International Journal of Law, Education, Social and Sports Studies (IJLESS)
A Peer Reviewed (Refereed) International Research Journal
Homepage:www.ijless.kypublications.com
Vol. 2. Supplementary issue 3.2015 (October)

Category: Science of Sports

ISSN : 2394 - 9724

EFFECT OF CIRCUIT TRAINING, INTERVAL TRAINING AND STAIRCASE TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AMONG UNIVERSITY LEVEL MEN ATHLETES

B.V. NARASINHA RAJU[1], Prof. Y.KISHORE[2]

[1]Research Scholar University College of Physical Education & Sports Sciencess Acharya Nagarjuna UniversityNagarjunanagar -Guntur (Dt)Andhra Pradesh-India & Lecturer in Physical Education, D.N.R College Bhimavaram, West Godavari, Andhra Prsesh, India

[2]Dean, Faculty of Physical Education, Yoga & Sports Sciences&Director of Physical EducationAcharya Nagarjuna UniversityNagarjunanagar -Guntur (Dt)Andhra Pradesh-India

INTRODUCTION

Sport plays a very prominent role in the modern society. It is important to individuals, a group, a nation and indeed the world. Throughout the world, sport has a popular appeal among people of all ages and both sexes. Much of the attraction of sport comes from the wide variety of experience and feeling that result from participation such as success, failure, exhaustion pain, relief and feeling of belonging. Sport can bring money, glory, status and goodwill. However, sport can also bring tragedy, grief and even death (Coakley, Jay J., 1998) As the amount of leisure time has increased in modern society time spent on sports has grown, while very few participate at the elite or Olympic level. There are many more who participate at the local or community level, for others involvement in sport is a passive one as spectators, coaches, umpires, teachers or sports writers.

Man by nature, is highly competitive and in pursuit of performance he has always been striving to jump higher and farther, to run faster and to demonstrate greater strength and skill. Physical fitness plays emphasis on more and more activity.

ATHLETICS

Athletics is the mother of all sports and so it has assumed great importance in recent years. Athletics is a collective name for physical exercise and game requiring skill and activity. Athletic events are classified into two namely track and field events. The track events includes short distance run (sprint) long distance run, middle distance run, relays, hurdling, walking and steeple chase. The field events include jumping events (such as long jump, triple jump, pole vault and high jump) and throwing events (such as discus throw, hammer throw and putting the shot).

IMPORTANCE OF ATHLETICS

The physical educationist, coaches and sports scientist of today is becoming more aware of the scientific information related to the athlete's potential proficiency in sports. Research in Physiology, Nutrition, Psychology, Biochemistry and Physics has contributed much to the performance level to athletes in various competitive sports of today. In recent years, the sports scientist have taken interest in the analysis of human movement in various sports activities making use of the laws of physics (Davis, B., 2000).

Training:-Training has been explained as programme of exercise designed to improve the skills and increase the capacities as resting heart rate (Hardayal Singh, 1991).

Circuit Training:-It is the type of training, in which a certain number of exercises is done one after the other in the form of a circuit. This circuit is repeated three or more times. Circuit training can be used for the improvement of technical and tactical element or for the improvement of conditional activities (Hardayal Singh, 1991).

International Journal of Law, Education, Social and Sports Studies (IJLESS)
A Peer Reviewed (Refereed) International Research Journal
Homepage:www.ijless.kypublications.com
Vol. 2. Supplementary issue 3.2015 (October)

Interval Training:-Fox and Mathews (1974) defined interval training as a system of conditioning or training consisting of a series of repeated bouts of exercise alternated with periods of relief, light or mild exercise usually constitutes the relief period.

Stair Case Training:-"A set of stairs and it's surrounding structure" (Soanes, 2000).The training provided to a person through specifying exercises such as going up and down, bounding, alternate steps, up down, down up, hopping etcetera.

PHYSICAL FITNESS:-The goal of physical fitness programme is to improve the performance in activities of daily living, job demands, sports and recreational activities which was said by (Frank W. Dick 1992).

Fox and Mathews (1985) quoted that, "Fitness is composed of many complex factors where complete evaluation cannot be done by testing a single factor. Many variables such as those included in measuring cardio-respiratory balance, flexibility and nutrition reflex each in special way, some aspect of total physical fitness.

