-Session Concurrent Training on Aerobic Capacity and Anaerobic Power of University and Collegiate Football Players

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Received 20th March 2018, Accepted 10th April 2018

Abstract

The Purpose of the study is to determine the effects of in-session concurrent training on aerobic capacity and anaerobic power of University and collegiate football players. Fifteen university and 15 collegiate Football players were observed during a lengthy in-session period to monitor the possible interfering effects of concurrent and energy system conditioning on maximum aerobic and power levels. All the subjects performed concurrent training aimed at increasing aerobic capacity and anaerobic power, as well as on before and during the in-session period. The experimental group significantly improved queen collage step test in aerobic capacity and markariaya kalamen step test in anaerobic power for university and college-age foot players introduction world –style foot ball both require a high degree of aerobic capacity and anaerobic power of successful competition. Although strength and power may be relatively easily developed during off-and presession training periods, there was some disagreement and power can be maintained during the long in-session playing periods, especially when amount of energy system aerobic and anaerobic conditioning or lengthy team practices are performed. It has been demonstrated that an acute decrease in aerobic capacity and anaerobic power torque occurred when concurrent aerobic and resistance training was preceded by game of 30 minutes of mixed concurrent aerobic and resistance conditioning. University players has more better then the collegiate players.

Keywords: Concurrent Training, Aerobic Capacity, Football Players.

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Introduction

Success in sports depends heavily upon the player's aerobic capacity and anaerobic power. Concurrent training is commonly conducted using lighter resistances that are performed properly. To achieve the greater benefits from concurrent training it should be performed at the beginning of an exercise session or on a separate training day. The best results are attained when a combination of heavy and light loads are implemented within the workout.

By performing heavy loads before light concurrent aerobic and resistance exercises there is greater activation and preparation for maximal effort in the lighter load. The heavy resistance work gets the nervous system into full action so that more Type II fibers are available for the resistance exercise. The use of heavy resistance exercises and lighter resistance exercises within a in session has repeatedly been referred to as "concurrent training". The terms "university players" and "collegiate players" have been used interchangeably to define the use of heavy and light resistance loads within same workout. For the purpose

of this investigation "concurrent training" defines various sets of aerobic and resistance exercise performed in a manner in which several sets of a heavy resistance exercises are followed by sets of a lighter resistance exercise. The term "university players" refers to a workout that involves the use of exercises of contrasting loads that is, alternating heavy and light exercises set for set. Performing lighter resistance before the heavy resistances will be termed the university players.

Verkhoshansky and Tatyana examined if there was any significant difference in power development when manipulating the order in which exercises are conducted within a single training session. Although intense exercise results in potentiating of power performance and this was because of increased neuromuscular activity, the effect of several sets of a heavy loaded exercise on power performance, as in a typical weight training session, has not been examined. The purpose of this investigation was to comparative effects of in-session concurrent training on aerobic and anaerobic variables of university and collegiate foot ball players

Methodology

Thirty university and collegiate male football players volunteered to take part in this study. The subjects were randomly divided in to two equal groups namely university group and collegiate group. The

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subjects were selected from Kannur district collegiate players and Kannur University players. The subjects ranged (N = 15: age 17-25 years. None of the subjects had training experience using concurrent training programme before this study. The subjects received all the necessary information about the study's procedure in oral and written form.

Experimental Design

Thirty foot ball players were randomly divided into the university players Group I (UNI), Collegiate group II (COLG) underwent a concurrent training programme, i.e., aerobic followed by resistance training. The experimental lasted for 8 weeks during which 24 training sessions were conducted 3 times per 8 week.

Testing Procedures

Subjects were assessed before and after a 6 week training programme for aerobic capacity and anaerobic power. The assessment was done in the

following variables aerobic capacity and anaerobic power. The aerobic capacity was measured in through queen college step test and anaerobic power was measured through markaria kalomen step test. Tests followed a general warm – up that consisted of running and stretching. All the tests were performed with trials and all the correspondent mean values were considered for statistical analysis.

