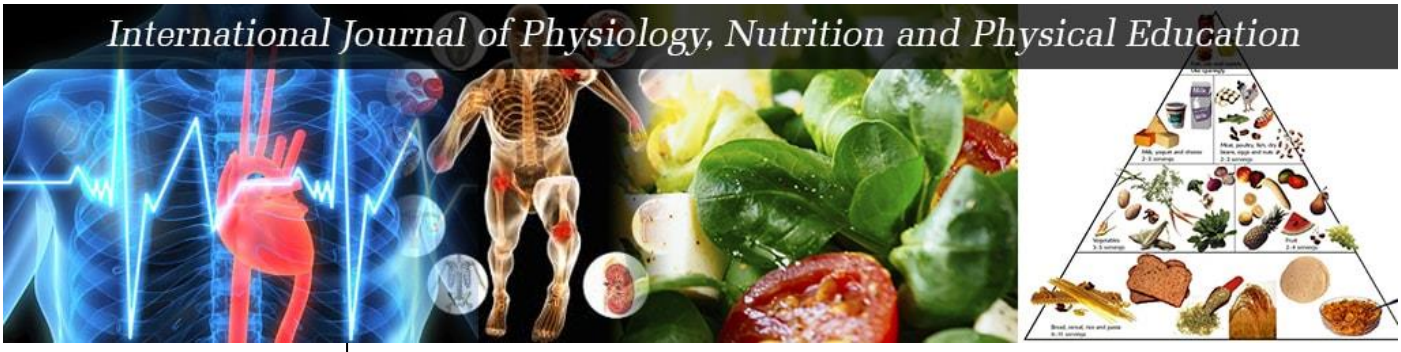

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Investigation of the impact of parcourse training and interval training on leg strength, cardio-respiratory endurance and vital capacity: A comprehensive study

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Abstract
The aim of the present study was to investigate the impact of parcourse training and interval training on leg strength, cardio-respiratory endurance and vital capacity. For this purpose, forty five male students studying bachelor degree in the Department of Physical Education and Sports Sciences, Chaudhary Charan Singh University (C.C.S.), Meerut, Uttar Pradesh with age group of 18 to 22 years, were selected as subjects. They were divided into three equal groups, each group consisted of fifteen subjects, in which Group – I underwent parcourse training, Group – II underwent interval training and Group – III acted as control which did not participate any special training, except their regular curricular activities. The training period for this study was three days in a week for twelve weeks. Prior to and after the training period, the subjects were tested for leg strength, cardio-respiratory endurance and vital capacity. The selected criterion variables, such as, leg strength, cardiorespiratory endurance and vital capacity, were tested by using and administering, dynamometer, Cooper's 12 minutes run/walk test and wetspiromter. The Analysis of Covariance (ANCOVA) was applied as statistical tool. Whenever the post-test means found significant, the Scheffé S was applied as post-hoc test. In all cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate. It was concluded from the results of the study that the training groups have improved leg strength, cardio-respiratory endurance and vital capacity.

Keywords: Parcourse trai, leg strength, cardio-respiratory endurance, vital capacity

Introduction
Physical training may be started for a variety of reasons. It may be initiated by the individual or promoted by healthcare professionals in the course of comprehensive medical care.
Whatever the reason for discussing physical training, it is helpful to ask the individual some basic questions before embarking on a more detailed assessment and setting realistic targets.
Physical training is one of the most important ingredients in training to achieve high performance. The objectives of physical training are to increase the athlete's physiological potential and to develop biomotor abilities to the highest standards. A new concept of circuit training developed in Europe has been adopted recently in the United States and Canada called 'parcourse'. It consists of a series of stations set up over a one to two and a half mile path, to provide a recreational exercise circuit for individuals of all ages and abilities. Interval training is a type of physical training that involves bursts of high-intensity work interspersed with periods of low-intensity work. The high-intensity periods are typically at or close to near-maximum exertion, while the recovery periods may involve either complete rest or activity of lower intensity. Interval training can refer to organization of any cardiovascular workout (e.g. cycling, running, rowing, etc.), and is prominent in many sports' training. It is a technique particularly employed by runners, but athletes from several backgrounds have been known to use this type of training. The endurance required resisting fatigue due to loading at sub maximum and maximum intensity (approximately 85 –100% maximum intensity) and predominantly aerobic production of energy. It is essential in sports demanding this types of endurance that speed is not reduced due to fatigue or innovation inhibition.
Vital capacity is the maximum amount of air a person can expel from the lungs after a maximum inspiration. It is equal to the inspiratory reserve volume plus the tidal volume plus the expiratory reserve volume.

A person's vital capacity can be measured by a spirometer which can be a wet or regular spirometer. In combination with other physiological measurements, the vital capacity can help make a diagnosis of underlying lung disease. The unit that is used to determine this vital capacity is the millilitre (ml). A normal adult has a vital capacity between 3 and 5 liters.

