

INVESTIGATION ON THE CHANGES OF INSPIRATORY RESERVE VOLUME DUE TO DIFFERENT INTENSITIES OF CIRCUIT TRAINING AMONG MALE FOOTBALL PLAYERS

¹Dr. T. PARASURAMAN, ²Dr. B. SELVAMUTHU KRISHNAN, ³Dr. D. HARIGARAN, ⁴Dr. K. BALAMURUGAN

¹Assistant Professor (Senior Scale), School of Physical Education & Sports Sciences, Hindustan Institute of Technology & Science, Chennai, TN.

²Professor & Director of Physical Education, Professor & HOD, School of Physical Education & Sports Sciences, Hindustan Institute of Technology & Science, Chennai, TN.

³Assistant Professor, School of Physical Education & Sports Sciences, Hindustan Institute of Technology & Science, Chennai, TN.

⁴Assistant Professor, Cheran college of Physical Education, Karur, Tamil Nadu.

Abstract

The purpose of the study is to investigate the changes of inspiratory reserve volume due to different intensities of circuit training among male football players. To achieve the purpose of the study, Sixty male football players from Hindustan Institute of Technology & Science, Chennai, Tamilnadu, India were selected as subjects. Their age ranged from 18 years to 23 years. The selected subjects were randomly assigned into four equal groups of 15 subjects each. Group-I underwent low intensity circuit training, Group-II underwent medium intensity circuit training, Group-III underwent high intensity circuit training and group-IV acted as control. The selected dependent variable inspiratory reserve volume was assessed by expirograph before as well as after training. The assessed data of the four group's was analyzed through paired 't' test. Additionally, magnitude (%) of changes was also calculated. To abolish the early mean disparity, the four group's data (pre&post) were calculated through ANCOVA statistics. When the 'F' (adjusted) score in ANCOVA was high, the post hoc (Scheffe's) test was followed. The confidence level 0.05 was set. Due to the effect of different intensities of circuit training the inspiratory reserve volume of male football players were notably progressed however, high intensity circuit training was much superior to low and medium intensity circuit training in developing inspiratory reserve volume of male football players.

Keywords: Circuit training, Football, Inspiratory reserve volume and Intensity.

INTRODUCTION

In today's competitive sports, dedication to work and training is critical to obtaining high levels of performance in contests. Players who excel have been discovered to be more sober, disciplined, realistic, and tough-minded. Nowadays, competitions are so difficult that only those who prepare for lengthy periods of time may attain high levels of performance. Football, although requiring excellent physical

fitness and fast reflexes, also requires hard effort and the ability to withstand mental stress in addition to the physical hardship of training. In competitive football, a tender-hearted individual has no place. Other attributes necessary for excellent success in football are self-discipline and confidence. Football players are more likely to engage in man-to-man fighting with the ball, necessitating physical and mental toughness.

Football players must build muscle power and endurance for brief, intermittent bursts of exercise. Footballers must be able to explode into action from standing starts hundreds of times throughout an average match, but long-distance runners and cyclists must keep a constant pace. Circuit training is an excellent technique to build the strength and fitness necessary for this sort of performance.

One of the most significant advantages of circuit training is that it requires relatively little equipment to properly execute a circuit training routine inside a football team. In many situations, all that is required is a set of dumbbells or kettlebells, some resistance bands, and a medical ball.

High-intensity aerobics are used in circuit training to increase muscular strength and endurance. It is a fantastic kind of training for footballers, since it mixes resistance work with aerobic activity for an all-round workout. A 'circuit' is defined as the completion of one exercise in a certain routine, however the effectiveness of circuit training is dependent on the athlete's ability to pick the most appropriate exercises.

Among sport conditioning coaches, there is considerable discussion regarding the efficiency of training methods that improve inspiratory reserve volume. But the best method for achieving improvement in inspiratory reserve volume is disputed. Different intensities of circuit training are well-established training method and vital necessary for football players.

