



## The interference effect of interval training and circuit training on explosive strength, speed and endurance Anomg Kendriya Vidyalaya schools boys

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### Abstract

Forty boys of age group ranging from 15 to 17 years were randomly selected from the Kendriya Vidyalaya schools Puducherry, Puducherry as subjects. The selected subjects underwent seasonal training in athletics under the auspicious of Puducherry district sports association. The subjects were randomly divided into four groups of 10 subjects. Group I acted as control, group II underwent circuit training, group III interval training and group IV underwent interval and circuit training simultaneously. The interval training group, circuit training group and circuit and interval training group underwent training three days per week for six weeks, the control group was kept sedentary. The subjects of all the four groups were tested on explosive strength, speed and endurance before and after the training programme. Analysis of covariance was used significant improvement was found on explosive strength in all the three experimental groups and significant improvement in endurance was noted in interval and circuit training groups.

**Keywords:** interference effect, circuit training, explosive strength

### Introduction

For years the virtues and values of aerobic exercise have been extolled and celebrated while the benefits of resistance training have been minimized to that building muscles and improving sports performance. More recently, the traditional of resistance training has undergone revitalization due to scientific evidence suggesting betterment. Numerous controlled training studies have tested for the effects of intensity, duration and frequency of aerobic exercise on maximal oxygen uptake (VO<sub>2</sub>max). A minimum of 20 minutes of aerobic exercise at 50% or more of the individual's VO<sub>2</sub>max, on three or more days per week, will produce a 10% to 20% increase in VO<sub>2</sub>max in most sedentary persons (ACSM 1995). The literature thoroughly supports the evidence that exercise intensity is directly related to the change 1986. Higher doses of aerobic exercise produce greater increases in VO<sub>2</sub>max, although these improvements are not proportionately greater.

Traditional resistance training that employs sets followed by 1 to 2 minutes of rest has not shown an increase in VO<sub>2</sub>max. Studies have shown little to mild improvement in aerobic capacity (5% to 9.5%) from participation in circuit weight training (Kass & castriotta, 1994; Peterson et al., 1988) [2]. High-intensity interval training (HIIT) is a time-efficient way to induce adaptations, such as increased maximal mitochondrial enzyme activity (Burgomaster et al., 2005) and a reduction in glycogen utilization and lactate accumulation (Harmer et al., 2000; Burgomaster et al.,

2006) [1]. In addition, HIIT may be more effective than conventional endurance training at improving muscle buffering capacity (Weston et al., 1997; Edge et al., 2006). High-intensity interval training has been shown to be effective method for improving endurance performance (Weston et al., 1997).

### Methodology

Forty students were selected randomly from Kendriya Vidyalaya schools Puducherry, Puducherry and were divided into four groups of ten subjects each. Group I acted as control, group II underwent circuit training, group III underwent interval training, and group IV underwent interval; and circuit training simultaneously. The interval training group, circuit training group and interval training group underwent training three days per week, for six weeks. The control group was kept sedentary. The subjects of all the four groups were tested on explosive strength, speed and endurance before and after the training programme. Explosive strength was tested by conducting vertical jump: 50m run was used to assess speed. The procedure recommended by Greg M Kline et.al, was used to estimate VO<sub>2</sub> max. The intensity of the training load gradually increased from 50 to 80%. Analysis of covariance (ANCOVA) was used for the analysis and interpretation of the collected data.

### Analysis of data and results of the study

**Table 1:** ANCOVA on speed between pre test and post test of the control group, circuit group, interval group and interval and circuit group. (Seconds)

Test	Control groups	Circuit training group	Interval training group	Circuit and interval training group	SOV	SS	df	Mean square	'f'
Pre-test means	7.23	7.27	7.33	7.24	B W	0.05	3	0.0198	0.1013
SD	0.28	0.39	0.59	0.43		7.03	36	0.1955	
Post-test means	7.27	6.69	7.19	6.81	BW	2.42	3	0.8087	5.83*

SD	0.35	0.30	0.47	0.32		4.99	36	0.1385	
Adjusted post-test means	7.29	6.68	7.14	6.82	BW	2.35 1.38	3 36	0.786 0.0429	18.32

\*Significant at 0.05 level of confidence.

The table value for significance at 0.05 level with df 3 and 36 and 3 and 35 is 2.88.

**Table 2:** Scheffé’s post hoc test for the differences between the adjusted post-tests paired means on speed performance. (Seconds)

Adjusted Post test Mean				Mean difference	Confidence interval 0.05 level
Control group	Circuit group	Interval group	Circuit interval group		
7.28	6.67			0.6065*	0.2712
7.28		7.13		0.1464	0.2712
7.28			6.83	0.4682*	0.2712
	6.67	7.13		0.4601*	0.2712
	6.67		6.83	0.0183	0.2712
		7.13	6.83	0.3218*	0.2712

\*Significant at 0.05 level of confidence.

Table II shows that the adjusted post test means difference in speed between the control and the circuit training group is 0.6065 which is statistically significant and higher than the confidence interval of 0.2712 at 0.05 level. Since the

adjusted post-test mean difference between the control and interval training group is 0.1464 which is lesser than the value of 0.2712 at 0.05 level of confidence it statistically insignificant.

**Table 3:** Scheffé’s post hoc test for the differences between the adjusted post test paired means on endurance (vo<sub>2</sub> max) (seconds)

Adjusted Post test Mean				Mean difference	Confidence interval 0.05 level
Control group	Circuit group	Interval group	Circuit interval group		
4.8416	4.8188			0.0227	0.1334
4.8416		5.0697		0.2280*	0.1334
4.8416			5.000	0.1582	0.1334
	4.8188	5.0697		0.2538*	0.1334
	4.8188		5.000	0.2538*	0.1334
		5.0697	5.000	0.0697	0.1334

\*Significant at 0.05 level of confidence.

**Conclusions**

The following conclusions were drawn from the analysis of the data

1. Performance in speed significant improved in both the circuit training group and the circuit and interval training group. No significant difference in speed was found in the interval training group.
2. No significant difference was found in vertical jump performance in the entire group compared to the control group.
3. As far as endurance is concerned VO<sub>2</sub> max improved significantly in interval training group and the circuit interval training group. No significant improvement was noted in circuit training group.

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