Methods

The purpose of the present study was to find out the effect of par course training and interval training on leg strength, cardio-respiratory endurance and vital capacity. For this purpose, forty five male students studying bachelor degree in the Department of Physical Education and Sports Sciences, Chaudhary Charan Singh (C.C.S.) University, Meerut, Uttar Pradesh with age group of 18 to 22 years, were selected as subjects. They were divided into three equal groups, each group consisted of fifteen subjects, in which Group – I underwent par course training, Group – II underwent interval training and Group – III acted as control group. The training period for this study was three days in a week for twelve weeks. For every training programme there would be a change in various structure and systems in human body. So, the researcher consulted with the experts, then selected the following variables as criterion variables: 1. leg strength, 2. cardiorespiratory endurance and 3. Vital capacity. The selected criterion variables such as, leg strength, cardio-respiratory endurance and vital capacity, were tested by using and administering, dynamometer, Cooper's 12 minutes run/walk test and wetspirometer.

Analysis of the data

Analysis of covariance was used to determine the differences, if any, among the adjusted post test means on selected criterion variables separately. Whenever the 'F' ratio for adjusted posttest mean was found to be significant, the Scheffé S test was applied as post-hoc test. The level of significance was fixed at .05 level of confidence to test the 'F' ratio obtained by analysis of covariance Table 1: Analysis of Covariance and 'F' ratio for Leg strength, Cardio-respiratory Endurance and Vital Capacity of Par course Training and Interval Training Groups and Control Group.

Table 1: Analysis of covariance and 'f' ratio for leg strength, cardio-respiratory endurance and vital capacity of par course training and interval training groups and control group

Variable Name	Group Name	Parcourse	Interval Training	Control	'F' Ratio
		Training Group	Group	Group	
Leg Strength (in Kgs)	Pre-test Mean ± S.D	69.53±4.565	67.93±1.932	69.13±5.222	0.388
	Post-test Mean ±	72.60±5.962	69.20±5.647	68.07±5.092	2.683
	S.D.				
	Adj. Post-test Mean ± S.D.	71.903	70.176	67.788	35.274*
Cardio-respiratory endurance (in Mts.)	Pre-test Mean ±	2856 ± 63.56	2844 ± 37.95	2838.3 ± 45.3	0.304
	S.D				
	Post-test Mean ± S.D.	2892.7 ± 63.5	2893.3 ± 52.5	2838.7 ± 50.3	4.755*
	Adj. Post-test Mean ± S.D.	2885.725	2896.523	2842.42	9.11*
Vital Capacity (liters)	Pre-test Mean±	4.5573 ± 0.054	4.5453 ± 0.04	4.574±0.039	1.619
	S.D.				
	Post-test Mean ± S.D	4.5747 ± 0.058	4.5653 ± 0.04	4.5693 ± 0.05	0.136
	Adj. Post-test Mean ± S.D.	4.576	4.580	4.553	12.115*

*Significant at .05 level of confidence. (The table value required for significance at .05 level with df 2 and 42 and 2 and 41 are 2.21 and 3.22 respectively).

Table 2: Scheffe S test for the difference between the adjusted post-test mean of leg strength, cardiorespiratory endurance and vital capacity adjusted post-test mean on leg strength

Parcourse Training Group	Interval Training Control Group		Mean Difference	Confidence Interval at .05 Level
	Group			
71.903	67.788		4.115*	1.24839
71.903	70.176		1.727*	1.24839
	70.176 67.788		2.388*	1.24839
Adjusted Post-test Mean on Cardio-respiratory Endurance				
2885.725		2842.42	43.305*	34.013543
2885.725	2896.523		10.798	34.013543
	2896.523	2842.42	54.103*	34.013543
Adjusted Post-test Mean on Vital Capacity				
4.576		4.553	0.023*	0.014471
4.576 4.580			0.004	0.014471
4.580		4.553	0.027*	0.014471

*Significant at .05 level of Confidence

Results

Table 1 showed that there was a significant difference among parcouse training group, interval training group and control group on leg strength, cardio-respiratory endurance and vital capacity. Table 2 shows that the Scheffe S test on leg strength for the difference between adjusted post-test mean of between parcourse training group and control group (4.115), parcourse training group and interval training group (1.727) and interval training group and control group (2.388), which were significant at .05 level of confidence. Moreover, the parcourse training group was significantly increased the leg strength than the interval training group. Interval training group were

better improvement than the control group. Table 2 shows that the Scheffe S test on cardio-respiratory endurance for the difference between adjusted post-test mean difference of parcourse training group and control group (43.305), and interval training group and control group (54.103), which were significant at .05 level of confidence. Table 2 shows that the Scheffe S test on vital capacity for the difference between adjusted post-test mean difference of parcourse training group and control group (0.023), and interval training group and control group (0.27), which were significant at .05 level of confidence. The result of the study also shown that there was a significant difference between the training groups on leg strength and there was no significant difference occurred between the training groups on cardio-respiratory endurance and vital capacity after the training programme.

Conclusions

It was concluded from the results of the study, the leg strength, cardio-respiratory endurance and vital capacity has improved significantly after the respective training programmes. When compared with the control group, the training groups has significantly improved in selected criterion variables, such as, leg strength, cardio-respiratory endurance and vital capacity. There was a significant difference was found between the training groups on leg strength after the completion of twelve week training programme, in which parcourse training group have improved the leg strength than the interval training group.

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