International Journal of Physical Education, Sports and Health 2019; 6(2): 75-77

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2019; 6(2): 75-77
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www.kheljournal.com
Received: 25-01-2019
Accepted: 28-02-2019

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Effect of circuit par course and interval training on speed explosive power and vital capacity among school baseball players

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Abstract
Forty female students studying in St. Mary's M.M Girls High School Adoor, Pathanamthitta, Kerala, India were selected randomly as subjects. The age of the subjects ranged from 10 to 14 years. They were randomly divided into four groups. Group I underwent circuit training, group II underwent par course training, group III underwent interval training practices and group IV acted as control group. Each group consist of 10 subjects each. The training schedule was for a period of 24 weeks. The criterion variables selected for the study were speed, explosive power and vital capacity. The data collected for the pre, mid and post-test were analysed by using one way repeated measure (ANOVA) and analysis of co variance (ANCOVA). The result of the study reveals that all the criterion variables had significant improvement in all the three experimental groups when compared to control group.

Keywords: speed explosive, baseball players, civilization

Introduction
Today, sports have become a part and parcel of our civilization. It is being influenced and does influence all our social institutions including education, economics, arts, politics, law, mass communication and even international negotiation. They attract a lot either for recreation or physical fitness or as a full time profession. The world is so advanced that science dominates every aspect of life, sports is not an exception to it. Technology has forever changed our world, and in the process significantly increased the importance measuring and controlling performance relevant to physical, physiological and anthropometrical parameters.

Sport activity is as elderly as the human society and it has achieved a universal acceptance in the modern times. It now enjoys popularity, which outstrips any other form of social activities. It has become an integral part of the educational process at all levels. Millions of fans follow different sport events all over the world with great enthusiasm and devotion. Many participate in activities for the fun of it, for health, speed and fitness. It is facing the shape of a profession to some with high skills with ample financial benefits linked with a high degree of popularity. Hence where there is a sound body there we can ensure a sound mind. Research has shown that the physically fit person is able to withstand fatigue for longer periods than the unfit; that the physically fit person is better equipped to endure physical stress, that the physically fit person has a stronger and more efficient heart; and that there is a relationship between good mental alertness, absence of nervous tension, and physical fitness.

Circuit training consists of certain exercises or activities that are performed in sequence or in a circuit. There are usually six to ten stations in a circuit. Circuit preparation is an amalgamation of high intensity aerobics and resistance preparation designed to be easy to follow and intention fat loss, muscle building and heart fitness. An exercise "circuit" is one finishing point of all prescribed exercise in the program. When one circuit is absolute, one begins the first exercises again for another circuit. Conventionally, the time between exercises in circuit training is short, often with rapid movements to the next exercise.

Par course is a training technique that combines continuous training with exercise done at stations along the course. Par course as a new concept of circuit training developed in Europe has been accepted and adopted recently in the United States and Canada. It is an activity with

the aim of moving from one place to another as efficiently and quickly as possible, using principally the abilities of the human body. It helps one to overcome obstacles, which can be anything in the surrounding environments.

Interval training consisting of shorts bouts of all-out activity separated by rest periods of between 20 seconds and five minutes. It was the combination of low and high intensity of training method. Intermittent training was a low volume strategy for producing gains in aerobic power and endurance normally associated with longer training bouts.

Methodology

To achieve the purpose, forty female students studying in St. Mary's M M Girl's High School, Adoor, Kerala were selected randomly as subjects. The age of the subjects ranged from 10 to 14 years. They were randomly divided into four groups.

Group I underwent circuit training such as: - forward jump/tuck jump, push up, high knee running, back arch/bridge, zig-zag running, cross jump (huddle), medicine ball exercise and vertical jump

Group II underwent Par course training such as - biceps curl standing, biceps curl sitting, triceps curl, pull down, abduction, adduction, diagonal adduction, pull over (double hand) and alternative pull over.

Group III underwent Interval training practices such as: - skipping, jumping jacks, ladder drills, high knee running run up, spot running, squat etc… the over the various parts of the body and group IV acted a control group. Each group consist of (n=10) subjects each. The experimental groups subjected to the circuit training in the morning and circuit training and Interval training practices in the evening for alternative days for a period of 24 weeks except on Sunday. The data were collected two days before the training schedule (pre- test); during the middle of the training schedule 12 weeks (mid-test) and two days after the training schedule (post- test). The criterion variables selected for the study are speed and explosive power and were assessed by the following standardized test items such as: 50 yard run and standing broad jump test respectively.