Training Protocol

After the initial measurements, university group and collegiate age group were practice concurrent aerobic and resistance training. All the two groups trained for 8 weeks, 3 days per week concurrent training and 3 days per week regular skill practice. Before the initiation of the training periods, the subjects of all groups were instructed about the proper execution of all the exercises to be used during the training period for all training regimens.

Table 1

Concurrent Aerobic and Resistance Training

S.No	Exercise	1-2 week	3-4 Week	5-6 weeks	7-8 weeks
1.	Jogging Half Squat	40 % MHR¥45 €3*6(50)†30¥45	50 % MHR¥50 €3*8(60)†40¥50	60 % MHR¥55 €3*8(70)†50¥55	70 % MHR¥60 €3*6(80)†60¥60
2.	Steps Bench Press	40 % MHR¥45 €3*6(50)†30¥45	50 % MHR¥50 €3*8(60)†40¥50	60 % MHR¥55 €3*8(70)†50¥55	70 % MHR¥60 €3*6(80)†60¥60
3.	Rowing Barbell Lunge	40 % MHR¥45 €3*6(50)†30¥45	50 % MHR¥50 €3*8(60)†40¥50	60 % MHR¥55 €3*8(70)†50¥55	70 % MHR¥60 €3*6(80)†60¥60
4.	Cycling Lat Pull Down	40 % MHR¥45 €3*6(50)†30¥45	50 % MHR¥50 €3*8(60)†40¥50	60 % MHR¥55 €3*8(70)†50¥55	70 % MHR¥60 €3*6(80)†60¥60
5.	Stair Climbing Peck Tec	40 % MHR¥45 €3*6(50)†30¥45	50 % MHR¥50 €3*8(60)†40¥50	60 % MHR¥55 €3*8(70)†50¥55	70 % MHR¥60 €3*6(80)†60¥60

Note:

MHR= Maximum Heart Rate, ¥ duration of training

€ = set, * = repetition, () intensity †= rest between sets ¥ =duration of training

Statistical Analysis

Statistical analysis followed the most important descriptive statistics, such as mean and SD. A repeated measure 't' test was used to determine the presence or absence of gains in each group. Analysis of variance and co-variance was applied.

Results

The results between the pre - and post - test for explosive aerobic and anaerobic power performance scores in all the two groups and the results between groups at baseline and after the training programme are presented in Table 2.

Table 2

The pre and post test mean difference on concurrent training of university players and collegiate foot ball players

Groups	Variables	Pre test Mean \pm SD	Post test Mean \pm SD	M.D	Std. Error Mean	t
University	Aerobic capacity	40.45 \pm 1.41	43.18 \pm 1.83	2.73	0.32	8.44*
	Anaerobic power	948 \pm 30.93	1016.27 \pm 31.52	86.27	6.66	10.26*
Collegiate	Aerobic capacity	38.43 \pm 1.34	40.39 \pm 1.19	1.963	0.09	21.22*
	Anaerobic power	900.6 \pm 29.51	951.13 \pm 28.41	50.533	2.06	24.52*

* Significant at 0.05 level (2.10)

Table – 2 indicates the pre and post test mean values and mean difference of university and collegiate players. The obtained t- ratios university players were 8.44 (Aerobic capacity), 10.26 (Anaerobic power) players and collegiate players 21.22(aerobic capacity), 24.52 (Anaerobic power), The obtained 't' ratio on aerobic capacity and anaerobic power were greater than the critical value of 2.10 for degrees of freedom 1,14. It

was observed that the mean gains and losses made from pre-test and post-test were statistically significant resulting that eight weeks practice of concurrent training produced significant improvement of collegiate players of aerobic capacity (2.73 $P < 0.05$), anaerobic power (86.27 $P < 0.05$) and collegiate aged players of aerobic capacity (21.22 $P < 0.05$), anaerobic power (24.52 $P < 0.05$) from the performance of baseline.