Speed:-The capacity of moving a limb or part of the body's lower system or the whole body with the greatest possible velocity (Soanes, 2000).The maximal rate at which an individual is able to move the entire body over a specific distance is considered to be his speed movement

OBJECTIVES OF THE STUDY:-

(a) to assess the selected physical Fitness variables of university level athletes.

(b) to find out the effect of varied training methods, such as, circuit training, interval training and stair case training on selected physical Fitness variables.

(c) The effect of circuit training, interval training and staircase training on sportsmen on each of the physical fitness, Fitness variables was compared with these effects with control group to determine whether these training produce significant changes in the selected variables.

(d) If so, which of the training method is better than the other one? Thus, the current research focuses on the effects of varied training packages, such as, circuit training, interval training and staircase training on selected physical, Fitness variables.

STATEMENT OF THE PROBLEM :-This experimental study was to find out the "Effects circuit training, interval training and staircase training on selected physical, Fitness variables among university level men athletes."

METHODOLOGY:-Selection of the subjects, selection of variables, experimental design, pilot study, criterion measures, reliability of data, reliability of instruments, tester's reliability, subject reliability, training programme, training schedule, test administration, collection of data and the statistical techniques used have been explained.

SELECTION OF SUBJECTS:-The purpose of the study was to find out the effects of circuit training, interval training and staircase training on selected physical fitness, variables among university level men athletes. To achieve the purpose of this study, sixty university level men athletes from different colleges in Andhra Pradesh were selected. The selected subjects' age group was ranging from nineteen to twenty four years. The subjects were randomly divided into four groups and each group consists of fifteen subjects. Group one acted as experimental group one and Group two acted as experimental group two and group three acted as experimental group-III and group-four as control group. Group-four underwent routine activities and care was taken that they should not involve in special exercise programmes. Experimental group-I underwent circuit training and experimental group-II underwent interval training and experimental group-III underwent staircase training for twelve weeks.

The requirements of the experimental procedures, testing as well as exercise schedules were explained to them so as to avoid any ambiguity of the effort required on their part and prior to the administration of the study, the investigator got the individual consent from each subject.

International Journal of Law, Education, Social and Sports Studies (IJLESS)
A Peer Reviewed (Refereed) International Research Journal
Homepage:www.ijless.kypublications.com
Vol. 2. Supplementary issue 3.2015 (October)

SELECTION OF VARIABLES:-The research scholar reviewed the various scientific literature pertaining to the circuit training, interval training and stair case training on selected physical fitness, variables from books, journals, periodicals, magazines and research papers. Taking into consideration of feasibility criteria, availability of instruments and the relevance of the variables of the present study, the following variables were selected.

Dependent Variables-Physical Fitness Variables:- Speed

Independent Variables

1. Twelve weeks circuit training
2. Twelve weeks interval training
3. Twelve weeks stair case training.

EXPERIMENTAL DESIGN:-The study was formulated as a true random group design, consisting of a pre-test and post-test. The subjects (n=60) were randomly assigned to four equal groups of fifteen athletes in each group. The groups were assigned as Experimental Groups I, II, III and control group respectively. Experimental group-I was assigned as Circuit Training Group (CTG), experimental group-II was assigned as Interval Training Group (ITG), experimental group-III was assigned as Stair Case Training Group (STG) and the control group was strictly under control not involving any special training. Pre-tests were conducted for all the subjects on selected physical fitness, variables. The experimental groups participated in their respective circuit training, interval training and staircase training for a period of twelve weeks. After the experimental period, the post-tests were conducted on the above said dependent variables for all the four groups. The difference between the initial and final scores on each variable was considered the effect of respective treatments. The effects of varied package of training on selected variables were tested through ANCOVA. In all cases 0.05 level was fixed to test the hypothesis.

SPEED:-Purpose :- The purpose of the test was to measure the speed of the subject.

Facilities and Equipment:-An area on a track, foot ball field or playground with a starting line a 50 mts. run, and a finish line. Two stop watches or a split second timer.