Methodology

To achieve the purpose of the study, Sixty male football players from Hindustan Institute of Technology & Science, Chennai, Tamilnadu, India were selected as subjects. Their age ranged from 18 years to 23 years. The selected subjects were randomly assigned into four equal groups of 15 subjects each. Group-I underwent low intensity circuit training, Group-II underwent medium intensity circuit training, Group-III underwent high

intensity circuit training and group-IV acted as control. The selected dependent variable inspiratory reserve volume was assessed by expirograph before as well as after training. The assessed data of the four group's was analyzed through paired 't' test. Additionally, magnitude (%) of changes was also calculated. To abolish the early mean disparity, the four group's data (pre&post) were calculated through ANCOVA statistics. When the 'F' (adjusted) score in ANCOVA was high, the post hoc (Scheffe's) test was followed. The confidence level 0.05 was set.

Training Programme

The experimental Group-I performed low intensity circuit training, Group-II performed medium intensity circuit training and Group-III performed high intensity circuit training. Intensity was fixed by their heart rate. The training groups participated in a 12-week training program performing a variety of exercises designed. After the initial measurements the specially designed training programme was given to the subjects of the experimental groups. The training sessions were conducted three days a week i.e. (Monday, Wednesday, and Friday) over a period of twelve weeks. Each experimental session was of 30-45 minutes duration excluding warm-up and warm-down. After one week of general physical conditioning the training was administrated to the experimental group, which includes variety of exercises. The training sessions were supervised by experienced coaches. The experimental group undertook three training sessions in a week. Sessions were progressively structured to gradually increase intensity over each of the 12 weeks. The training intensity was increased progressively from first week to proceeding week. The frequency of training was thrice in a week. The duration of warm-up and warm-down were fixed at ten minutes respectively.

Statistical Technique

The data collected from the experimental and control groups on agility was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post test. Further, percentage of changes was calculated to find out the changes in selected dependent variables due to the impact of experimental treatment.

The data collected from the four groups prior to and post experimentation were

Table – I: *Paired 't' Test Results and % of Changes on Inspiratory reserve volume of Chosen Four Group's*

Group	Test	N	Mean	SD	DM	't' - ratio	%
Low intensity Circuit Training	Pre	15	2.54	1.32	0.14	11.58*	5.51
	Post	15	2.68	1.34			
Medium intensity Circuit Training	Pre	15	2.56	1.33	0.20	14.24*	7.81
	Post	15	2.76	1.32			
High intensity Circuit Training	Pre	15	2.59	1.26	0.29	17.25*	11.19
	Post	15	2.88	1.34			
Control	Pre	15	2.55	1.32	0.01	0.65	0.39
	Post	15	2.54	1.31			

Table value for df 14 is 2.15(*significant)

The pre and post values of both training groups differ considerably since the 't' values of low intensity circuit training (11.58), medium intensity circuit training (14.24) as well as high intensity circuit training (17.25) groups were greater than the table value (df14=2.15). After 12 weeks of treatment, low

statistically analyzed by Analysis of Covariance (ANCOVA). Since four groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test. In all the cases the level of confidence was fixed at 0.05 level for significance.

The football player's inspiratory reserve volume was analyzed statistically and presented in table- I.

intensity circuit training (5.51%), medium intensity circuit training (7.81%) and high intensity circuit training (11.19), group's inspiratory reserve volume enhanced considerably.

By using ANCOVA statistics, the agility performance of all 4 groups were analyzed and exhibited in table-II.

Table – II: *ANCOVA Statistics Output on Inspiratory reserve volume*

Performance of Chosen Four Group's

	Low	Medium	High	Control	SoV	SS	df	MS	'F' ratio
Adjusted Mean	2.61	2.72	2.84	2.55	B	22.07	3	7.36	22.14*
					W	5.31	55	0.197	

(Table value for df 3 and 55 is 2.77)*Significant (.05 level)

The ANCOVA result proved that the adjusted final means low intensity circuit training (2.61), medium intensity circuit training (2.72), high intensity circuit training (2.84) and control group (2.55) on inspiratory reserve volume of all 4 chosen groups significantly differs, as the derived 'F' value

(22.14) is better than the required value (df 3 and 55 is 2.77).