Table 3

Anova of variance on pre test mean on concurrent training of aerobic capacity and anaerobic capacity of university and collegiate players

Variables	source of variance	Sum of Squares	df	Mean Square	F
Aerobic capacity	Between Groups	30.664	1	30.664	16.303
	Within Groups	52.664	28	1.881	
Anaerobic power	Between Groups	16850.700	1	16850.700	18.442
	Within Groups	25583.600	28	913.700	

* Significant at 0.05 level (4.19)

Table 3 reveals the obtained 'F' values on pre-test means among the two groups. The obtained 'F' ratios were: 16.30 (Aerobic capacity), 18.44 (Anaerobic power), 40.02. Since the observed F- values on post-test means among the groups namely Professional players (Group - I), college- aged players (Group - II), on aerobic

capacity and anaerobic power was highly significant and the values were higher than the required critical value 4.19. Thus the results obtained proved that the interventions namely concurrent training produced significantly different improvements among themselves.

Table 4

Anova of variance on post test mean on concurrent training of aerobic capacity and anaerobic capacity of professional and college - aged players

Variables	source of variance	Sum of Squares	df	Mean Square	F
Aerobic capacity	Between Groups	58.492	1	58.492	24.433
	Within Groups	67.033	28	2.394	
Anaerobic power	Between Groups	31817.633	1	31817.633	35.338
	Within Groups	25210.667	28	900.381	

* Significant at 0.05 level (4.19)

Table 4 reveals the obtained 'F' values on post-test means among the two groups. The obtained 'F' ratios were: 24.43 (Aerobic capacity), 35.34 (Anaerobic power), 40.02. Since the observed F- values on post-test means among the groups namely university players (Group - I), collegiate players (Group - II), on aerobic capacity and anaerobic power was highly significant and the values were higher than the required critical value 4.19. Thus the results obtained proved that the interventions namely concurrent training produced significantly different improvements among themselves.

Discussion of comparison

The university players significantly improved the aerobic capacity from pre-test to post-test. The aerobic capacity increased in the concurrent aerobic and resistance training from pre-test (40.45 ± 1.41) to post-test (43.18 ± 1.83); college- aged players from pre-test (38.43 ± 1.34) to post- test (40.39 ± 1.19). The aerobic capacity significantly improved performance of pre-test to post-test in two groups. The present study demonstrated that an increase in aerobic capacity of 6.74 %, and 5.10 % estimated with queen college step test for concurrent training group respectively. The university players group improved the aerobic capacity by 6.74 % better than the collegiate players group by 5.10 % the result of the present study is in line with previous study [Akilan et.al (2010)] finding found that the Effect of sports specific circuit training on aerobic capacity of high school male basketball players during competitive season. The studies of known [Wong PL, 2010] pre-season concurrent muscular strength and high-intensity interval training studies improved concurrent resistance circuit and endurance training improved the aerobic capacity. [Gallagher D(2010)] finding showed effects of concurrent endurance and resistance training improved the muscular strength endurance. [Shaw BS (2009)] concurrent aerobic and resistance training on maximal aerobic capacity.

The university players significantly improved the anaerobic power from pre-test to post-test. The anaerobic power increased in the concurrent aerobic and

resistance training from pre-test (948 ± 30.93) to post-test (1016.27 ± 31.52); collegiate aged players from pre-test (900.60 ± 29.51) to post- test (951.13 ± 28.41). The anaerobic power significantly improved performance of pre-test to post-test in two groups. The present study demonstrated that an increase in anaerobic power of 9.10 %, and 5.61 % estimated with markaria kalomen step test for concurrent training group respectively. The university players group improved the anaerobic power by 9.10 % better than the collegiate players group by 5.61 % the result of the present study is in line with previous study [Umesh Muktama et.al (2010)] finding found that the Effects of two modes of resistance training improved the speed leg explosive power and anaerobic power of college men students

Conclusion

This present study compares between two groups namely university and collegiate players. The main findings from these study university players produced better then the collegiate players.

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