Procedures:-After a short warm-up period the subject took a position behind the starting line. Best results are obtained when 2 subjects run at a time for competition. The starter uses the command, " ready" and "Go". The later was accompanied by a downward sweep of the arm as a signal to the timer to start the stop watch. The subject ran across the finish line. One trial was permitted.

Scoring:-The score was the clasped time to the nearest tenth of a second from the starting signal to the instant the subject a crossed the finish line.

Testing Personal:-One starter and 2 timer's services were used to administer this test. The timer recorded the scores.

RESULTS AND DISCUSSIONS:-COMPUTATION OF ANALYSIS OF COVARIANCE AND POST- HOC TEST.

Results on Speed:- The descriptive statistics comparing the initial and final means of physiological variable Speed due to varied packages of training, namely, circuit training, interval training, staircase training and control groups of university men athletes is presented in **Table 1.**

Descriptive Statistics on Varied Packages of Training, namely, Circuit training, Interval training, Staircase training and Control Groups on Speed

Groups	Test	Mean	Standard Deviation	RANGE	
				Min	Max
Circuit training	Initial	7.22	0.33	6.80	7.70
	Final	7.03	0.18	6.70	7.30

International Journal of Law, Education, Social and Sports Studies (IJLESS)
A Peer Reviewed (Refereed) International Research Journal
Homepage:www.ijless.kypublications.com
Vol. 2. Supplementary issue 3.2015 (October)

	Adjusted Mean	7.08			
Interval training	Initial	7.26	0.31	6.80	7.90
	Final	7.10	0.27	6.70	7.70
	Adjusted Mean	7.11			
Stair case training	Initial	7.34	0.43	6.70	8.10
	Final	7.17	0.37	6.70	7.90
	Adjusted Mean	7.13			
Control Group	Initial	7.32	0.33	6.70	7.70
	Final	7.35	0.31	6.70	7.80
	Adjusted Mean	7.32			

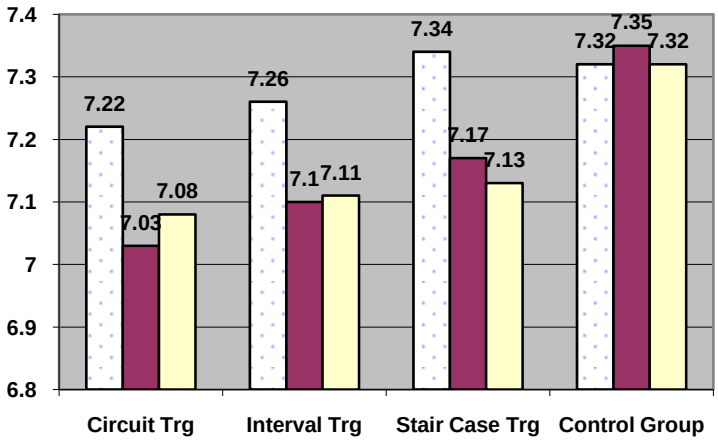
Table 1 shows that the pre-test mean on Speed of circuit training group was 7.22 with standard deviation ±0.33 pre-test mean of interval training group was 7.26 with standard deviation ±0.31. The pre-test mean of staircase training group was 7.34 with standard deviation ±0.43, the pre-test mean of control group was 7.32 with standard deviation ±0.33.

The descriptive statistics on post-test mean on Speed of circuit training group was 7.03 with standard deviation ±0.18 post-test mean of interval training group was 7.10 with standard deviation ±0.27. The post-test mean of staircase training group was 7.17 with standard deviation ±0.27, the post-test mean of control group was 7.35 with standard deviation ±0.31.

The adjusted mean on Speed on circuit training group was 7.08, interval-training group was 7.11, staircase-training group was 7.13 and control group was 7.32, as shown in Table 1.