Analysis of the data and results of the study

The data pertaining to the criterion variables selected for the study were examined by using one way repeated measure (ANOVA) for finding the significance difference within the group(pre, mid and posttest); in order to find significance difference between the groups (circuit training, par course training, interval training practices and control groups) are presented in the following tables.

Speed

Table 1.1: One way repeated measure ANOVA on speed of experimental and control groups

Group	Source of Variance	Sum of Squares	d.f	Mean Squares	F-ratio
Circuit training	Test (Between)	0.46	2	0.23	6.47*
	Error	2.79	78	0.04	
Par course training	Test (Between)	2.41	2	1.21	103.41*
	Error	0.91	78	0.01	
Interval training	Test (Between)	2.07	2	1.03	269.48*
	Error	0.30	78	0.00	
Control group	Test (Between)	0.00	2	0.00	1.86
	Error	0.02	78	0.00	

*Significant at 0.05 level of confidence.

Table 1.1 reveals the analyzed data on speed within the group. The obtained F- ratio values are 6.47, 103.41 and 269.48 of circuit training, par course training and interval training group respectively. The table value required for significance at 0.05 level of confidence with 2 and 18 were 3.55. Based on F-ratio value interval training group training proves to be the most significant and circuit training was the least significant among the three experimental groups.

Table 1.2: Analysis of Covariance of Experimental and Control Groups on Speed

Adjusted Posttest Mean				Source of variance	Sum of squares	Df	Mean squares	F – ratio
Circuit training	Par course training	Interval training	Control group					
7.98	7.78	7.81	8.14	Between	3.22	3	1.07	27.64*
				Error	6.02	155	0.04	

*Significant at 0.05 level of confidence.

Table 1.2 reveals that all the three experimental groups had shown significant improvement in speed among the groups. The obtained ANCOVA (F- ratio) value 27.64 shows that the entire experimental groups are significant amongst them and is higher than the table value 2.92 of 3 and 35.

Explosive Power

Table 2.1: One Way Repeated Measure ANOVA on Explosive Power of Experimental and Control Groups

Group	Source of Variance	Sum of Squares	d.f	Mean Squares	F-ratio
Circuit training	Test (Between)	911.52	2	455.76	46.18*
	Error	769.82	78	9.87	
Par course training	Test (Between)	3274.12	2	1637.06	109.34*
	Error	1167.88	78	14.97	
Interval training	Test (Between)	7321.65	2	3660.83	259.19*
	Error	1101.68	78	14.12	
Control group	Test (Between)	11.45	2	5.73	1.31
	Error	340.55	78	4.37	

*Significant at 0.05 level of confidence.

Table 2.1 reveals the analyzed data on explosive power within the group. The obtained F- ratio values are 46.18, 109.34 & 259.19 of circuit training, par course training and interval training group respectively. The table value required for significance at 0.05 level of confidence with2 and 18 were 3.55. Based on F-rato value Interval training group training proves to be the most significant and Par course training were the least significant among the three experimental groups.

Table 2.2: Analysis of Covariance of Experimental and Control Groups on Explosive Power

Adjusted Posttest Mean				Source of variance	Sum of squares	d.f	Mean squares	F – ratio
Circuit training	Par course training	Interval training	Control group					
146.20	152.02	158.17	138.66	Between	8298.89	3	2766.30	117.67*
				Error	3644.00	155	23.51	

*Significant at 0.05 level of confidence.

Table 2.2 reveals that all the three experimental groups had shown significant improvement in explosive power among the groups. The obtained ANCOVA (F- ratio) values 117.67 shows that the entire experimental group are significant among themselves and is higher than the table value 2.92 of 3 and 35.

Conclusions

The following were the main findings of the study.

1. The interval training had achieved better significant improvement than circuit training and par course training in the dependent variables such as speed, and explosive power.
2. Circuit training had achieved better significant improvement than par course training in the dependent variables such as explosive power.
3. Par course training had achieved better significant improvement than circuit training in the dependent variable such as speed.

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