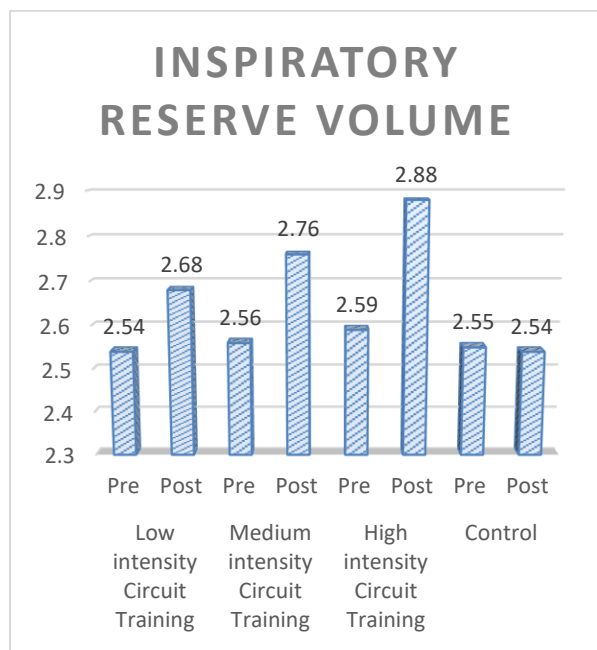
As the adjusted final means is significant, the follow up test was applied as put on view in table-III.

Table – III: *Scheffe's Test Outcome on Inspiratory reserve volume of Four Groups*

Variable	Low	Medium	High	Control	MD	CI
Inspiratory reserve volume	2.62	2.71			0.11*	0.042
	2.62		2.84		0.22*	
	2.62			2.55	0.07*	
		2.71	2.84		0.13*	
		2.71		2.55	0.16*	
			2.84	2.55	0.29*	

*Significant (.05)

It proved that due to low intensity circuit training, medium intensity circuit training and high intensity circuit training the inspiratory reserve volume was greatly enhanced. Though, high intensity training was much better than other training groups. Chosen four group's inspiratory reserve volume scores are illustrated in figure-I.

Figure – I: *Chart Showing inspiratory reserve volume of Chosen Groups*

Discussion

Twelve weeks of low, medium and high intensities of circuit training had positive impact on inspiratory reserve volume of the football players. Both, low, medium and high intensities of circuit training group have improved their inspiratory reserve volume when compared with the control group. Singh et.,al. (2018) found that there was a high improvement in inspiratory reserve volume

after the circuit training and yogic practices programme. Shyamkarthick et.,al. (2014) and Havesepian et.,al. (2013) has recommended from his research work that there was a high improvement in inspiratory reserve volume after the yogic practices and aerobic exercises programme. In addition, the results of the tests shows that there was a significant difference between experimental groups..

Conclusion

Due to the effect of low intensity circuit training (5.51%), medium intensity circuit training (7.81%) and high intensity circuit training (11.19), group's inspiratory reserve volume of male football players were remarkably enhanced. However, high intensity training was much better than other training groups. This study outcome makes obvious that low, medium and high intensities of circuit training can be a useful training tool for the enhancement different qualities of football players.

Reference

- [1] Hovsepian, V., Marandi, S. M., Kelishadi, R., & Zahed, A. (2013). A comparison between yoga and aerobic training effects on pulmonary function tests and physical fitness parameters. *Pakistan Journal of Medical Sciences*. 29:1, 2013.p 317-320.
- [2] Karuppasamy, Govindasamy, Effect of Plyometric Training and Circuit Training on Selected Physical and Physiological Variables Among Male Volleyball Players (2018). *International Journal of Yoga, Physiotherapy and Physical Education*, Volume 3; Issue 4; July 2018; Page No. 26-32.
- [3] Shyam Karthik, P., Chandrasekhar, M., Ambareesha, K., & Nikhil, C. (2014).

- Effect of pranayama and suryanamaskar on pulmonary functions in medical students. *Journal of Clinical and Diagnostic Research*. 8:12, 2014,p 4-6.
- [4] Singh, S., & Gehlot, S. (2019). Effect of circuit training and yogasanas on cardiovascular endurance, inspiratory capacity and forced vital capacity among sports person with special reference to prakriti. *Journal of Natural Remedies*, 19(3).
<https://doi.org/10.18311/jnr/2019/23559>