The obtained mean values on the experimental and control groups were presented in **Figure-I.**

BAR DIAGRAM SHOWING PRE, POST AND ADJUSTED MEANS ON SPEED DUE TO VARIED PACKAGES OF TRAINING



The results on descriptive statistics proved that physiological variable Speed was improved. And to test statistical significance of the differences, the obtained data on Speed using ANCOVA was presented in **Table-II.**

International Journal of Law, Education, Social and Sports Studies (IJLESS)
A Peer Reviewed (Refereed) International Research Journal
Homepage:www.ijless.kypublications.com
Vol. 2. Supplementary issue 3.2015 (October)

COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO CIRCUIT TRAINING, INTERVAL TRAINING AND STAIR CASE TRAINING
AND CONTROL GROUP ON SPEED

	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre-test Mean	Between	0.17	3	0.06	0.47
	Within	9.30	76	0.12	
Post-test Mean	Between	1.16	3	0.39	4.55*
	Within	6.44	76	0.08	
Adjusted Post-test Mean	Between	0.71	3	0.24	22.76*
	Within	0.79	75	0.01	

Required $F_{(0.05),\,(df\ 3,75)}$ =2.77

* Significant at 0.05 level of confidence

As shown in Table II, the obtained F-ratio of 0.47 on pre-test means of the groups was not significant at 0.05 level as the obtained F-value was less than the required table F-value of 2.77 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table II, the obtained F-ratio of 4.55 on post-test means of the groups was significant at 0.05 level as the obtained F-value was greater than the required table F-value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups at initial stage.

Taking into consideration of the pre-test means and post-test means, adjusted post-test means were determined and analysis of covariance was done. The obtained F-value on adjusted means was 22.76. The obtained F-value was greater than the required value of 2.77 and, hence it was accepted that there were significant differences among the adjusted means on the Speed of the subjects.

Since significant improvements were recorded, the results were subjected to post-hoc analysis using Scheffe's Confidence Interval test. The results were presented in **Table III.**

Multiple Comparisons between Circuit Training, Interval Training, Stair case training and Control Groups and Scheffe's Post-Hoc Analysis on Speed

Circuit training Group	Interval training Group	Stair case training Group	Control Group	Mean Diff.	C.I
7.08	7.11			0.04	0.09
7.08		7.13		0.05	0.09
7.08			7.32	0.24*	0.09
	7.11	7.13		0.02	0.09
	7.11		7.32	0.21*	0.09
		7.13	7.32	0.19*	0.09

***** Significant at 0.05 level.

The post-hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 0.09. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Circuit training *Vs* Control Groups (MD: 0.24)

Interval training *Vs* Control Groups (MD: 0.21)

Staircase training *Vs* Control Groups (MD: 0.19)

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Circuit training *Vs* Interval training Groups (MD: -0.04)

Circuit training *Vs* Staircase training Groups (MD: -0.05)

Interval training *Vs* Staircase training Group (MD: -0.02)

DISCUSSIONS ON FINDINGS:-Findings on Physical Fitness Variables

The effects of varied packages of training, namely, circuit training, interval training and stair case training results presented in Tables II, On physical fitness variable speed, proved that the obtained F-values on adjusted means 22.76, Was significant at 0.05 level.

The formulated **hypothesis** that varied packages of training would improve physical fitness variables, speed, was accepted at 0.05 level.

The post-hoc analysis results presented in Tables III proved that varied packages of training significantly improved selected physical fitness variables comparing to control group. It was also found that there were no significant differences on speed among treatment groups and the formulated hypothesis that there would be significant differences among treatment groups in altering physical fitness variables was rejected at 0.05 level. However staircase training was significantly better than circuit training and interval training in improving abdominal strength of the subjects and the formulated hypothesis was accepted to this extent..

The findings of this study that varied packages of training, namely, circuit training, interval training and staircase training on selected physical fitness variables, speed, Was in agreement with the findings of previous researches cited.

CONCLUSIONS;-It was concluded that varied packages of training, namely, circuit training, interval training and stair case training significantly improved physical fitness variable, such as, speed among university athletes compared to control group. It was also found that there was no significant difference among treatment groups in altering speed.

BIBLIOGRAPHY--BOOKS

Coakley, Jay J. (1998), **Sport in Society: Issues and Controversies**, 6 Edn, Boston, McGrowHill

Davis, B. et al. (2000) ***Physical Education and the Study of Sport***. UK: Harcourt Publishers Ltd.

Frank W. Dick, (1992), **Sports Training Principles**, Cambridge, University Press.

Hardyal Singh, (1991) **Science of Sports Training**, DVS Publication, New Delhi

Edward L. Fox and Donald K. Mathews (1974), **Interval Training** (London: W.B.Saounders Company), p. 36.